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USE OF RIDESHARING PLATFORMS IN A DEVELOPING COUNTRY: A BOUNDARY OBJECT THEORY PERSPECTIVE

ROBERT OHENE-BONSU SIMMONS

DEPARTMENT OF OPERATIONS AND MANAGEMENT INFORMATION SYSTEMS

NOVEMBER 2022

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BY

ROBERT OHENE-BONSU SIMMONS

(ID. NO. 10599521)

THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF DOCTOR OF PHILOSOPHY IN INFORMATION SYSTEMS DEGREE

DEPARTMENT OF OPERATIONS AND
MANAGEMENT INFORMATION SYSTEMS

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DECLARATION

I do hereby declare that this work is the result of my own research done under supervision and has not been presented by anyone for any academic award in this or any other university

………………………………………… …04/11/2022………

ROBERT OHENE-BONSU SIMMONS DATE

(ID. NO. 10599521)

………………………………………… …04/11/2022…………

Prof. John Effah DATE

(Principal Supervisor)

..RICHARD BOATENG

………………………………………… …04/11/2022…………

Professor Richard Boateng DATE

(Co-Supervisor)

INTEGRI PROCEDAMUS

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ABSTRACT

The purpose of this study is to understand the use of ridesharing platforms in a developing country. Ridesharing platforms have attracted many studies. A review of the studies suggests knowledge gaps which warrant research attention. First, the literature on ridesharing platform overlooks explaining the goals of actors on the platforms. Second, previous research also tends to be silent on explaining how the platforms enable or constrain the realisation of actors' goals. This research gap can be addressed through a theoretical lens which exclusively accommodates both the social and technical aspects of ridesharing platforms. However, theoretical applications predominantly focus more on other phenomena such as agency theory for shared use of resources and platform theory for entry of ridesharing platform with less research attention on actors' actions, interactions, and transactions across boundary objects (platforms). Thus, there is a need to use boundary object theory to understand actors' activities across boundaries. Finally, extant research is silent on how contextual factors such as business climate and government regulations potentially influence ridesharing platforms use. Such knowledge is critical to a developing country context, as ridesharing platforms has received mixed reactions. To address the research gaps, this study, therefore, uses three questions, *(1) Why do actors (drivers and riders) use ridesharing platforms? (2) How do ridesharing platforms enable or constrain the realisation of actors' goals? (3) What contextual factors influence actors' use of ridesharing platforms and the achievement of their goals?* Responding to the research questions, this study employed the interpretivist research paradigm, the qualitative methodology, the case study method, and the boundary object theory to understand the use of ridesharing platforms in Ghana, a developing country in sub-Saharan Africa. Thus, the study seeks to explore the phenomenon for developing countries using Uber and Dropping ridesharing platform companies as case studies from Ghana. The cases were selected via theoretical sampling. The participants were also selected through snowballing and purposive

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sampling. The findings show that drivers use ridesharing platforms because of the following goals: linkage, flexibility, traffic update, unrestrictedness, and security. Riders also use ridesharing platforms because of the following goals: mobility, legitimacy, accountability, security, and convenience. The findings also show that drivers and riders have personal goals for using ridesharing platforms. Some drivers pursue personal goals to maximise revenue illegally such as accepting riders outside the platform. Some riders also pursue personal goals such as endangering drivers. Comparably the personal goals of riders tend to be more undesirable since drivers are endangered and violent crime is sometimes committed. Addressing these are critical especially in the context of developing countries where public transportation still remains a challenge and thus, ridesharing platforms are necessary for both employment and public mobility. This may require a combined effort of law enforcement agencies (e.g., the Ghana Police) and other authorities (e.g., driver unions). In terms of process, the findings show that ridesharing platforms enable drivers and riders to perform: 1) user-boundary actions – platform entry, platform utilisation, user identification, user set-up, and user rating; 2) user-boundary interactions – platform connection, users' update, pick-up interactions, and end trip interactions; and 3) user-boundary transactions – booking transaction, trip transaction, and service transaction. The platforms, on the other hand, constrain drivers and riders from achieving their goals, namely, registration, information and reversal, location, and complaint constraints. The findings also show contextual factors that prevent drivers and riders from using ridesharing platforms in developing countries. The factors are internet outages, poor digital address system, lack of public phone charging systems and services, working condition, and car model. The study's findings also show that innovations are coming up from drivers and riders due to the contextual factors. The innovations include drivers' and riders' interactions outside the boundary objects via text message and/or phone call for location identification, use of power bank to charge mobile phone battery rundown, and multiple users across different

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ridesharing platforms. Also, cars used by drivers have become part of the boundary object with tracking system and camera that can be stopped remotely when snatched by thieves.

The thesis contributes to knowledge in terms of theory, research, practice, and policy. For theory, the study advances knowledge on the use of boundary object theory for studying a phenomenon involving a divergent group of users' actions, interactions, and transactions across boundaries. The study also adds one concept to the theory called *user-boundary transactions.* Furthermore, this study introduces ridesharing platforms as boundary objects. For research, the study contributes to ridesharing platform literature. First, ridesharing has been introduced into a context which has a tradition of how cars are accessed and used from a public perspective and traditional riding is a social and physical infrastructure phenomenon. Second, however, ridesharing is a digital-enabled service which needs physical infrastructure. But in developing countries that physical and digital infrastructures are under-developed. Hence, for these to work efficiently, adaptations are occurring on the perspective of digital, physical, and social infrastructure. For practice, the study provides new insight into the use of ridesharing platforms, such as how drivers' and riders' profiles can assist security agencies to investigate post-trip activities in case of taxi fraud. For policy, the study provides lessons and guidelines for policy formulations in developing countries to guide ridesharing platforms in the sharing economy. The findings are limited to one developing country and the choice of interpretive research paradigm. These contributions from the study have been published in one book chapter and three conference papers. Furthermore, this study is the first to use the boundary object theory to understand users' actions, interactions, and transactions across multiple organisations.

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DEDICATION

To my Family

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LIST OF ABBREVIATIONS

3G	Third Generation
4G	Fourth Generation
App	Application
CEO	Chief Executive Officer
COVID-19	Corona Virus Disease 2019
DVLA	Driver and Vehicle Licensing Authority
GPS	Global Positioning System
ICTs	Information and Communication Technologies
IS	Information Systems
IT	Information Technology
SMS	Short Message Service
Telcos	Telecommunication Companies

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CHAPTER ONE

INTRODUCTION

1.1 Research Background

In recent years, information systems (IS) have become more advanced and diversified in many sectors of developed and developing countries (Malik & Wahaj, 2019; Mcbride, 2018). The transportation sector exemplifies the advancement and diversification in IS usage (e.g., Garcia-murillo et al., 2018). This innovation in the transportation sector (transportation information system) is based on information and communication technologies (ICTs) such as Google map, global positioning system (GPS), mobile devices, and mobile applications (apps) (Watanabe et al., 2016; Wang et al., 2019). This evolution of ICTs paves the way for realising vast opportunities for digitally-enabled firms in a sharing economy (Cheng et al., 2020; Mcbride, 2018), such as ridesharing platform companies.

In the context of a sharing economy, sharing is the redistribution of unused goods and services (Sutherland & Jarrahi, 2018). Economy also is a way of managing and controlling goods and services (Vasarhelyi & Alles, 2008). Sharing economy thrives on digital technologies to redistribute unused or underutilised goods and services to others willing to pay for them (Basili & Alessandra, 2020; Li et al., 2017). The intensive use of ICTs in business organisations has created a digital platform concept in the sharing economy (e.g., Malik & Wahaj, 2019). The digital platform in the sharing economy is flexible and diversified, and it promotes trust between resources providers and users. These trends in the sharing economy, however, have the potential to compete with alternative service providers (e.g., traditional taxi drivers) by putting them at risk (Hinings et al., 2018; Manville et al., 2018).

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A digital platform is an electronic system that supports multiple users' communications to share information in real-time (Mäntymäki et al., 2019). The communications on platforms involve users, ICT artefacts, and other stakeholders who share information on a particular theme (Schultze & Brooks, 2019). Such communications are based on the advancement of ICTs in developed and developing countries (Ameen & Willis, 2019). The use of digital platforms generates ecosystems for diverse users with the same standard to share information, which supersedes rivals outside the platforms in competitions (Kapoor & Agarwal, 2017). Users communicate on digital platforms with objects (Faulkner & Runde, 2019). The objects provide an interface for users to use digital devices, which involve properties and methods that define graphic data.

Ridesharing platform is a synergy of digital technology and traditional taxi services (e.g., Lanamäki et al., 2020; Li & Hou, 2019). Ridesharing is a service. It refers to an arrangement that enables a rider to travel in a physical private car driven by a driver from a ridesharing platform company for a fee (Basili & Alessandra, 2020). A rider is a user on ridesharing platform who uses a car driven by a driver from origin to destination in a short-term and pays a fee (Stiglic et al., 2018). A ride is a means to provide a service with a car (Mäntymäki et al., 2019). A driver is a user on ridesharing platform who uses a car to provide a traveller with a ride for a fee (Liyanage et al., 2019). This ridesharing enables drivers with cars to provide service to people they have not met before or have no acquaintance with (Hildebrandt et al., 2018; Sutherland & Jarrahi, 2018). The introduction of ridesharing in the taxi business has improved the quality of services by making the traditional taxi services uncompetitive (Millara et al., 2018).

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Another aspect of the term ridesharing has been the transportation of neighbours in different cars (Malik & Wahaj, 2019). This phenomenon of ridesharing used to be a way for neighbours who agree to use their cars on different days for trip activities. This ridesharing involves one of the neighbours who uses his/her car to provide a service to another. The next trip requires another neighbour to use his/her car to provide a service for the first neighbour or vice versa. Examples include ridesharing among students and staff to reduce the use of cars (Triki et al., 2017) and arrangements in workplaces for those who live in close proximity.

The platform connects drivers and riders with ridesharing mobile apps (Boulet & Lebraty, 2018; Gupta et al., 2019a). This connection occurs via a centralised and automated matching and pricing system within the ridesharing platform company's geolocation. Ridesharing platforms emerged in developed countries (Lanamäki et al., 2020; Sutherland & Jarrahi, 2018). This trend by ridesharing platform companies is changing urban mobility in developed and developing countries. In cities, ridesharing platform companies are optimising taxi services to meet riders' needs leading to smart cities (Millara et al., 2018). Smart cities provide drivers opportunities to quickly convey riders from one place to another. More specifically, ridesharing platforms in developed and developing countries have significant impacts on the mobility of people and goods (Abrell et al., 2016; Lokuge et al., 2019). This innovation includes a rider accessing a car in real-time according to his/her location. In addition, it has reduced challenges for matching drivers' and riders' trip activities in the traditional taxi services through information sharing. Ridesharing platform infrastructure is based on ICT resources (Gupta et al., 2019a), which enables such information sharing. The resources include smartphones, personal computers, software applications, and computer networks. These resources allow different users to manage and use information relating to trip activities to meet their needs.

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The ridesharing platform companies such as Uber in the United States of America, WhipCar in England, Didi Chuxing in China, goCatch in Australia, and Ola in India have been competing with the traditional taxi services in the sharing economy (Lee et al., 2019; Tan et al., 2017). In most urban areas, the traditional taxi services have been facing some challenges (Tang et al., 2016; Willing et al., 2017). For example, riders find it difficult to take a taxi during peak hours and at night. They also feel insecure when going to destinations for the first time. However, it is plausible that the presence of ridesharing platform companies mitigates these service inefficiencies electronically (e.g., Greenwood & Wattal, 2017) by using Google map and GPS. This innovation motivates riders with smartphones to request a ride from drivers with cars via ridesharing platform. Despite the ridesharing platforms activities in the taxi sector, the traditional taxi services are still active in many cities (Lanamäki et al., 2020).

1.2 Research Problem

Ridesharing platforms have attracted many studies. A review of the studies' assumptions suggests three knowledge gaps which warrant research attention. First, extant studies on ridesharing platform show lack of research questions on why and how drivers and riders use ridesharing platforms (see Basukie et al., 2020; Gupta et al., 2019b; Mäntymäki et al., 2019). These studies focus more on various research questions such as why ridesharing platforms have gained market (Stiglic et al., 2018; Wu et al., 2020), impacts on society (Guo et al., 2019; Mäntymäki et al., 2019), and governments concern to regulate their service (Li & Hou, 2019). Others also focus on how travel times are calculated (Gurumurthy & Kockelman, 2018; Yan et al., 2020), drivers' profile is generated (Basili & Alessandra, 2020; Gupta et al., 2019b), and drivers get trip directions (Li & Hou, 2019; Wang et al., 2018). These studies, while necessary, overlook explaining the goals of the ridesharing platform actors. The studies assume that the actors join and use the platform for its sake, without pursuing any individual goals. However,

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these actors (e.g., drivers and riders) have individual goals which may either be in harmony or conflict with each other. For instance, while some riders attempt to hijack drivers and destroy their vehicles (Mchugh, 2016), or make unsolicited sexual advances (Bellon, 2020). Some drivers also trap and take riders out of their way to undisclosed locations in attempted kidnaps (Biddle, 2014). Consequently, the need to understand the actors' goals is pertinent because it could help to identify and solve potential sources of conflict, and maximise platform value for all connected actors. Unfortunately, past research has ignored explaining these goals (Mäntymäki et al., 2019).

Second, previous ridesharing research also overlooks explaining the platform's contribution in actors' pursuit and achievement of their goals. From a socio-technical perspective, the role of information technology artefact cannot be ignored when explaining its use and impact (Orlikowski & Iacono, 2001). Existing studies assume the platform's dormancy, suggesting an inactive role in platform activities. Meanwhile, actors converge on, and pursue their goals via the platform. The platform, thus exerts some influences which either enable or constrain the platform actors' operations. How the platforms enable or constrain actors' goals have been ignored by past research. Consequently, future research needs to direct attention to explaining how the ridesharing platform enables or constrains the realisation of actors' goals. This research effort may be achieved through a theoretical lens which exclusively accommodates both the social and technical aspects of ridesharing platforms. In line with this gap, theoretical applications predominantly focus more on different phenomena such as agency theory for shared use of resources and platform theory for entry of ridesharing platform with less research attention on actors' actions, interactions, and transactions across boundaries. Thus, there is a need to use boundary object theory to understand actors' actions, interactions, and transactions across ridesharing platforms.

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Third, the focus of existing ridesharing platform research assumes that platforms and actors work in relative isolation from any contextual influence. Such a view is quite deterministic and overlooks how contextual factors such as business climate and even government regulations potentially influence the operations and outcomes of ridesharing platforms. As of 2016, there was a scarcity of literature addressing this issue. Recently there have been attempts to address this gap (see Cheng et al., 2020; Thao et al., 2021). For instance, Cheng et al. (2020) investigated how the sharing economy enabled ridesharing drivers' trust in passengers in China. Similarly, Thao et al. (2021) studied Switzerland's preparations to integrate ridesharing with public transport in rural areas. However, literature from developing economies in West Africa is yet to catch up with studies addressing the contextual influences. From the foregoing examples, the importance of contextual factors cannot be overemphasised. They need to be explored, and their influences on ridesharing platforms are explained (Eze et al., 2021).

In summary, a challenge of the assumptions in extant ridesharing platform research suggests three knowledge gaps. The first gap concerns the need to explain the goals of actors on ridesharing platforms (Mäntymäki et al., 2019). The second gap concerns the need to explain how ridesharing platforms enable or constrain the realisation of actors' goals. The third gap concerns the need to explore the contextual factors that influence actors' pursuit of goals on ridesharing platforms.

This study, therefore, seeks to address the research gaps in IS and provides pertinent recommendations. In addressing the above research gaps, this study contributes to the body of knowledge by using a qualitative interpretive case study approach as a methodology (Myers, 2013; Sarker & Sahay, 2002; Walsham, 1995a) and the lens of boundary object theory (Stange et al., 2016). To the knowledge of the researcher, this study is the first to use the theory to

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understand users' actions, interactions, and transactions across ridesharing platforms. This thesis, therefore, is the first research to discuss the phenomenon understudy comprehensively. Consequently, there is a need to understand the phenomenon to inform research, practice, and policy. In order to extend the existing body of knowledge, this thesis uses a cross-case study from two ridesharing platform companies in a developing country.

1.3 Research Context

The research field is IS and paradigm is interpretivist. IS research in recent times is multidisciplinary (Fielt et al., 2014) because it covers every field that supports the impacts of information dissemination on societies and organisations. Alter (2008) describes IS as a special case of work systems such as the use of ridesharing platforms. As a result, IS exists to support ridesharing platforms' users with information sharing. A cogent set of IS philosophy depends more on managerial information processing and dissemination, such as the phenomenon understudy. More specifically, IS drives on human communications for using IT artefacts (Mcbride, 2018).

IS is socio-technical (sociotechnical) in nature (Alter, 2008; Baskerville & Myers, 2002). It involves task, people, structure, and IT artefact to disseminate information to meet users' needs. The social context implies that IS is concerned with investigating IT/ICT impact on society, such as the use of ridesharing platforms. On the other hand, IS foundation is based on IT (technical or technological) and how it is used to solve problems for ridesharing platforms' users. The sociotechnical nature of IS enables researchers to measure IT artefact as a tool and its impacts on societies and organisations (e.g., Sutherland & Jarrahi, 2018), such as the phenomenon understudy. IS research explores more than IT artefact sub-system or social sub-

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system. Thus, a subject that emerges when the two systems work together to achieve a goal such as ridesharing platforms.

The context of this thesis, therefore, is on IS research which focuses more on observing and understanding IT artefact and its social impacts in the taxi industry in Ghana. The process focuses more on why and how research approach is used to show users' activities that occur (Jewer & Compeau, 2021). This approach is unlike IT research, which produces or benefits from the artefact. More specifically, IS helps ridesharing platforms users to take the right decision at the right time relating to information sharing for trip activities. This study, therefore, adheres to the rules of IS discourse. For this thesis, users refer to drivers and riders (commuters, passengers or travellers), employees of ridesharing platform companies refer to staff or IT professionals, and car ridesharing refers to ridesharing. Staff are central persons who connect and manage drivers' and riders' groups in the form of a network to share trip information (Basili & Alessandra, 2020). The next sections continue to expand this chapter's discussion by highlighting the research context in terms of the phenomenon, theory, and settings.

1.3.1 Ridesharing Platform

The phenomenon of this study is the ridesharing platform. Ridesharing platforms' main objective is to increase car utilisation (Liyanage et al., 2019) by providing riders with convenience, reliability, affordability, safety, and on-demand service. More specifically, ridesharing platforms reduce the challenges of matching drivers and riders for trip activities.
Ridesharing platforms form part of the emerging sharing economy as a dynamic matching algorithm between drivers and riders for trip activities (Basili & Alessandra, 2020; Wu et al., 2020). The platforms rely on mobile apps as links on users' smartphones for real-time information for trip activities (Lee et al., 2019). This innovation, however, thrives on ICTs to

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provide multi-sided digital platforms for users (e.g., Wyman, 2017). In the view of multi-sided digital platforms where users can access more than one at a time, some authors maintain that ridesharing platforms provide quality trip activities better than traditional taxi services (Tan et al., 2017; Teubner & Flath, 2015). The focus of this study is on the use of ridesharing platforms.

1.3.2 Boundary Object Theory

The theoretical lens underpinning this study is boundary object theory. The theory was originated by Star and Griesemer (1989) in Sociology to explain the collaboration between a divergent group of actors (users) and constraints for information sharing. It focuses on a tangible object that goes across boundaries (Stars, 2010; Spante, 2019) to unite a divergent group of users from different social worlds. As a result, it shows how multi-users' interactions are structured across boundaries (Stange et al., 2016). Star and Griesemer (1989) used the theory to analyse the function of scientific objects' interactions across museum. IS scholars argue that using IT artefacts for interactions between heterogeneous platforms should be viewed as boundary objects (Uppström & Lönn, 2017), such as ridesharing platforms.

A boundary object connects a divergent group of users with a common interface to share information (Star & Griesemer, 1989; Star, 2010). This connection is similar to how a common language links different people worldwide. Boundary is the social world for different users (Oever, 2019). The boundary is not a matter of physical border; rather, it enables users at different locations to share information. Object is an abstraction with different meanings according to the environment, but it is recognisable (Hocine et al., 2019).

As of now, the boundary object theory is silent on actor conflicts and appropriations (what they do with the boundary object beyond the goals of the platform) and to what extent the boundary

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object enables or constrains these conflicts and appropriations. A ridesharing platform in a developing country presents a unique mix of actors and boundary objects embedded in a relative resource-poor context that offers an opportune setting for the contribution of knowledge.

This thesis, therefore, applies boundary object theory as a theoretical lens to explain the use of ridesharing platforms in a developing country. The justification for choosing the boundary object theory is how it interprets a divergent group of users' actions, interactions, and transactions across ridesharing platforms. The boundary object theory also works in line with this study's research paradigm.

1.3.3 Ridesharing Platforms in a Developing Country Context of Ghana

The empirical study focuses on Ghana, a developing country in sub-Saharan Africa. Ghana is a low-level middle-income developing country with about thirty million people (United Nations, 2018, p.265). A developing country is characterised by low levels of industrialisation and ICT, high rate of illiteracy, poor transportation networks, inadequate health facilities and services, and overdependence on primary products for export (Yoon et al., 2016). The study's focus is on the taxi sector, where ridesharing platform companies operate.

The availability of ICT infrastructure in Ghana has paved the way for many business organisations to innovate. An example of the business organisations includes ridesharing platform companies. Ghana is a knowledge economy and ranked 5th in Africa and 101st in global ICT ranking (United Nations, 2018). Knowledge economy is where work activities are controlled by ICTs. In ridesharing platforms context, the Internet is the backbone and any piece of information required to support users' decisions is available at anytime and anywhere. The

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study selected Uber and Dropping ridesharing platform companies in Ghana for two reasons. First, Ghana is an emerging digital economy from a developing country perspective. The study also seeks to explore the phenomenon in-depth for developing countries using Ghana. Second, the selected companies were within the study's context. They also agreed to provide information to the researcher.

1.4 Research Purpose and Questions

The purpose of the study is to understand the use of ridesharing platforms in a developing country. In line with the interpretive paradigm, the study, therefore, sought to answer the following research questions:

i. Why do actors use ridesharing platforms?

ii. How do ridesharing platforms enable or constrain the realisation of actors' goals?

iii. What contextual factors influence actors' use of ridesharing platforms and the achievement of their goals?

The study adopts the following approaches to answer the above research questions:

i. Literature review on ridesharing platform. It provides the following headings: sharing economy, ridesharing platform, and digital objects. The study then expands the ridesharing platform section as follows: ridesharing platform infrastructure, setup of ridesharing platform, use of ridesharing platform, ridesharing platforms in developed and developing countries, and benefits and challenges of ridesharing platform. Finally, the study reviews literature on theoretical and conceptual approaches used to study ridesharing platforms.

ii. Case description and analysis of Ghana's experience in the use of ridesharing platforms using the interpretive case study methodology (Klein & Myers, 1999; Walsham, 1995a, 2006) and boundary object theory (Stange et al., 2016). Two cases were selected for

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the use of ridesharing platforms in Ghana, namely, Uber and Dropping. Each case covered components, planning and setup, process, reasons, use, and challenges. The case analysis also used each platform as a boundary object components and features, use of platform as a boundary object, and factors constrain use of platform as boundary object. Cross-case analysis was also used to produce findings.

iii. There was also a discussion of the study's findings associated with those from the literature. The discussion covered actors' goals for using ridesharing platforms as boundary objects, process of using ridesharing platforms as boundary objects, and contextual factors that prevent actors from using ridesharing platforms.

1.5 Chapter Organisation

The thesis comprises eight chapters. **Chapter 1** is the introduction of the study. It covers the following research sections: background, problem, context, and purpose and questions.

Chapter 2 reviews the IS literature on ridesharing platform. It discusses the following: sharing economy; ridesharing platform – ridesharing platform infrastructure, setup of ridesharing platform, use of ridesharing platform, ridesharing platforms in developed and developing countries, and their benefits and challenges; and digital objects. The chapter further describes theories and conceptual approaches used in studying ridesharing platforms, gaps found in ridesharing platform literature, and a summary with a conclusion.

Chapter 3 discusses boundary object theory as the theoretical foundation for the research. The chapter describes the theory. It describes the concepts and principles of the theory. It further explains applications of the theory in IS and this thesis. This is followed by the limitations of the theory. It also introduces a cross-boundary object. The chapter concludes with a summary.

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Chapter 4 discusses the research methodology. The chapter covers research paradigms, methodology, and methods. It describes interpretive case study, fieldwork and case selection, data sources and collection, data analysis procedure, and reasons for using interpretive paradigm for the study. It also describes principles for evaluation of interpretive studies and ethical considerations that guide the research. The chapter concludes with a summary

Chapter 5 provides the case description. It presents the description for each of the two cases selected in Ghana, namely, Uber and Dropping. The chapter presents each case's background, components, planning and setup, process, reasons, use, and challenges. The chapter concludes with a summary.

Chapter 6 provides the within-case analysis and their cross-case analyses reported in Chapter 5. The analysis is in line with the concepts and principles of boundary object theory in Chapter 3. A summary of the findings concludes the chapter.

Chapter 7 presents the discussion of findings. This chapter discusses the interpretation of the findings associated with the research purpose and questions outlined in Chapter 1 and the evidence from the literature reviewed in Chapter 2. The chapter also presents the researcher's reflection on the application of the boundary object theory discussed in Chapter 3. The chapter concludes with a summary.

Chapter 8 presents the final part of the thesis. It summarises and concludes the study by presenting the contributions to knowledge in line with theory, research, practice, and policy as well as implications of the study. It evaluates the study based on principles of interpretive work and ethical considerations. The chapter also presents the limitations of this thesis and offers recommendations for further studies.

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CHAPTER TWO

RIDESHARING PLATFORM

2.1 Chapter Overview

The previous chapter provided the introduction to the thesis. It presented the research background, problem, context, and purpose and questions, which the study seeks to answer. The current chapter examines literature on ridesharing platform. The chapter begins by reviewing literature on sharing economy. The next section provides a discussion on ridesharing platforms with the following sub-sections: ridesharing platform infrastructure, setup of ridesharing platform, use of ridesharing platform, ridesharing platforms in developed and developing countries, and benefits and challenges of ridesharing platforms. This is followed by digital objects. Theories and conceptual approaches used in studying ridesharing platforms are also examined. The next section presents gaps found in the literature on ridesharing platform. The chapter concludes with a summary.

2.2 Sharing Economy

Sharing economy is the use of digital technologies to redistribute goods and services to users willing to pay for them (Basili & Alessandra, 2020). For example, users use ridesharing platforms to arrange for trip activities to meet their needs. Drivers in this context use cars to convey riders willing to pay from one place to another. Some authors refer to sharing economy as distributing of users' access to goods and services via digital platforms for a period of time (Hofmann et al., 2019). This access is given to those willing to provide the goods and services and users willing to pay. There is no accepted universal definition of sharing economy due to the variety of digital platforms (Malik & Wahaj, 2019), such as mobile money platforms (Potnis et al., 2019), banking platforms (Kemal, 2019), and social media platforms (Li et al., 2019).

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Sharing economy is sociotechnical (Sutherland & Jarrahi, 2018) fuelled by digital technologies (Cheng et al., 2018; Hamari & Ukkonen, 2016; Watanabe et al., 2016). It is also a socio-economic system for distributing and acquiring goods and services based on users' information via digital platforms (Basukie et al., 2020; Davlembayeva et al., 2020). Sharing economy in this era has created a concept of goods and services utilisation via digital platforms (Teubner & Flath, 2015). This concept reduces transaction costs for distribution of underutilised goods and services to get users willing to pay. Wallsten (2015) posits that sharing economy enables under-used goods and services to good use. The under-used goods and services enable users who are in need to get access and pay for accordingly.

Some authors maintain that digital technologies innovations have brought more jobs in the sharing economy (Cheng et al., 2018; Garcia-murillo et al., 2018; Lanamäki et al., 2020). For instance, Uber business model (ridesharing platform) connects drivers with cars and riders for trip activities (Lee & Chan, 2018). This innovation for ridesharing platforms, therefore, has created more jobs for drivers who are ICT-oriented in the sharing economy. Thus, the ridesharing platforms application in the sharing economy increases the efficacy of commercial transport services (Davlembayeva et al., 2020) by providing drivers with more riders. This innovation in the sharing economy also provides global employment (Malik & Wahaj, 2019) and flexibility of working (Davlembayeva et al., 2020). The global employment provides users with opportunities to work across boundaries. The flexibility of working provides users with opportunities to work at their convenience. However, most organisations in the sharing economy do not own the goods and services rather are intermediaries between resource providers and users (Lee & Chan, 2018). For instance, the Uber ridesharing platform in the sharing economy links drivers who are resource or service providers with riders ready to pay for their trips.

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2.3 Ridesharing Platform

Ridesharing platform connects drivers and riders to share information for trip activities (Mäntymäki et al., 2019). It matches drivers and riders together for trip activities based on their geographical information (Yan et al., 2020; Wu et al., 2020). It is a subset of the sharing economy (Mäntymäki et al., 2019; Basili & Alessandra, 2020) and plays a significant role (Sutherland & Jarrahi, 2018; Kane & Whitehead, 2017; Malik & Wahaj, 2019). Thus, the notion of IS-enhanced ridesharing platforms is the objective in the sharing economy (Liyanage et al., 2019; Lee et al., 2019; Tan et al., 2017). More specifically, Tang et al. (2020) posit that ridesharing platforms provide riders with access to cars at their convenience and pay for short periods according to the distance covered. Riders use the available cars to meet their needs under the control of an administration panel (Gupta et al., 2019b). The administration panel is the main component of ridesharing platform used to manage drivers' and riders' rights for trip activities. The cars in this context are drivers' main resources, which convey riders from one place to another for a fee. Drivers provide the service with cars while riders pay for the service.

Ridesharing is a service and some authors provide synonymous terms as car hailing (Cheng et al., 2018; Li & Hou, 2019); ride-hailing (Yan et al., 2020; Thebault-spieker & Terveen, 2017; Young & Farber, 2019); transportation network companies (Gurumurthy & Kockelman, 2018); carsharing (Hildebrandt et al., 2018; Mounce & Nelson, 2019); ridesourcing, shared mobility (Basili & Alessandra, 2020); car-pooling (Cetin & Deakin, 2019; Schreffler, 2018); real-time ridesharing (Jung et al., 2017; Ge et al., 2017); ride-sharing (Wallsten, 2015; Gecchelin & Webb, 2019); on-demand rides (Lee et al., 2019; Liyanage et al., 2019); and online car hailing (Wu et al., 2020). Ridesharing platform, therefore, has different terms and definitions in the sharing economy. For example, the different terms are car-pooling (Cetin & Deakin, 2019) and real-time ridesharing (Jung et al., 2017). The different definitions also are a matching process

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between drivers and riders for trip activities (Basili & Alessandra, 2020) and a digital system that links drivers and riders together with their available trip information (Wu et al., 2020).

Ridesharing platforms involve interactions between drivers and riders for information sharing via ICT artefacts such as mobile phones (Cheng et al., 2018) and Internet access (Basukie et al., 2020). A mobile phone is a moveable electronic device used to distribute information between users for faster and affordable activities (Potnis et al., 2019). The electronic device is used for housing users' applications (Sheikh et al., 2013), such as drivers' and riders' apps. The users' mobile phones are smartphones, which include iPhones and Android phones. The smartphones operate with advanced computing features for users' fast activities (ibid). The users depend on the availability, affordability, and adoption of mobile phones for information sharing (Ameen & Willis, 2019). Concerning the availability, the patterns of mobile phones ownership and use have increased to shape users' routine activities (Potnis et al., 2019; Porter et al., 2020). This availability of mobile phones in rural and urban areas has increased users' online activities. For example, most users in Ghana use mobile phones, especially in urban areas (Porter et al., 2020). These mobile phones contain drivers' and riders' apps with Internet access as links for accessing ridesharing platforms. The phones enable them to move easily with all their ridesharing platforms' activities. Mobile phones for drivers' and riders' apps are camera-enabled, which can be used to capture their photos and make video calls. Mobile phones are affordable, and young people can even acquire to meet their needs (ibid). The different types of mobile phones such as Android make users acquire their choice with less amount. This affordability has increased mobile phone users for their routine activities such as voice call and e-payment (e.g., Potnis et al., 2019). Thus, most users have acquired mobile phones because of the affordable cost, especially among those who are unemployed in rural and urban areas (Porter et al., 2020).

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Concerning the adoption of mobile phones, the phones have become part of users' routine activities (Potnis et al., 2019; Porter et al., 2020), such as booking a ride via ridesharing platform. Most users also have adopted mobile phones to receive and pay bills or commissions directly into their accounts (Potnis et al., 2019) instead of physical cash. Some users also have adopted mobile phones to share their profiles with others across boundaries for contacts and real-time activities (Pérez et al., 2017), such as riders' location address. More specifically, the adoption of mobile phones provides users with real-time access to ridesharing platform to share their trip information, irrespective of their geographical locations. Thus, users have adopted mobile phones for their trip information sharing due to the availability and affordability associated with smartphones.

These ridesharing platforms in the sharing economy, therefore, have changed the business operations of traditional taxi services globally (Lanamäki et al., 2020; Li & Hou, 2019; Wallsten, 2015). The changes include riders accessing cars at their convenient location and reducing transportation costs (Lokhande et al., 2018). In addition, traffic prediction associated with ridesharing platforms has improved drivers' flow of information to reduce jams (Wang et al., 2018). For example, Uber, the originator of ridesharing apps in 2010 (Simmons, 2018) has created a community in the sharing economy via its platform for users (Cheng et al., 2018). The resource sharing phenomenon is not new; it used to be among relatives in close proximity (Malik & Wahaj, 2019). Thus, this era of ridesharing based on information sharing via digital platforms addresses the perceived problem for exchange of goods and services with strangers (Cheng et al., 2018). The perceived problem includes a lack of records for post-trip activities (Tan et al., 2017). Ridesharing platforms have also reduced personal travel cars (Kane & Whitehead, 2017; Liyanage et al., 2019) and fuel consumption (Wang et al., 2018; Wu et al.,

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2020). In addition, they create smart cities for users with fast trip activities (Millara et al., 2018). Smart cities support users with some swift trip activities.

This ongoing issue of the ridesharing platform companies in the sharing economy affects the traditional taxis services in developed (Cram & Wiener, 2020; Li & Hou, 2019) and developing countries (Malik & Wahaj, 2019; Simmons et al., 2019). Furthermore, the use of ridesharing platforms has introduced less use of riders' own cars (e.g., Teubner & Flath, 2015). This strategy enables some riders to use ridesharing for short distance instead of their cars. Drivers, on the other hand, have the opportunities to use their cars economical by getting riders in close proximity via ridesharing platforms without wasting fuel. Wu et al. (2020) also maintain that ridesharing platforms promote pricing strategy for riders on two-sided platforms. This strategy enables riders to compare estimated trip cost from different ridesharing platforms before their final decision.

2.3.1 Ridesharing Platform Infrastructure

Ridesharing platform infrastructure comprises ICT resources, services, and management (Gupta et al., 2019a) for information sharing. The ICT resources include mobile phones (Chatterjee et al., 2017), drivers' and riders' apps, Internet, and GPS (Alter, 2018; Chen et al., 2021), which provide means for users to use ridesharing platforms. The services provide users with opportunities to utilise the available ICT resources to suit their needs (Potnis et al., 2019). The management also explains how the available ICT resources and services are operated and maintained by users to suit their needs. Digital infrastructure is broadly defined as ICT resources that allow different users to manage and enjoy services from the resources to meet their needs (Constantinides et al., 2018).

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Ridesharing platform infrastructure is accessible (Constantinides et al., 2018), expandable (Chen & Qiu, 2019), and modifiable with other compatible platforms (Leong et al., 2019). The accessibility enables users to get access to ridesharing platforms at their convenience without any challenge. The expandable provides ridesharing platform companies with opportunities to increase their coverage areas and the number of users. The modifiable provides opportunities to upgrade and relocate offices as well as exchange users' information with other stakeholders (e.g., Lee et al., 2019). Those characteristics make ridesharing platforms different from the traditional taxi infrastructure. Furthermore, the infrastructure is driven by a digital architecture (Constantinides et al., 2018), which supports broader services across boundaries.

The reason behind ridesharing platform infrastructure is to share information in order to make trips convenient and cost-effective (Gupta et al., 2019a). The infrastructure is also described as "clients-server infrastructure" (Gupta et al., 2019b). The clients refer to drivers' and riders' ICT resources used for accessing ridesharing platforms. The clients' or users' resources are the mobile phone-based ridesharing apps (Gupta et al., 2019a; Lokhande et al., 2018). Mobile phones contain the drivers' and riders' apps and the Internet (Gupta et al., 2019a; Davlembayeva et al., 2020), where the apps become mediators (Chen & Qiu, 2019) or provide links. Both apps are complementary modules of ridesharing platforms. Drivers' app is a ridesharing mobile app on phones meant for accessing ridesharing platform (Gupta et al., 2019a). Riders' app is also a ridesharing mobile app on phones meant for accessing ridesharing platform (Lokhande et al., 2018). Gupta et al. (2019a) describe the apps as part of the ridesharing platform infrastructure used for information sharing. This infrastructure, however, requires only registered users with a compatible mobile phone for information sharing.

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The server, on the other hand, is the ridesharing platform company's ICT resource such as personal computer or powerful computer (Gupta et al., 2019b; Lokhande et al., 2018), which is used to connect and control the clients. For example, Uber uses its server for creating, managing, and monitoring users' profiles in real-time and offline via the Internet. The server elements include web app, database, and Internet (Gupta et al., 2019b). The *web app* is the core module of ridesharing platform used for users engagement (Davlembayeva et al., 2020) and service management (Gupta et al., 2019b). Thus, the interface of ridesharing platform element (Gupta et al., 2019a) connects users and other stakeholders for data exchange (e.g., Graaf & Ballon, 2019). The other stakeholders include banks who perform funds management for riders to pay their trip fare directly into ridesharing platform companies' accounts. The *database* collects users' profiles, keeps track, and extracts information about them for decision-making (Gupta et al., 2019b) relating to their real-time trip activities for safety assurance. The web app and database constitute the main module of ridesharing platform called administration panel. The administration panel is used by the ridesharing platform staff. The *Internet*, on the other hand, is the network layer (Gupta et al., 2019a) and a backbone of ridesharing platforms that virtually links users and server together without boundaries. In order to extend this ongoing discussion from the extant literature, the server is an intermediary that connects users as clients together. However, the server's failure makes the entire infrastructure inactive (Lokhande et al., 2018) for effective users' actions, interactions, and transactions across ridesharing platforms.

2.3.2 Setup of Ridesharing Platform

Ridesharing platform setup provides a foundation for using the platform based on the collective digital technology infrastructure (Leong et al., 2019). Thus, the setup or deployment of a digital platform is a foundation for providing its services. The setup is based on the availability of

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mobile phones (Pérez et al., 2017), mobile apps (Simmons et al., 2019), and Internet access (Cram & Wiener, 2020). Setups of ridesharing platforms are done in isolation but interoperability of digital networks provides them with the potential to share information in real-time across boundaries (Sedera et al. 2016). Interoperability is the standard of ICT resources from different infrastructures that support users' information sharing across boundaries (Chatterjee et al., 2017). Thus, interoperability connects different firms. The central role of a ridesharing platform company in this context is the ability to manage multiple boundaries for the dynamic growth of its network (Lee et al., 2019; Leong et al., 2019). Moreover, in order to provide ridesharing platforms, Lee et al. (2019) suggest that organisations must plan for effective services strategies across boundaries.

Ridesharing platform setup involves administration panel, drivers' app, and riders' app (e.g., Gupta et al., 2019b). The administration panel is the main component as a server (Gupta et al., 2019b), which is installed by the ridesharing platform staff. The two apps are installed on drivers' and riders' smartphones. Drivers register for the app at the company's office under the supervision of the ridesharing platform staff (e.g., Li et al., 2020). The ridesharing platform staff inspect the drivers' documents for approval. The registration involves information for identification such as name, photo, valid driving license, and contact number (e.g., Gupta et al., 2019a). However, riders register for the app at anywhere without any supervision (Triki et al., 2017). The riders' registration also involves information for identification such as name, photo, and contact number (ibid).

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Some IS scholars argue that digital platforms setup and use create ecosystems with better services than rivals in competition (Tiwana, 2015; Kapoor & Agarwal, 2017). This means that to ensure better use of ridesharing platforms, organisations must consider network dynamics such as users' interactions challenges across boundaries (Leong et al., 2019), network standards

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(Lee et al., 2019), and inclusion of other stakeholders (Ballon et al., 2018). The users' interaction challenges deal with issues that can disrupt their information sharing. The network standards deal with compatibility with different systems for users' apps setup. The inclusion provides opportunities to share information across boundaries with other digital platforms with different network standards such as banking and mobile money platforms (Lee et al., 2019). Therefore, an extensive feasibility study is needed by organisations to provide ridesharing platforms, which can meet the interoperability for information sharing across boundaries.

2.3.3 Use of Ridesharing Platform

The process involves the use of mobile phones, apps, Internet, and GPS within the coverage area of the ridesharing platform company for sharing of trip information between drivers and riders (Tan et al., 2017; Wang et al., 2019). Mobile phones house users' computing features for interconnectivity (Pérez et al., 2017). Thus, the features match drivers and riders on ridesharing platform for trip activities with a common origin and/or destination (Cram & Wiener, 2020; Siuhi & Mwakalonge, 2016). Wyman (2017) accentuates that ridesharing platform immediately connects drivers and riders with their information for trip activities. Riders first activate the app as a link to open the ridesharing platform then request rides within the geolocation for drivers to accept or reject the booking (Wang et al., 2019; Yu et al., 2017). Riders always see available cars in close proximity on the ridesharing platform for their options. Then once the choice is made, the system automatically shares the users' profiles for communication (Lee et al., 2019). The riders can monitor the booked cars in motion before and during the trip activities such as automatic billing, unlike the traditional taxi with a fixed charge (Wang et al., 2018). Then riders finally pay for the trip at the end (Li & Hou, 2019).

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This ridesharing platform innovation in digital technology (Siuhi & Mwakalonge, 2016; Tan et al., 2017) solves the traditional taxis challenges of getting a car (Lanamäki et al., 2020; Wyman, 2017). Some of the traditional taxi challenges include riders finding it difficult to get cars in close proximity and at night. This innovation has reduced challenges for matching drivers' and riders' trip activities in the traditional taxi services through information sharing. Thus, ridesharing platforms' basic idea is to share information between drivers and riders. This innovation enables drivers to share cars with riders to reduce the number of vehicles use for personal travel (Lee & Chan, 2018; Siuhi & Mwakalonge, 2016). The platforms also reduce transportation costs (Greenwood & Wattal, 2017; Wang et al., 2018) and provide on-demand service (Kim et al., 2019). A rider can electronically book a car when he/she needs it within the coverage of the ridesharing platform company at any time, but he/she does not need to own one (Yu et al., 2017). Despite all these from the literature reviewed, the reasons for the use of ridesharing platforms remain unknown to IS researchers. This study, therefore, provides empirical data to answer the research questions from the developing country.

2.3.4 Ridesharing Platforms in Developed Countries

Extant IS studies on ridesharing platform in developed countries focus on different phenomena. For instance, Elbanna and Newman (2016) assessed Uber in London and Manchester to understand the disruptive nature of its digital innovation in the taxi industry. Basukie et al. (2020) examined why Uber ridesharing platform is described as digital disruption in England. Thebault-spieker and Terveen (2017) explored the role of digital map for Uber ridesharing platform in Minnesota. The study shows how this strategy supersedes the traditional taxi services in competition. Other competitive relative issues studied include ridesharing platforms are replacing the traditional taxi drivers' communications in the taxi industry in California (Cram & Wiener, 2020) and what happens when ICT innovation is also a disruptive innovation

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in Finland (Baiyere & Salmela, 2015; Lanamäki et al., 2020). In addition, Cusumano (2015) examined the evolving relationship between traditional taxi services and Uber ridesharing platform in competition in New York and San Francisco. The overall findings, however, show the disruptive nature of digital technology by ridesharing platforms in developed countries (Basukie et al., 2020; Cram & Wiener, 2020; Lanamäki et al., 2020).

Other studies examined the growth of digital services in the taxi industry (Chen & Qiu, 2019) and the use of GPS for an effective travel mode for emission reduction (Chen et al., 2021) by DiDi Chuxing in China, drivers authentication for real-time management and monitoring in Italy (Gupta et al., 2019a), and riders' societal benefits of ridesharing platform in California (Greenwood & Wattal, 2017). Furthermore, understanding the role of ridesharing platform companies and users in Germany (Hildebrandt et al., 2018) and platform mediated system in the sharing economy in Italy (Basili & Alessandra, 2020). The findings from the literature show users' roles and benefits in ridesharing platforms. Ridesharing platforms also provide security features for users. Gupta et al. (2019b) analysed the security features involved in ridesharing platform based on users' profiles in Italy. Other studies investigated how ridesharing platforms are integrated with public transport in rural areas in Switzerland (Thao et al., 2021). Cheng et al. (2020) explored how the sharing economy enabled ridesharing drivers' trust in passengers in China. The findings show contextual factors that influence ridesharing platforms in the sharing economy. Lee et al. (2019) examined on-demand car service in South Korea and concluded with how ridesharing platform provides better services than traditional taxis based on security features. Furthermore, Tan et al. (2017) examined the principal characteristic of ridesharing platform and how appropriate ICT affords users' trip activities in Australia. Finally, extant studies on ridesharing platform in developed countries' findings show how the platforms create fast mobility in the form of smart cities (Liyanage et al., 2019; Willing et al., 2017).

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2.3.5 Ridesharing Platforms in Developing Countries

Extant IS research on ridesharing platform in developing countries focuses on few contexts due to insufficient studies. For instance, understanding the impacts of ridesharing platforms in the sharing economy in Pakistan (Malik & Wahaj, 2019). The authors relied on two case studies from Uber and Careem to show how ridesharing platforms enhance users' trust in a trip. The findings also show that ridesharing platforms create economic opportunities, unlike the traditional taxis. The platforms also have constraints relating to digital divide (ibid). This issue prevents ICT illiterates from taking part. Ridesharing platforms provide a strategic function to serve more riders' requests. Thus, they reduce city traffic flow compared to the traditional taxi services in Singapore (Wang et al., 2018). The findings show the impacts of ridesharing platforms on societies relating to improving traffic flow and limited riders' waiting time. A study conducted in South Africa investigated how ridesharing platform shapes work relations (Mäntymäki et al., 2019). The findings indicate that the key element of ridesharing platform provides "flexibility in work relationships" and "self-employed status of drivers".

A study conducted in India explores how ridesharing platforms provide riders with convenience and the best trip activities based on information sharing (Lokhande et al., 2018). The findings show how ridesharing platform infrastructure works. The findings also show users' benefits associated with ridesharing platforms such as safety for riders and convenience (ibid). Other studies conducted in Ghana concerning ridesharing platform impacts and related affordances and constraints (Simmons, 2018; Simmons et al., 2019). Two case studies were used, namely, Uber and Uru. The first study shows opportunistic, security, and ubiquitous affordances available for ridesharing platforms users, which disrupt the traditional taxi services in a competition (Simmons, 2018). The second study also shows affordances and constraints of ridesharing platform, thus, what enables and restricts users to access the platform (Simmons

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et al., 2019). The findings from the two studies, however, show that most users prefer ridesharing platforms as a way of better trip activities. Thus, the platforms affect the traditional taxi services. The overall findings from the literature indicate the impacts of ridesharing platforms on developing countries (Lokhande et al., 2018; Malik & Wahaj, 2019; Simmons et al., 2019). Another study conducted in Ghana highlights the competitive advantage and service recovery associated with digitally-enabled firm (Amoako et al., 2021). The study investigates the market strategy initially introduced by Uber in the taxi sector and how service recovery due to the company's new approach affects customer royalty in Ghana. The authors highlight service failure by Uber including technology and poor relationship with customers. The findings show how that service recovery can strengthen consumer loyalty and the "mediation role of trust" for using Uber ridesharing platform (ibid).

2.3.6 Benefits and Challenges of Ridesharing Platform

Extant studies on ridesharing platform show some benefits relating to social (Greenwood & Wattal, 2017) and environmental (Hildebrandt et al., 2018; Liyanage et al., 2019). The social benefits motivate users to use ridesharing platforms instead of the traditional taxis in terms of convenience (Chen & Qiu, 2019; Lokhande et al., 2018), where riders can get cars at anytime and anywhere to meet their needs. Riders can request for cars when not ready without incurring additional cost as a form of service flexibility (Davlembayeva et al., 2020). Ridesharing platforms provide users with safety by minimising risks associated with the alternative traditional taxi services such as taxi fraud (Tan et al., 2017) and driver's authentication (Gupta et al., 2019a). The social benefits also provide speed monitoring facilities (Lokhande et al., 2018). The speed monitoring avoids accidents as drivers' movements are checked in real-time from one place to another. This monitoring prevents drivers from over-speeding, which can generate accidents. The environmental benefits include a reduction in fuel consumption as

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drivers are always linked to riders in close proximity (Wang et al., 2018; Wu et al., 2020; Yu et al., 2017). The operations of ridesharing platforms provide traffic prediction (Li & Hou, 2019). The prediction provides drivers with traffic flow information to avoid jams (Wang et al., 2018). Ridesharing platforms reduce the parking space of cars (Millara et al., 2018). This benefit prevents many drivers from parking their cars at some locations while waiting for riders. The environmental benefits also include reducing the number of riders' own cars for trips (Kane & Whitehead, 2017; Liyanage et al., 2019). This strategy provides easy mobility in the form of smart cities (Millara et al., 2018).

On the other hand, extant literature on ridesharing platform shows some social and technological challenges. For the social challenges, ridesharing platform companies treat drivers as independent contractors (Watanabe et al., 2016; Cram & Wiener, 2020) and neglect their rights regarding pension contribution and wage rates (Davlembayeva et al., 2020). There are also some crimes committed by some drivers or riders against each other as assault (Calo & Rosenblat, 2017) and robbery (Mousavi et al., 2020). Assault is where drivers or riders physically attack each other during the trip. Robbery is how riders snatch the car or drivers steal something from riders such as money. Digital technologies' challenges, in general, are what constrain users' ability to achieve their goals (Zhou et al., 2018). Example includes content and ownership rights are independent (ibid) and technology failure (Amoako et al., 2021). This issue prevents digital platform owners from having control over associated programs such as Google map and GPS. In addition, technology challenges constrain users' ability for processing electronic identification (Hedström, 2016). Environmental context also affects the use of IT artefacts for a particular purpose (Eze et al., 2021). These consequences affect users to achieve their objectives for using ridesharing platforms due to the integration system (e.g., Currie et al., 2015).

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2.4 Digital Objects

Digital objects are an abstraction and refer to any type of information on digital platforms (Gruning, 2018). Faulkner and Runde (2019) define digital objects as elements on platforms with one or more bitstrings (program files and data files). Digital objects are the representation of items on digital platforms with different qualities in the form of data and metadata (Hui, 2012). The metadata describes items on digital platforms for easy identification such as riders' photos on ridesharing platform. These objects coexist with the real world and users can interact with virtual elements in real-time (Berkemeier et al., 2019) like living items on digital platforms. They may be either material or nonmaterial objects (Faulkner & Runde, 2019) but exist in the real world. The objects enable users to interact with digital interface elements in real-time (Berkemeier et al., 2019).

Existing studies indicate that digital objects consist of two main concepts. First, digital is a paperless technique for managing data (Fang, 2002; French & Shim, 2016). Second, objects are items that determine a particular appearance such as image, text, and video on digital platforms (Hui, 2012; Kallinikos et al., 2010). The objects can be dragged, changed, copied, renamed, distributed, and deleted (Kallinikos & Mariátegui, 2011). Therefore, digital objects are visible on digital platforms like natural items (Hui, 2012). They are meaningful only when networked to share information between users on digital platforms. On the platforms, digital objects are reprogrammable (Ojala, 2019) and fact-based data (Hui, 2012). The reprogrammable provides opportunities to update or modify the digital platform contents anytime. The reprogrammable makes the objects editable that respond to users' actions on digital platforms and do not function in the same ways as physical objects (Gruning, 2018). They are not objects of consumption like natural physical ones. The fact-based data provides users with the exact function of objects with accurate details for actions and interactions.

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Faulkner and Runde (2019) argue that digital objects provide ordinary language for communication like the natural way.

Extant literature indicates four types of digital objects for users' interactions across digital platforms (ridesharing platforms), namely, text, voice, image, and video (Erixon, 2016; Ojala, 2019). First, the text element provides an alphanumerical description of objects on ridesharing platforms for visual narratives, such as rider's name, driver's name, and locational addresses. Second, the voice enables users' speech registered on a recorder as an alternative form of interaction (Erixon, 2016). Third, the image is a type of digital object (Molloy, 2017) on ridesharing platforms that provides a graphical representation for users to interact in the form of riders, drivers, cars, and directions. Finally, the video element is designed in an animation form such as the movement of cars on the ridesharing platforms via Google map, which interacts between users (Kallinikos & Mariátegui, 2011).

2.5 Conceptual and Theoretical Approaches used in studying Ridesharing Platform

The extant IS research shows that the conceptual and theoretical approaches used in studying ridesharing platforms have focused on different phenomena. The sub-sections below highlight the different conceptual and theoretical approaches used in studying ridesharing platforms in IS research.

2.5.1 Conceptual Approaches used in studying Ridesharing Platform

The review shows that most IS studies on ridesharing platform focus more on the conceptual framework (Cetin & Deakin, 2017; Gupta et al., 2019b) with less attention on theory-driven and empirical-driven. For instance, Wang et al. (2018) explored the benefits of ridesharing platform. The study shows how the traditional taxis services operate with fixed billing compared to the ridesharing platform with a concept-based approach. Cusumano (2015) used

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a concept-based approach to explore how the traditional taxi services must compete with ridesharing platforms in the sharing economy. Thebault-spieker and Terveen (2017) used a concept-based approach to demonstrate the importance of considering well-known geographic principles when designing and studying ridesharing platforms in the sharing economy.

Other authors also have used different models to explain ridesharing platforms in different contexts in IS research (Almeida et al., 2017; Gupta et al., 2019a; Willing et al., 2017). From this approach, for instance, Willing et al. (2017) developed a model for cataloguing mobility solutions of ridesharing platforms. Yu et al. (2017) developed a model-based life cycle analysis of car fuels to assess the environmental benefits of ridesharing platform. A model-based to understand drivers' authentication to improve riders' safety for using ridesharing (Gupta et al., 2019b) and ridesharing platform infrastructure (Gupta et al., 2019a).

The model-based approach has also been used to examine ridesharing platform interfaces (Basukie et al., 2020) and spatial operations between ridesharing platform and traditional taxi services (Wu et al., 2020). Most of the IS studies on ridesharing platform from the extant literature have been conducted in developed countries (Watanabe et al., 2016; Wu et al., 2020) in different contexts without empirical evidence (Basili & Alessandra, 2020; Liyanage et al., 2019). The extant literature, however, shows that empirical and context gaps exist, which require empirical-based IS research to investigate the use of ridesharing platforms.

2.5.2 Theoretical Approaches used in studying Ridesharing Platform

Theoretical approaches used in studying ridesharing platform in extant IS studies have been on different phenomena. For instance, agency theory has been used as a theoretical lens to investigate what motivates riders to alter their behaviour when using ridesharing platform cars

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(Hildebrandt et al., 2018). Table 2.1 below shows different theory-driven approaches used in studying ridesharing platforms in IS research.

Table 2.1: Theoretical Approaches used in studying Ridesharing Platform

Theory	Phenomenon	Theoretical lens (analysis)	Author
Agency theory	Shared use of resources	Ridesharing motivates users to alter their behaviour	(Hildebrandt et al., 2018)
Affordance theory	Technology affordances of multi-sided digital platforms	Ridesharing platform enables users engagement and, subsequently, disrupts the incumbent industry	(Tan et al., 2017)
Platform theory	Entry of ridesharing platform	Social benefits of ridesharing platform	(Greenwood & Wattal, 2017)
Customer value theory	Evaluation of an on-demand car service	Riders' decisional factors to evaluate on-demand car service	(Lee et al., 2019)
Two-sided market theory	Spatial differentiation and network externality on ridesharing platform's pricing mechanism	Ridesharing platform's optimal pricing	(Wu et al., 2020)
Diffusion of Innovation Theory and Technology Acceptance Model	User adoption of the Uber mobile application	User attitudes and adoption intentions of Uber app	(Min et al., 2018)
Cognitive Dissonance Theory	Strategies in shaping Uber apps	Effects of co-creation and dissonance reduction on service satisfaction	(Mousavi et al., 2020)
Practice theory	Digital transformation via platform-based business	Role of digital technologies in the transformation of the taxi industry and the taxi dispatch practice	(Lanamäki et al., 2020)
Extended valence framework	Users' intention to participate in the sharing economy	The interplay among perceived risks, perceived benefits, and trust in the context of Uber platform in the sharing economy	(Lee & Chan, 2018)

The study involves ridesharing platform users' relationships for trip activities in the sharing economy. Thus, drivers' behaviour for providing rides and riders' conduct for payment after the service, respectively, via ridesharing platform in the sharing economy. The findings show that drivers aim to make profit whiles riders seek to reduce costs, thus, consequences of providing and using cars. Affordance theory has been used as a theoretical lens in IS research to demonstrate how ridesharing platform as a disruptive technology in the taxi industry can

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meet users' needs (Tan et al., 2017). Thus, how digital innovation for ridesharing platforms enables users' engagement and subsequently, the strategy affects the traditional taxi services. Greenwood and Wattal (2017) used platform theory to investigate the social benefits of ridesharing platform with empirical evidence. The study shows how some riders in recent time opt for ridesharing platform, especially in the cities instead of an alternative to avoid an accident when they are under the influence of alcohol. The findings also show that ridesharing platform is economical, which reduces transaction cost between drivers and riders as well as alcohol-related accident.

Drawing on customer value theory, Lee et al. (2019) explored how riders evaluate on-demand car service. Thus, there was an assessment of how digital innovation provides the ridesharing platform companies with marketing strategies to reshape the transportation business to meet riders' needs. The findings show some significant decisional factors such as interactivity and monetary value, that riders consider to evaluate on-demand car service.

Two-sided market theory has been used as a theoretical lens by focusing on the riders to understand spatial differentiation and network externality of ridesharing platform's pricing strategy (Wu et al., 2020). The spatial differentiation explores the consequences of ridesharing platform's price strategy for riders' travel mode. The findings show that ridesharing platform's optimal pricing is decided by riders' valuation according to the request period and drivers' cost available on the platform. Min et al. (2018) integrated diffusion of innovation theory and technology acceptance model lenses to examine the factors affecting users' adoption of Uber ridesharing platform in the tourism industry. The findings show that social influence and mobile phones compatibility have a significant influence on users' attitudes as well as adoption intentions for assessing the Uber ridesharing platform.

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Mousavi et al. (2020) used cognitive dissonance theory to investigate strategies for shaping ridesharing platform with empirical evidence. Although trip activities via ridesharing platforms supersede the traditional taxi services, there are some negative impacts associated with the platforms where users' reactions are used to improve the system. The findings show that strategies to satisfy users' needs for assessing ridesharing platform are based on their participation, effective service offerings, and ability to handle dissonance. Lanamäki et al. (2020) used practice theory to examine the service transformation by ridesharing platforms' and taxi drivers' practice with empirical evidence. Thus, the introduction of ridesharing platforms in the taxi industry has brought a partial service change, which is affecting the traditional taxi services. The findings show that users' proactive and reactive communications with ICT artefacts for ridesharing are gradually changing the traditional taxi services.

Lee & Chan (2018) used extended valence framework as a theoretical lens to explain users' intention to participate in the sharing economy with empirical evidence. Users in the sharing economy have developed trust in using goods and services more than the traditional approach for doing business. This is because digital activities provide an audit trail for future reference. The findings show that users' intentions to reuse ridesharing platform are based on trust, platform qualities, perceived risks, and perceived benefits.

2.6 Gaps Found in Literature

This section provides the key trends and gaps from extant studies on ridesharing platform relating to the context or issues and theoretical approach in general to propose new research areas. The sub-sections below provide research and theory gaps found in the extant IS research on ridesharing platform.

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2.6.1 Limitations in Existing Research

Extant IS studies on ridesharing platform focus more on issues and evidence from the developed countries in Europe, North America, Australia, and Asia (Basili & Alessandra, 2020; Borowiak, 2019; Bugador, 2019) with less attention on developing countries such as those from Africa. For instance, Greenwood and Wattal (2017) investigated the social benefits of ridesharing platform in America and call to extend the research into other aspects of the sharing economy. Wu et al. (2020) also examined spatial differentiation between ridesharing platform and traditional taxi services in America and call for the strategic behaviour of users. As a result, there are gaps concerning geographical focus, which require research attention.

Extant research calls for studies relating to issues and knowledge gaps such as the need to explore legal actions against ridesharing platforms by the traditional taxi drivers (Cetin & Deakin, 2017; Wyman, 2017; Yu et al., 2017). The need also to understand social relations issues between users of ridesharing platforms (Gupta et al., 2019b). Tang et al. (2016) recommend further studies to cover impact of different sources for route selection associated with ridesharing platforms. Furthermore, a need to explore technology strategy in ridesharing platforms with empirical evidence (Almeida et al., 2017; Tan et al., 2017; Thebault-spieker & Terveen, 2017). The need also to use a business model to understand transparency and privacy between ridesharing platform and traditional taxi services in the sharing economy (Basukie et al., 2020). Lee et al. (2019) also called for how ridesharing platforms in other nations can establish tailored strategies to develop and expand their markets. There is also a need to understand the constraint of matching users with a specific car model via ridesharing platform (Wang et al., 2019). Some authors suggest further studies to investigate the work of ridesharing platforms with various approaches such as research questions, theoretical lenses, and "business relationship between" the platforms and other digital platforms (Mäntymäki et al., 2019).

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In addition to those series of issues and knowledge gaps, IS research on ridesharing platform focuses more on individual user group such as drivers' behaviour in using the system (Cram & Wiener, 2020; Davlembayeva et al., 2020; Gupta et al., 2019a). Others also focus on riders' benefits of using ridesharing platforms (Greenwood & Wattal, 2017; Mäntymäki et al., 2019; Stiglic et al., 2018). Furthermore, some studies focus on drivers' traffic flow information for using ridesharing platforms (Li & Hou, 2019; Wang et al., 2018). The literature reviewed, however, shows that there is less research that looks at the use of ridesharing platforms by drivers and riders. There is, therefore, a gap that requires research attention to investigate users' actions, interactions, and transactions across ridesharing platforms.

Other knowledge gaps also show that prior research on ridesharing focuses on various research questions. These studies focus more on why ridesharing platforms have gained market over the traditional taxi services (Stiglic et al., 2018; Wu et al., 2020). Why do ridesharing platforms have impacts on society (Guo et al., 2019; Mäntymäki et al., 2019). Finally, why do governments wish to regulate ridesharing platforms (Li & Hou, 2019). However, there is less attention on why drivers and riders use ridesharing platforms. The highlighted limitations in this context show that there is a need to investigate the reasons why users use ridesharing platforms (Stiglic et al., 2018).

Other research questions also focus more on how travel times under dynamic ridesharing platform conditions are calculated (Gurumurthy & Kockelman, 2018; Yan et al., 2020). Others also focussed on how driver information is collected and made available for real-time access (Basili & Alessandra, 2020; Gupta et al., 2019b). Finally, some focused on how drivers access ridesharing platform to get traffic information and trip directions for fast trip activities (Li & Hou, 2019; Wang et al., 2018). Yet, there is less research attention on the process involved in

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how drivers and riders use ridesharing platforms. Also, extant IS research on ridesharing platform focuses more on what are the factors of ridesharing platforms (Cheng et al., 2018; Davlembayeva et al., 2020; Wang et al., 2018). What are the factors that affect riders to adopt ridesharing platforms (Min et al., 2018; Hildebrandt et al., 2018; Lee et al., 2019). Finally, what are the challenges of managing ridesharing platform based on its big data governance and algorithmic (Basukie et al., 2020). Yet, there is less IS research attention on challenges that users face when using ridesharing platforms or contextual factors that influence the use of the platforms, which needs to address. In addition to the series of gaps identified in the literature, most IS studies on ridesharing platform focus more on conceptual framework (Cetin & Deakin, 2017; Gupta et al., 2019a) with less attention on theory-driven and empirical-driven.

2.6.2 Theoretical Limitations in Existing Research

Theory-driven gaps from the extant literature show that there is a need for a new theory and/or extension of existing theories to understand the use of ridesharing platforms in IS research. More specifically, there is a need to use theoretical lens to understand what emerges when a divergent group of users are connected by ridesharing platforms as boundary objects. Thus, most theory-driven IS research on ridesharing platform focuses more on different theories on different phenomena with less attention on users' actions, interactions, and transactions across ridesharing platforms. For instance, affordance theory exclusively emphasises what inspires users to use ridesharing platform without showing how they are connected to achieve a common goal. IT artefact affords and constrains users to achieve their goals (Bygstad et al., 2015). This issue is unlike the original affordance that deals with what affords users without constraints (Gibson, 1979). Extant IS studies have highlighted both affordances and constraints process (Bygstad et al., 2015; Mettler & Wulf, 2019), yet how a divergent group of users are connected for effective interaction has not been addressed.

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The agency theory provides a theoretical lens to understand the consequences of providing and using goods and services (Hildebrandt et al., 2018). However, it is ineffective to understand each user group's role and even how a divergent group of users are connected. The platform theory focuses on information transparency and does not account for users' relationships and how they are connected (Bonina & Eaton, 2020; Saleh et al., 2020).

Some IS scholars posit that the customer value theory highlights the users' decision to purchase and fails to account for values involving trust for purchasing digital objects (Kim et al., 2011). The two-sided market theory investigates users' behaviour on a digital market platform while ignoring their real-time communication (Lacan & Desmet, 2017). Some authors in IS research also posit that the two-sided market theory accounts for riders' behaviour towards risk, benefits, and trust (Mou et al., 2016) without accounting for their interactions with drivers. Kiwanuka (2015) maintained that diffusion of innovation theory investigates users' adoption of the digital innovation process. The theory does not investigate the links between the innovation process and characteristics. The technology acceptance model, on the other hand, investigates the adoption and acceptance of IT artefacts without showing the social factors such as time, money, and information behind the adoption (Azmi et al., 2016; Kiwanuka, 2015).

The cognitive dissonance theory focuses on inconsistency in cultural differences among users and neglects the process of negotiation (Panagiotou & Kadianaki, 2019). The practice theory investigates social change by technological innovations and does not inform the design and transition process. Thus, it lacks practicality involving artefacts implementation (Spotswood et al., 2017). Another weakness of the theory is the inability to explain large-scale data, thus, it supports only observation of IT artefacts (Ivanov, 2017). Moreover, some authors maintain that

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extended valence theory highlights users' perceptions after using a service and ignores their effect before using the service (Lin et al., 2014).

From the extant literature, there is a gap in the theories, the use of the aforementioned theories to study the phenomenon understudy is important yet unable to provide understanding of users' interactions for information sharing. More specifically, the nature of different users' actions, interactions, and transactions across boundaries make the highlighted theories inappropriate for the phenomenon understudy. Thus, those theories may not be able to provide detailed accounts of actions, interactions, and transactions involving a divergent group of users across boundaries. In response, there is a need to address the theory gap in IS research with boundary object theory (Stange et al., 2016). In addition, extant boundary object literature focuses more on actions (Best, 2010; Kamal & Kamal, 2016; Vakkayil, 2012) of the object with less attention on user-local actions and user-boundary transactions. More specifically, there is a lack of research attention on the user-local actions and users' transactions process applied to boundary object theory. The use of ridesharing platforms is crucial in IS research, which is yet to receive research attention.

In all, the extant literature, however, shows that research gaps exist which require theory-driven and empirical-based IS research to investigate the use of ridesharing platforms. There is, therefore, a need to understand the use of ridesharing platforms with boundary object theory (Stange et al., 2016) as a theoretical lens and empirical evidence in IS research from a developing country.

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2.7 Chapter Summary

This chapter reviewed the literature on ridesharing platform. It examined literature review on sharing economy, ridesharing platforms in general, and digital objects. In all, the chapter serves as a foundation of the entire thesis by identifying theories used in studying ridesharing platform research and gaps this study seeks to fill. The next chapter presents the theoretical lens, which forms the basis of the thesis.

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CHAPTER THREE

THEORETICAL FOUNDATION

3.1 Chapter Overview

The previous chapter reviewed the relevant literature on ridesharing platform. The current chapter focuses on the IS theoretical foundation that underpinned this study. This chapter is organised as follows. The first section provides a boundary object theory background and a discussion of its essence for the study. The next section discusses the theory's concepts and principles. The next subsequent three sections provide an application of the theory in IS research, application of the theory in this thesis, and limitations of the theory. The final section presents a cross-boundary object. The chapter concludes with a summary.

3.2 Boundary Object Theory

Boundary object theory was originally developed in Sociology by Star and Griesemer (1989) to explain the collaboration between different actors (users) and constraints for managing information. Star and Griesemer (1989) define a boundary object as an item in diverse backgrounds (social worlds) with different identities. The theory focuses on objects' interactions across boundaries (Spante, 2019; Stange et al., 2016; Star, 2010). Corsaro (2018) posits that boundary object theory explores users' interactions across digital and physical environments. The digital environment (virtual) connects users with different backgrounds for a common activity (Oever, 2019), such as drivers' and riders' information sharing via ridesharing platform. The physical also connects users with different backgrounds for a common activity such as how a car links drivers and riders for trip activities (Star, 2010). The idea behind the boundary object theory is to connect users from different backgrounds with a common language to achieve a goal through shared information or work rather than confusion (Star & Griesemer, 1989; Star, 2010). The same goal can be achieved when using a digital platform (Spante, 2019) to connect users for information sharing for trip activities.

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Boundary is the actors' social world (Oever, 2019) and not a physical border of groups but rather intersections of various users to interact. Object is abstract (conceptual), artefact or concrete (tangible) with different meanings and common structure according to the environment but recognisable (Corsaro, 2018; Hocine et al., 2019; Paraponaris & Sigal, 2015). Thus, it can be digitised in the context of information systems. Hussenot (2010) posits that an object's role and type change during interactions within the information environment. Objects motivate a divergent group of actors for collaboration across boundaries (Nicolini et al., 2012; Burman, 2004), such as IT artefacts and they are standard elements from each users' world. Objects have two characteristics: (i) interpretative flexibility (Nicolini et al., 2012; Oever, 2019), which enables actors to translate the meaning of the objects from different perspectives and (ii) actors gain different understandings into other viewpoints (Akkerman & Bakker, 2011; Hedström, 2016). The characteristics enable actors to understand the objects in their meaning from broad perspectives.

Boundary objects have two types of view and use, namely, common and local features (Star & Griesemer, 1989). The common features are used for actors' interactions and transactions across boundaries. The *common features* form the environment where actors are managed (Sun, 2012). The common features are used for actors' interactions across boundaries such as administration panel of the ridesharing platform. More specifically, the administration panel is a common artefact or object relating to software (Bergman et al., 2007) used for managing actors' rights. The *local features* are used for meeting individual actor's needs. Local features are unique for a particular actor and dealt with actors separately to accomplish tasks (Sun, 2012), such as drivers' app. Thus, how the objects maintain a common identity across boundaries while meeting the local needs and constraints of actors. In common use, the objects are weakly structured but become strongly organised separately (Star & Griesemer, 1989; Star,

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2010). The objects are across different social worlds, yet they maintain their common features for identification. The purpose of the features is to help actors to identify artefact contents for actions. The feature is something unique or special characteristic that can be used to identify ICT artefacts functions (Wagner, 2004). More specifically, technology features are components, specifications or attributes of software used by actors (Kim et al., 2009) to accomplish tasks, such as riders' app component of the ridesharing platform.

Technology features are the visual representation of ICT artefacts or interface tools that support interactions between actors and software functions in IS (Crawford et al., 2016; Sun, 2012). The features must be standard and valid for actors to trust and rely on (Bergman et al., 2007). The standard is a well-known item that every actor can understand. Validity is where the features can perform the actual function to meet the actors' needs. Most software applications have embedding multimedia features designed to meet actors' needs (Wagner, 2004), such as ridesharing platforms. The multimedia provides actors with a lot of options such as video and audio for information sharing (Hui, 2012). Features are components of the boundary objects, therefore, linking the technology features to common and local features of ridesharing platform is the researcher's central argument.

Boundary objects, therefore, can bind different actors' social worlds together (Oever, 2019; Paraponaris & Sigal, 2015) with commonalities and differences (Star & Griesemer, 1989; Star, 2010) without imposing a user's right on another. Despite the heterogeneous functionalities of the objects, actors can interact with a common language across boundaries. The theory interprets actors' concern, commitment, and perception of the boundary object (Satatøen 2018). Thus, it helps to interpret how various actor groups are bound together by the organising

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structure of the boundary object. As Star (2010) posits that a car may be a boundary object if it can connect a divergent group of actors to achieve a particular goal.

A composite boundary object is a set of separate ICT artefacts that can support actors' information sharing across boundaries (Rehm & Goel, 2013). It deals with a collection of ICT artefacts in a particular context for actors' tasks across boundaries (e.g., Hewer & Brownlie, 2009). The vital role of boundary object for actors' interactions always deals with a single ICT artefact (Rehm & Goel, 2013). The composite boundary object, however, functions as a joint of ICT artefact interfaces for actors (Theng et al., 1999). It creates business ecosystems for organisations (Rehm & Goel, 2013), such as riders' payment transactions across ridesharing platforms and banks. It is also used to identify and address interaction problems (Hewer & Brownlie, 2009). The next sections present the fundamental concepts and principles of boundary object theory (Star & Griesemer, 1989; Stars, 2010).

3.3 Concepts of Boundary Object Theory

The fundamental concepts of boundary object theory are boundary object, actors, actions, and interactions. Consequently, all the divergent groups of actor-local actions and transactions involved in the boundary object are relevant but have not been addressed. There is, therefore, a need to extend the boundary object theory by introducing the actor-local actions and transactions processes. Figure 3.1 below shows the model of the boundary object.

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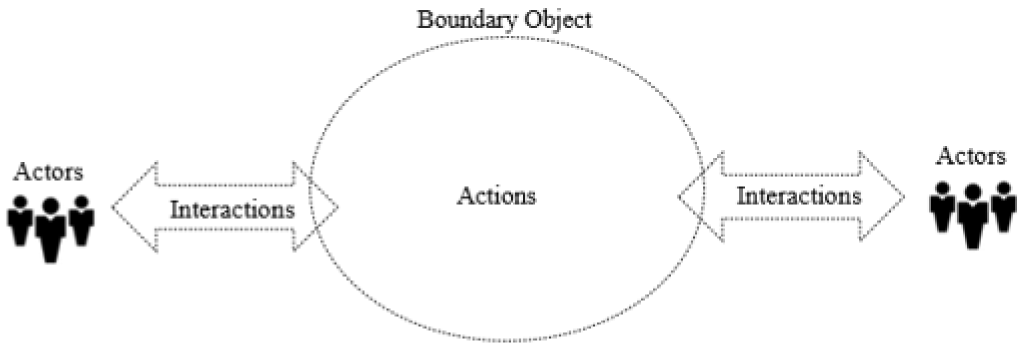
Figure 3.1: Boundary Object Model



Source: Adapted from Stange et al. (2016)

3.3.1 Boundary Object

The Boundary object concept refers to an object with both enablers and constraints (Star & Griesemer, 1989; Star, 2010) that can be adjusted to the standard of various actors' movement across borders and retain its identity. The boundary object concept explains collaborations phenomena across boundaries (Corsaro, 2018; Nicolini et al., 2012; Khoo & Hall, 2013). In this context, boundary object refers to the ridesharing platform that connects various actors for information sharing for trip activities such as riders booking cars and drivers accepting requests.

3.3.2 Actors

The actors refer to various user groups who interact with the boundary object to meet their needs (Zhou et al., 2019). The actors' concept explains a diverse group of users with in-depth local knowledge across the boundary (Oever, 2019). Hafezieh and Eshraghian (2017) define an actor as anyone who facilitates changes to get things done. In this thesis, actors refer to users on ridesharing platforms, namely, drivers' and riders' groups. The users create, use, and share information across boundaries (Zhou et al., 2019). Thus, their goals involve actions, interactions, and transactions across ridesharing platforms.

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3.3.3 Action

An action is an act that meets the layout standards applied to information sharing (Setiya, 2003). Actors' actions on boundary object are relevant to achieve a particular goal or to make an opportunity realisable (Hang et al., 2015). Even though extant IS research concerning boundary objects' interactions offers actors the opportunity to share information relating to their activities, user-local actions that occur when they are connected are limited with theoretical explanations and empirical evidence (e.g., Oever, 2019; Paraponaris & Sigal, 2015). Boundary object actions in general from the extant studies have been described in different contexts without user-local actions. For instance, Vakkayil (2012) underscores the challenge of managing boundary object actions rather than clarifying user-local actions. Thus, IS research on boundary objects perspective does not highlight user-local actions that emerge individually without affecting each other when actors are connected for their activities. IS research concerning boundary object theory-driven has repeatedly shown interactions across boundaries (Corsaro, 2018; Kertcher & Coslor, 2020; Spante, 2019). Thus, user-local actions that occur when actors are connected to the boundary object have not been addressed in the extant research. More specifically, the boundary object is a system or an artefact that unites a divergent group of actors (Star, 2010) to achieve their goals with user-local actions and not just interactions (e.g., Akkerman & Bakker, 2011). Thus, user-local actions that occur on boundary objects have less research attention in IS literature.

3.3.4 Interaction

Interaction is a specific occurrence where actors coordinate to share information (Alter, 2018). It is also actor's intention to act and react to others' actions (Kot & Leszczyński, 2020). The interaction concept explains how divergent actors with a common language communicate across boundaries (Corsaro, 2018; Hocine et al., 2019; Stange et al., 2016). Actors' interactions

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across boundaries influence each other (Kot & Leszczyński, 2020). In this thesis, interactions are how users share trip information across ridesharing platforms. Thus, translation or standardisation for sharing information from different actors to achieve a common work (Star & Griesemer, 1989; Star, 2010).

3.3.5 Transaction

A transaction is an exchange of exchangeable services, products, rights or funds (Thomas, 2017) across boundaries. Users' transactions on the boundary object are relevant for activities according to their agreed conditions. While extant IS research on the boundary objects focuses more on interactions for collaborative work (Hedström, 2016; Oever, 2019), users' transactions, which emerge across boundaries are limited with theoretical explanations and empirical evidence (e.g., Akkerman & Bakker, 2011; Oever, 2019). Some authors such as Kamal and Kamal (2016) examined the role of ICT for boundary object transactions in terms of firm trade share rather than showing users' transactions. Best (2010) also examined boundary object transactions for record storage without showing users' transactions. Thus, insights on users' transactions such as e-payment and drop-off which emerge when connected, have not been addressed in the extant literature. Extant studies repeatedly show boundary actions (e.g., Stange et al., 2016), interactions (e.g., Corsaro, 2018; Kertcher & Coslor, 2020), and transactions (e.g., Kamal & Kamal, 2016) with less attention on users' transactions across boundaries.

3.4 Principles of Boundary Object Theory

The principles are to connect users from different social worlds with common and local features across boundaries, various users have different interpretations about the boundary objects, and the boundary objects are dynamic with ill-structured but interpretative flexibility and more

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tailored use of the objects (Stange et al., 2016; Star & Griesemer, 1989; Star, 2010). In this study, the principles are how the various users are connected via ridesharing platform for information sharing for trip activities.

3.5 Application of Boundary Object Theory in IS Research

The concepts of boundary object have been used in IS research to theorise actions and interactions across boundaries. The study areas in IS where the theory has been applied include examining human rights in Internet governance (Oever, 2019), understanding of electronic identification card setting in a health-care (Hedström, 2016), practices of collaboration according to users' performance (Nicolini et al., 2012), and examining organisational knowledge dynamics (Paraponaris & Sigal, 2015). Hussenot (2010) used the theory to understand objects' roles and types for communications in the organisational process. Khoo and Hall (2013) explained metadata for a digital library based on IT work growth with the theory. The metadata refers to data about data. The theory has been used to identify design boundary features, which also helps to align and integrate domain knowledge across boundaries (Bergman et al., 2007). Spante (2019) examined the process that involves distance learning via digital technologies at primary schools. Some authors have used the theory to understand how ICT adoption improves boundary object transactions (Kamal & Kamal, 2016). In addition, some author used the theory to understand how records are stored at an appropriate location where unique functions deal with boundary object transactions (Best, 2010). Furthermore, another author has looked into the understanding of managing boundary object actions' challenges associated with organisational boundaries (Vakkayil, 2012).

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3.6 Application of Boundary Object Theory in this Thesis

The choice or justification of the theory for the phenomenon understudy is subjective in interpretive research (e.g., Lee et al., 2015; Walsham, 2006) and this is based on the researcher's personal belief. The initial justification is based on the researcher's paradigm and the phenomenon understudy. This is because the phenomenon being examined is based on interactions for information exchange between a divergent group of users across boundaries. More specifically, what emerges when a divergent group of users are connected on the boundary objects for their activities (Stange et al., 2016; Star, 2010), such as users' actions, interactions, and transactions. Hassan and Mingers (2018) posit that theoretical foundations inform the discipline about its object of study. The theory provides understanding of how one set of activities is translated into another without affecting its effectiveness (Oever, 2019). Boundary object theory, therefore, emerges as a theoretical lens from the highlighted background and applications to understand the process involved in users' actions, interactions, and transactions across ridesharing platforms.

The concepts and principles of the theory are useful in addressing the interoperability for information sharing. The process involves information sharing and this is seen as crossing borders by a divergent group of users' interests such as riders' e-payment via credit card. Thus, ridesharing platforms serve as boundary objects that support different group of users' interactions to share information. The theory also provides opportunities to understand users' rights and constraints for using ICT artefacts (Kamal & Kamal, 2016). Recognising the ridesharing platform as a boundary object shows the process involves in users' actions, interactions, and transactions for trip activities.

Additional reasons for using the boundary object theory instead of other theories are given. First, the theory allows the researcher to start the analysis by identifying sociotechnical

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elements in the context of users' common and local features. Second, the theory provides interpretative flexibility for researchers to explain interactions between a divergent group of users within the information ecology or across boundaries (Leonardi, 2011b; Mettler & Wulf, 2019), such as ridesharing platforms. Finally, the theory supports researchers to understand collaborations between users across boundaries such as information sharing for trip activities. The theory is, therefore, considered appropriate as it fits the phenomenon understudy.

3.7 Limitations of Boundary Object Theory

While the boundary object theory is useful in IS phenomena as a theoretical lens, there are also some limitations in its use. The theory only interplays between users by focusing on sociomateriality (Uppström & Lönn, 2017). Although the divergent group of users within the information ecology interact with standard, it does not make any of them a master (Oever, 2019). The theory becomes limited when some authors consider every artefact as a boundary object (Uppström & Lönn, 2017) for users' interactions without considering what can unite them.

Sataøen (2018), however, claims that the boundary is a shared space and not only an artefact that connects a divergent group of users for interactions. Some authors (Chen et al., 2019; Hussenot, 2010; Khoo & Hall, 2013) maintain that the theory deals with single organisational interaction, which does not account for generalisability across boundaries. The theory does not address general barriers for information sharing across boundaries (Chen et al., 2019). Thus, the use of the theory to understand users' actions, interactions, and transactions across boundaries is lacking, and this is an interesting phenomenon to study. More specifically, users' actions, interactions, and transactions, which emerge across boundaries for their activities have not been addressed as the extant literature focuses more on boundary actions (Best, 2010; Kamal & Kamal, 2016) and transactions (Vakkayil, 2012). Furthermore, extant studies that use

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common and local features as to how users view and use the boundary object in addition to the theory's concepts have not received sufficient attention. This study, therefore, addresses the above limitations with the boundary object theory (Stange et al., 2016) as the analytical lens to understand the use of ridesharing platforms.

3.8 Cross-Boundary Object

The cross-boundary object serves as essential interactions measures across boundaries (Bharadwaj et al., 2013; Chen et al., 2019). Notably, various users' interactions based on digital innovation for information sharing are the key value of the cross-boundary object for creating continuities in practice (e.g., Hsiao et al., 2012). Cross-boundary is an inter-organisational form of information sharing across boundaries between different users with a common standard (Tawfik & Anya, 2015). The common standard is where different organisations have similar features to make information compatible for users to share across boundaries. Some authors, however, posit that cross-boundary enables different users to operate beyond a single organisation (Chen et al., 2019) to interact for information sharing (Hsiao et al., 2012).

The boundary object involves crossing organisational lines for information sharing with a backbone of digital technology (Chen et al., 2019; Tawfik & Anya, 2015) and a common language (Kellogg et al., 2006). Faik et al. (2019) posit that boundary object is an open form of work that transforms organisational challenges for information sharing. The argument from extant literature is that the cross-boundary interactions trend will continue to grow based on the following five reasons:

First, digital (ridesharing) platform is multidisciplinary (Chen et al., 2019; Ku et al., 2016).

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This characteristic allows other platforms with similar settings such as social media, government, banks, and mobile money to exchange information about users.

Second, digital platform deals with interoperability (Bharadwaj et al., 2013; Ku et al., 2016), which allows organisations with different ICT arrangements to collaborate for information sharing without borders such as ridesharing platform companies and banks.

Third, the efficient need for users' information continues to advance for digital platform strategy by disrupting traditional business processes (Bharadwaj et al., 2013; Pagani, 2013), such as ridesharing platforms and taxi services.

Fourth, collaborations via cross-boundary object involve digital and physical interactions (Hsiao et al., 2012), such as users' interactions across ridesharing platforms. The physical is always associated with the activities outside ridesharing platforms such as face-to-face interaction between drivers and riders for the destination address and cash payment. The digital is always associated with online activities via ridesharing platforms such as drivers accepting riders' requests and e-payment.

Finally, digital technology for collaboration creates globalisation (Tawfik & Anya, 2015) and openness in organisations (Faik et al., 2019) by changing the business environment for interactions across boundaries. The reason behind this study's cross-boundary object is that the phenomenon is integrated and deals with a divergent group of users' actions, interactions, and transactions for information sharing. Despite the increasing attention from the extant literature, studies involving users' actions, interactions, and transactions across ridesharing platforms are limited. Therefore, there is a need to understand the phenomenon understudy with cross-boundary for users' actions, interactions, and transactions across boundaries.

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3.9 Chapter Summary

This chapter provided the background of boundary object theory for the study. The concepts, principles, and applications of the theory in IS research and this thesis were discussed. The chapter also underscored the limitations of the theory and cross-boundary object. The next chapter presents the research methodology, which guided the thesis process.

INTEGRI PROCEDAMUS

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CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Chapter Overview

The previous chapter examined the relevant theoretical approach for users' actions, interactions, and transactions across boundaries. The current chapter presents the research methodology. This chapter is structured as follows. The first section introduces the research paradigms in IS studies and the choice of interpretivism, the researcher's tradition as the line of enquiry for this study. This is followed by a discussion on research methodologies and methods, which determines the choice of the qualitative interpretive case study. Next is an introduction of the two cases selected and how the researcher gained access to the fieldwork for this thesis. This is followed by data sources and collection and analysis. In the next section, the principles for evaluating interpretive research and ethical considerations that guided this research are presented. The chapter concludes with a summary.

4.2 Research Paradigm

All research paradigms or approaches are based on certain ontological, epistemological, and methodological assumptions (Asif, 2013; Baškarada & Koronios, 2018; Hirschheim, 1992). These paradigms reflect philosophical underpinnings of knowledge development (Javidroozi et al., 2018; Heeks, 2018; O'Sullivan & Irby, 2015). Thomas Kuhn originated the term paradigm (also called philosophical foundation or worldview) in research in 1962 to describe the historical advance of the natural sciences concerning physics and astronomy (Porra, Hirschheim, & Parks, 2014; Hassan & Mingers, 2018). Rudy Hirschheim and Heinz Klein first introduced the term in 1989 to classify IS research (Porra et al., 2014). Paradigm is the researchers' "set of beliefs and patterns" in a particular field of study (Morgan, 2007). On the other hand, research paradigms are sets of beliefs and practices shared by communities of

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researchers, which regulate inquiry within disciplines (O'Sullivan & Irby, 2015; Nabende et al., 2007). As a result, a paradigm deals with beliefs and practices to influence how researchers select questions and methods. It is always linked to the researchers' action, constructive, and intervention for generating knowledge (Goldkuhl, 2012) and usually unites scholars in the academic community (Klein, 2004).

Myers (2013) outlines three research paradigms commonly used in IS, namely, positivism (e.g., Krotov, 2017; Ketokivi & Mantere, 2016), interpretivism (e.g., Creswell 2013; Walsham 2005), and critical realism (e.g., Asghar, 2013; Dobson, 2002). These research paradigms are explained in the next sub-sections with approaches for acquiring knowledge. Kroeze (2012) describes a paradigm as a set of theories with a historical phase in the philosophy of science. The author outlined ontology, epistemology, and methodology as the three main aspects of the paradigm for acquiring knowledge.

Ontology refers to the nature of reality, which exists and is being studied (Winch, 2017). Ontology and the concept of ontologies have attracted considerable attention in IS research (Wyssusek, 2004). Ontology is used for philosophical investigation of existence or being (ibid). Such investigation may be directed towards the concept of being, asking what it means or what it is for something to exist; it may also (or instead) be concerned with the question 'what reality' (Porra et al., 2014); and 'what exists?' or 'what general sorts of things are there?' (Craig, 1998). It involves researchers' field of study to question the sorts of things and nature of existence (Milton et al., 2006). Kroeze (2011) describes ontology as an "analytical view of the fundamental nature of the universe" and all its components. It also describes how various groups have observed reality in different eras (ibid). Winch (2017) says that the world is real as ontology and researcher's knowledge about it is epistemology. Grix (2002) maintains that ontology is the beginning of all research before the researcher's logical position for

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epistemology and methodology. Thus, ontology is all about the nature of the world around us, particularly the small part of reality that the researcher selected to address. More specifically, any ontology defines the most general categories of what really exists (Milton et al., 2006; Porra et al., 2014). For this study, ontology refers to the philosophical investigation of users' actions, interactions, and transactions across ridesharing platforms.

Epistemology is the study of nature and its origin as well as the level of human knowledge (Stroud, 2011). Epistemology also refers to the researcher's point of view to acquire knowledge or how to understand knowledge of reality. It is the analytical view of the universe and human understanding including its components (Kroeze, 2011). According to Grix (2002), epistemology emphasises the "knowledge-gathering process", and it is concerned with developing new models or theories that are better than competing models and theories. Epistemology provides researchers with the foundation to build on as an object that can be observed and reviewed (Wong et al., 2011). It is all about the nature and scope of what researchers ought to clarify, at least to justify its pursuit (Grix, 2002). Therefore, epistemology is the researcher's point of view to acquire knowledge about the reality being studied. That is an attempt to answer fundamental questions regarding what constitutes knowledge and how humans come to know. It is the foundation that provides a theoretical framework to highlight the co-construction of knowledge between the researcher and part (Hardy & Williams, 2011). More specifically, it is the field that provides researchers with criteria for distinguishing between reliable and unreliable knowledge. This enabled the researcher for this study to believe that the research issue could be best understood from the lived experiences of related users (e.g., Kroeze 2011). It addresses how researchers come to know that reality while methodology identifies the particular practices or approaches used to attain knowledge (O'Sullivan & Irby, 2015).

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Methodology is an approach that interprets ontological and epistemological principles into plans to show how research is to be conducted (Sarantakos, 2005). The methodology is all about the research methods (designs) and deals with how to search for knowledge about the reality (qualitative, quantitative, and mixed) (Cavana et al., 2001; Myers, 2013). Tuli (2010) says that every methodology for research relies on philosophical issues in line with the question of ontology (the nature of reality) and epistemology (the nature of knowledge). Thus, a systematic approach for solving a research problem or science of studying how a study is done scientifically.

In conclusion, a research philosophy is a consistent combination of epistemology and related methodology (Baškarada & Koronios, 2018; Kroeze, 2011). Thus, the main source which is used by researchers to establish relevance to subject areas in line with their discipline (Mkansi & Acheampong, 2012). Each paradigm has its own ontological, epistemological, and methodological claims that propose a particular approach or a set of approaches to social enquiry. Paradigm often provides a choice of data collection methods available to a researcher. Therefore, a basic overview of this is important to understand the researcher's assumptions and justification for the selected research philosophical perspective. Moreover, ontology and epistemology are assumptions for defining research approaches (e.g., Asghar, 2013).

4.2.1 Positivism

Positivism also known as positivist is a research paradigm that emphasises measuring variables and testing hypotheses with objective decisions (Lee, 1991). Positivism is used to establish a standard for scientific research in IS with a logical empirical approach (Siponen & Tsohou, 2018; Porra et al., 2014). In IS research, a positivist uses a case study with a fact-oriented approach through sciences (Orlikowski & Baroudi, 1991; Porra et al., 2014). Siponen and

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Tsohou (2018) say that the positivist beliefs in IS are generalisable, focus on absolute independent variables, ontological assumptions, and statistical or quantitative rather than qualitative methods. Positivists claim that explanations often fail to differentiate between non-causal and causal reasons (Baškarada & Koronios, 2018), such as given the same reasons, two people are likely to act differently (even the same person may act differently at different times). Orlikowski and Baroudi (1991) maintain that positivist research is classified in IS if there is hypothesis testing and inferential statistics about a phenomenon with a representative sample to justify a population. Lee (1991) also posits that any research approach associated with hypothesis testing, experimental design, and mathematical analysis is a positivist tradition. Therefore, a positivist's basic idea is to select a claim and ask about its fundamental (Siponen & Tsohou, 2018; Baškarada & Koronios, 2018). Some authors conclude that IS research is dominated by positivist ideology with the content of predations (Hassan & Mingers, 2018; Orlikowski & Baroudi, 1991; Mcbride, 2018).

At the ontological level, positivist knowledge is objective (real) and quantifiable (Antwi & Kasim, 2015), which demonstrates authority (Porra et al., 2014). A positivist assumes that reality is objectively given and measurable using properties, which are independent of the researcher and instrument. Researchers of this genre, however, tend to treat quantitative and qualitative data as representative facts, fixed set of variables or shared reality, and theory as generalisable (Lee, 1991). Orlikowski and Baroudi (1991) maintain that positivist studies are premised on the "existence of a priori fixed relationships within phenomena" with a structured approach. Therefore, the positivist role in research is to employ a reliable and accurate set of instruments to investigate a phenomenon objectively. As Goldkuhl (2012) states, positivist ontological description in research seems to be pivotal.

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The epistemological knowledge of a positivist is believed to be absolute and objective, irrespective of an observer waiting to be discovered (Cecez-Kecmanovic, 2011; Mcbride, 2018; Orlikowski & Baroudi, 1991). This means that the positivist and the phenomenon are independent and do not influence each other. Positivist beliefs that knowledge can be acquired by explaining and predicting what happens in the social world by searching for patterns and relationships (Lee, 1991). Porra et al. (2014) maintain that such knowledge about positivist's ontology can be acquired via developing and testing hypotheses. However, some authors argue that positivist knowledge is acquired through scientific explanation in quantitative and qualitative terms, such as how variables interact, shape events, and cause outcome (Hassan & Mingers, 2018; Siponen & Tsohou, 2018).

Methodologically, the positivist research paradigm underpins quantitative and qualitative approaches in data collection and analysis (Mcbride, 2018). This genre of paradigm tends to treat data as representative facts, theory as generalisable, and falsifiable propositions with an idea of value-free science (Cecez-Kecmanovic, 2011). Baškarada and Koronios (2018) describe positivist (hypothetico-deductive) methodological approach as creating different concepts and theories, with empirical tests based on the existing conceptual frameworks. Positivist studies, however, seem to work with a fixed set of variables, which can be seen as a contrast to interpretivist for creating a holistic understanding of the phenomenon (Goldkuhl, 2012; Porra et al., 2014). Positivist social science explanations and predictions may take the form of structural functionalism (Baškarada & Koronios, 2018) through statistical, mathematical, and reductionist approaches (Mcbride, 2018). Therefore, methodology becomes the cover-up for legitimacy and the crutch for validity, as if the statistics applied unquestionably made the results valid (Hassan & Mingers, 2018). As a result, positivists emphasise the use of valid and reliable methods to describe and explain the events as true. Furthermore, the positivist

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standards use to judge research are validity, reliability, and generalisability (Mcbride, 2018; Orlikowski & Baroudi, 1991) and deductive approach (Lee, 1991).

4.2.2 Interpretivism

Interpretivism also known as interpretivist is a research paradigm, which solves a problem by focusing on researchers to interpret elements of study (Sarker & Sahay, 2002). Thus, interpretivism integrates human interest into research. Gadamer and Fantel (1975) define interpretation as an explicit reflection for text to have a meaning of values and truths. The interpretivists do not believe in experimental research design except observation and interaction with participants to produce knowledge (Klein & Myers, 1999; Walsham, 1995b). Therefore, the interpretive paradigm is usually underpinned by observation and interpretation of participants through subjective meanings. Goldkuhl (2012) maintains that interpretive paradigm aim is to understand the subjective meaning of what is observed. Interpretivism aims to break out of the existing subjective conceptual frameworks by redescribing phenomena through new concepts (Baškarada & Koronios, 2018). Thanh and Thanh (2015) argue that the paradigm often seeks experiences, understandings, and individuals' perceptions for data to uncover reality rather than rely on statistical data. The data, however, may be obtained through interviews, observations, historical data (printed and online documents), and artefact examination (Sarker et al., 2018b) without any mechanistic rule for formulating an interpretation (Walsham, 2006). The paradigm methodology involves case studies with an interpretation-centric approach of the researcher and an inductive theoretical perspective (Ponelis, 2015; Sarker et al., 2018a). The researcher interprets the case studies from appropriate organisations (Walsham, 2006; Schwartz-shea & Yanow, 2012, p.6-7) through framing theory concepts inspired by textual interpretation (Baškarada & Koronios, 2018; Goldkuhl, 2012).

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However, Lee (1991) maintains that any research approach associated with ethnography, hermeneutics, case study, and phenomenology is interpretive in nature.

Ontologically, interpretive IS researcher is concerned with the nature of reality, particularly about human interpretations and meanings associated with ICT artefacts (Sarker & Sahay, 2004; Walsham, 1995a). Goldkuhl (2012) maintains that interpretivism's ontological assumption is a meaningful action from social interactions. More specifically, interpretivism is dependent on constructivist ontology when investigating IS phenomena (Aliyu et al., 2014; Klein & Myers, 1999). Orlikowski and Baroudi (1991) maintain that the ontological aspect of interpretivist in IS research assumes that the social world (that is, social relationships, organisations or division of labours) is not given but rather produced and reinforced by humans through action and interaction. Interpretivist ontology is subjective and suggests that knowledge is contextual and socially co-created (Lee, 1991) and social reality exists as human beings experience and give meaning to it (Cecez-Kecmanovic, 2011; Rowe, 2018; Walsham, 1995a).

The epistemological stance of the interpretivist is that knowledge is socially produced between the researcher (the knower) and the human subject (the participant) (Orlikowski & Baroudi, 1991). Walsham (1995b) maintains that interpretivist knowledge of reality is a social construction by human users without value-free knowledge, which cannot be obtained as the researcher may use his or her preconceptions to guide the process of getting data. As a result, interpretivist makes sense of the manifold of worlds through the relationship with the human subject, which is the main characteristic of IS research as this study is situated (e.g., Effah, 2016; Goldkuhl, 2012; Sarker et al., 2018a). Antwi and Kasim (2015) underscore the following questions by interpretivist when creating knowledge: What is the link between the researcher and what is known? How do researchers know what they know? What goes into the study as

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knowledge? The highlighted epistemology of the interpretivist, therefore, shows that knowledge is acquired through interpretation of the researcher's interaction with the participants. Orlikowski and Baroudi (1991) assert that in terms of "beliefs about knowledge", this tradition is premised on the epistemological belief to show that social process is not captured in hypothetical deductions, covariances, and degrees of freedom. Instead it is hinged on understanding the social process involved in getting inside the world with those generating it.

Methodologically, the interpretivist research paradigm underpins qualitative methodology in data collection and analysis through interview questions driven (Myers, 2019). The data may be obtained through interviews, observations, historical data, and artefact examinations (Sarker et al., 2018b) without any mechanistic rule for formulating an interpretation (Walsham, 2006). As Antwi and Kasim (2015) note, interpretivists do not believe in experimental research approach. The methodology involves case studies toward an interpretation-centric approach of the researcher and an inductive theoretical perspective (Sarker et al., 2018a). Moreover, interpretivism studies are inspired by textual interpretation and usually focus on meaning through multiple methods to reflect different aspects of the issue. This trend of research approach, therefore, is used to develop an in-depth understanding of the phenomenon understudy (e.g., Klein & Myers, 1999; Myers, 2019; Walsham, 2006).

4.2.3 Critical Realism

Critical realism also known as Criticalist (mixed-method researcher or critical social researcher) is a research paradigm in IS which attempts to critically evaluate and transform the social reality through investigation (Heeks, 2018). It is an alternative paradigm in IS to positivist and interpretive researchers for explaining contemporary phenomena (Rowe, 2018).

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Klein (2004) asserts that critical realism paradigm applies the social world in a reproductive methodology as mechanism to explain events. However, some authors maintain that critical researchers' perspective is concerned with criticising current social systems by revealing challenges associated with their structures (Stahl et al., 2017). This paradigm is qualitative multidisciplinary research in IS domain (Javidroozi et al., 2018; Heeks, 2018) that works with a threefold stratification, namely, the real (mechanisms, structures, and events), the actual, and the empirical (principle) (Klein, 2004). It allows the use of a well-developed and well-structured path to the research by identifying core elements including mechanisms, structures, and events. Therefore, the critical paradigm is usually underpinned by evaluating and transforming the social reality under investigation.

According to the ontological assumption of critical realism philosophy, a real-world does exist or reality always exists (Leonardi, 2013). The reality can be known or unknown (Bygstad et al., 2015) and does not believe that it is objectively given (Javidroozi et al., 2018). Therefore, there is no reality if it does not exist with access to know the fact. Criticalist perspective is that ideologies can be seen as partial and alienating with critical question and analysis (Stahl et al., 2017). Critical realism is not of the view that truth is just once to be found but the social context and materiality that exist in it for any investigation are separate (Leonardi, 2013).

Based on critical realism epistemological principles, Javidroozi et al. (2018) underscore that if the power of mechanisms and structures (regardless of being observable or not) and some other conditions related to the context (contextual conditions) are applied, then events can occur. However, these events are called 'actual events (actuals)', which create the actual layer of reality through observation, experience, and validation (Smith & Johnston, 2014; Klein, 2004). Klein (2004) underscores that criticalist avoids the misconception of logical positivism, which tried to find a rational basis for justifying truth claims based on a limited set of statements of

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facts. Leonardi (2013) maintains that criticalits make determinations about how and why the separate “social” and “material” turn to “sociomaterial” and persist that way over time.

Methodologically, critical realism is a heterogeneous philosophy that clarifies the way to move from ‘action’ to ‘outcome’ and assists the researcher in selecting a strategy and method for study based on a research question and its characteristics (Javidroozi et al., 2018; Leonardi, 2013; Klein, 2004). A variety of critical realism studies employ case study strategies and perform inquiries through qualitative and quantitative approaches. However, Mkansi and Acheampong (2012) maintain that the focus is on its ability to address natural and social sciences which offer a platform for using a variety of methods. Some authors posit that observations, experiences, and validations are the methodological principles of critical realism, which create the empirical layer of reality (Smith & Johnston, 2014; Stahl et al., 2017).

4.2.4 Choice of Interpretivist Paradigm for the Study

The philosophical assumption for this study is drawn from the interpretivist paradigm (Creswell, 2013; Myers, 2013; Walsham, 1995) stance in IS. Among the paradigms mentioned above, interpretivism is chosen as suitable to explain the study (e.g., Orlikowski & Scott, 2008). Qualitative interpretivists believe their role is always to understand social phenomena and then communicate to the audience (Walsham, 2006) with a “premise” or “proposition” (Kroeze, 2012). Therefore, from the researcher’s premise, a subjective epistemology and ontology are socially constructed, and this belief was applied. This approach is appropriate because of the research questions and context (e.g., Kroeze, 2012; Walsham, 2006). Thus, (e.g., Effah, 2016). According to the interpretivist approach, what the problem is, what might be an improvement of a situation and how progress may be worked out are subject to the interpretation of various participants and observers (Avgerou & LaRovere, 2008). This approach supports IS researchers to understand human behaviour in social and organisational contexts by assuming that as

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people interact with the world, they create subjective meaning through their interactions (Winch, 2017). The interpretivist point of view to understand reality in any context is that it can only be through social constructions such as language, consciousness, and shared meanings (Myers, 2019; Tuli, 2010; Klein & Myers, 1999). More specifically, qualitative interpretivist seeks to understand the phenomenon of interest from the participants' perspective through in-depth interaction in their given social and organisational contexts. As some authors maintain, qualitative interpretive research informs reflective thought rather than the simple application of a scoring system (Griffee, 2005; Kuper et al., 2008).

Therefore, interpretive research in IS aims to produce contextual understanding by investigating phenomena through interviews (research guides) and their co-shaping relationships within contexts (Walsham, 1993, 2016). More specifically, IS interpretive researchers favour methodologies that help to collect rich data (Walsham, 1995; Gates, 2006), such as the topic understudy (use of ridesharing platforms) and not only about a phenomenon but also about its context. Hassan (2013) also says a researcher decision often deals with a choice of available data collection methods (e.g., interpretivist – interviews) followed by equally clear data analysis approaches. Oates (2006) underscores how interpretive studies try to understand a pluralistic world based on the principle that people assign meanings and values to a unique context. Kroeze (2012) posits that interpretivism as a philosophical system focuses on reality as human construction via only subjective understanding. This study, therefore, does not work with "falsifiable statements" or "hypotheses" but rather a premise (e.g., Kroeze, 2012; Ballsun-Stanton, 2010). These assumptions form the basis of the researcher's philosophy of studying the phenomenon or producing an understanding of the context of the phenomenon. Furthermore, the choice of interpretivist paradigm supports the researcher to understand philosophical questions to generate rigorous and insightful work (Hassan et al., 2018). The

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interpretivist paradigm, therefore, was considered over the positivist and criticalist paradigms based on the researcher's philosophical background.

4.3 Research Methodology

The term methodology refers to the researcher's applied approach to study a particular issue (Myers, 2019), such as the phenomenon understudy. Methodology translates a paradigm's principles into a research language and shows how the world can be explained, handled, approached or studied (Grix, 2004; Hollway, 2008). It involves the philosophical assumptions and research methods that the researcher believes can be known. More specifically, methodology enables a researcher to translate ontological and epistemological principles into guidelines to show how research is conducted (Sarantakos, 2005) or practices that govern research (Hollway, 2008).

O'Sullivan and Irby (2015) say methodologies are nested within broader research paradigms about the nature of the world, how we interact with it, and how we know it. Research methodology can be classified in different ways but the overall methodological approaches are quantitative, qualitative, and mixed methods (Lee & Hubona, 2009; Kilani & Kobziev, 2016; Myers, 2013). Examples of methodologies include experimental design, surveys, correlational studies, ethnography, phenomenology, and case studies (Myers, 2019). Boundary object can be used as a theory or methodology (Andrade & Urquhart, 2010) but Walsham (1997) suggests that a complete methodology guides research design, data collection, and analysis. The study, therefore, used case studies (Myers, 2019), inductive reasoning logic, hermeneutic approach (Grabara et al., 2014), and boundary object theory (Stange et al., 2016; Star & Griesemer, 1989) as a theoretical lens to understand the phenomenon.

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4.4 Research Methods

Research methods describe strategies for a study and the approach could be quantitative, qualitative or mixed (Hannes et al., 2015; Myers, 2013; Vidgen, 2002). Some of these strategies helped the researcher to find empirical data about the research phenomenon. A research method is a strategy of investigation for getting empirical data in a particular context (Myers, 2013). The choice of research method influences how the researcher collects data (Hassan, 2013; Kilani & Kobziev, 2016). There are various philosophical perspectives, which can inform qualitative research methods such as positivist (Yin, 2014), interpretivist (Walsham, 2006), and criticalist (Mingers, 2002). Qualitative research methods associated with interpretivist approach enabled the researcher to undertake the phenomenon understudy in IS (e.g., Sarker et al., 2018b).

Qualitative research methods in IS consist of four types, namely, action research, ethnography, grounded theory, and case study (Myers, 2013). Any of these is appropriate but the researcher recommended the case study method for the phenomenon understudy.

Action research is a way of expanding scientific knowledge to solve current practical issues (Myers, 2013). It is an iterative process with business people, which is used for improving practical job process or scientific knowledge (Myers, 2019). The practical job process involves business people and researchers. This approach enables researchers to interfere with the issue understudy, unlike the other research methods where researchers just observe. Action research is not applied research because it does not deal with extant findings (Myers, 2013). It is time-consuming and the risk involved is that researchers may lose focus on the value of their contribution (Walsham, 2006). Action research is not flexible because it is not likely for researchers to do the action and study concurrently. The concern of action research is that practice is relevant to suit a particular business (Myers, 2019).

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Ethnography research provides researchers opportunities to get closer to the action understudy (Chughtai & Myers, 2017). More specifically, it helps researchers to spend more time studying human, social or organisational culture. Ethnography and case study have a similar approach just that ethnography takes a longer time than a case study in data collection (Myers, 2019). The ethnography provides an in-depth understanding of a phenomenon as researchers get enough time to explore the participants' activities in a particular context (ibid). It also occupies a wide range of data collection for revealing truths (Sarker et al., 2018b).

Grounded theory is based on how data are systematically collected and analysed (Myers, 2019). It offers researchers one way of coding based on the chosen concepts as the researcher's mind is the best tool for a study (Walsham, 2006). Thus, it provides a very useful coding technique for researchers (Kellogg et al., 2006). Grounded theory is the best qualitative research method that supports researchers to study routine and repeated processes (Myers, 2019). The focus of the grounded theory is to propose frameworks or a "new theory" with an inductive reason approach according to the available data (Sarker et al., 2018a).

A case study is defined as a description of a particular situation used to draw some conclusions about a phenomenon (Myers, 2019). The definition of case study research is philosophically neutral such as interpretive. Case studies are used in teaching and research (Myers, 2013). For teaching, they help students to understand relevant theories and principles for business. For research, they provide researchers with empirical evidence to understand a phenomenon understudy. More specifically, research case studies contribute to the body of knowledge in a particular domain such IS (Myers, 2013; Sarker et al., 2018b). The process involves historical data as an antecedent to describe current phenomena (Porra et al., 2014). The case location is broad and could be of social process, unit or organisation (Myers, 2019). The next section

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focuses on interpretive case study, fieldwork and case selection from a developing country, data source and collection, data analysis, and evaluating interpretive studies.

4.5 Interpretive Case Study

The basis of this study is the qualitative interpretive case study, which is in line with the researcher's paradigm. An interpretive case study is used to produce deep insight into a phenomenon in social and organisational contexts (Klein & Myers, 1999; Myers, 2019; Walsham, 2006). The research approach is interpretive-centric and inductive theoretical lens (Sarker et al., 2018a). This approach supports researchers to explore theories in a particular context (Myers, 2019) based on the research purpose and question. More specifically, case study enables researchers to understand the contemporary phenomenon under investigation (Ponelis, 2015; Porra et al., 2014; Walsham, 2006) with why, how, and what research questions (Myers, 2019). Furthermore, it helps researchers to understand a phenomenon in its natural setting with multiple methods for data collection from one or more organisations (Myers, 2019) to construct themes and patterns with participants (Miles et al., 2014, p.28). This study focused more on *why* and *how* for a process perspective to show activities which occurred (i.e., interpretive) instead of variance perspective with *what* approach (e.g., critical realism) (Jewer & Compeau, 2021). The case study method is in line with the interpretive tradition of the researcher, which made the qualitative interpretive case study appropriate. The nature of qualitative interpretive case study does not require hypothesis; rather it requires empirical evidence via interview and source data (Myers, 2019). This aspect guided the research to rely on artefact observation and other sources of documents including the interview data for an in-depth understanding of the phenomenon understudy (e.g., Myers, 2019) without a statistical concepts. More specifically, interpretive case study is the qualitative research genre, which helped the researcher to understand the selected cases for this study. Thus, the approach

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enabled the researcher to gain an in-depth understanding concerning the use of the selected two ridesharing platform companies from a developing country.

4.6 Fieldwork and Case Selection from a Developing Country

The study's setting was Ghana, a developing country in sub-Saharan Africa. The fieldwork was conducted in Ghana to explore the phenomenon in-depth for developing countries. Initial fieldwork was conducted to identify ridesharing platform companies in Ghana. The locations of the companies were identified and selected based on the local news and information from friends (Myers, 2019). Thus, this case selection involved ridesharing platform companies in Ghana as required by qualitative research methods (e.g., Myers, 2019). The cases were selected via theoretical sampling (Khan, 2014). This strategy enabled the researcher to gather data to check the properties of the appropriate cases or companies that represent the theoretical concepts in studying ridesharing platforms. The approach was also achieved via case selection techniques (Ponelis, 2015) for most potential similar cases based on the research purpose, questions (Sarker et al., 2013; Tan et al., 2017), and how interesting the cases were (Baškarada, 2014). This study selected more than one case in Ghana to improve the confidence level (Myers, 2019). There were four ridesharing platform companies in Ghana as of 2017, namely, Uber, Uru, Dropping, and Yenko Taxi and all of them initially agreed to be used for the case study. The researcher's access to the four ridesharing platform companies was based on the letter provided by the Lead Supervisor. Yenko Taxi initially accepted the introduction letter but failed to provide interview data for the study. This issue prevented the researcher from getting access to Yenko Taxi firm. As Myers (2019) maintains, it can be difficult to get access to a particular organisation for data collection in a case study. Uru ridesharing platform company also failed to provide enough information. The study, therefore, relied on an interpretive epistemology by ensuring that reality is socially constructed (Lee et al., 2015;

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Walsham, 2006) through multiple case studies approach (Myers, 2019). The multiple case studies were finally based on the Uber ridesharing platform company and the Dropping ridesharing company, all in Ghana.

4.7 Data Source and Collection

In accordance with the interpretive paradigm, various sources were used for data collection, namely, semi-structured interviews, artefact observations, printed documents, and online information (relevant documents) (Klein & Myers, 1999; Sarker et al., 2018b; Walsham, 2006) in order to obtain comprehensive insights on the phenomenon. The processes were guided by the concepts and principles of boundary object theory (Stange et al., 2016; Star & Griesemer, 1989) between October 2017 and March 2020. Additionally, the interview data were collected occasionally throughout 2021 as data analysis and reporting progressed. The study used semi-structured interviews for the data collection from IT professionals, drivers, and riders from the two selected companies. The IT professionals are staff from the selected companies. The process was achieved through an interpretive epistemology by ensuring that reality is socially constructed (Walsham, 2006) based on the professional positions (Walsham, 1995a) via face-to-face and technically-enabled conversations (e.g., Sarker et al., 2018b). The semi-structured interview questions were in line with key issues relating to the use of ridesharing platforms in a developing country context of Ghana. Thus, users' actions, interactions, and transactions across Uber and Dropping ridesharing platforms.

Relevant literature, however, provided preparation for the semi-structured interviews and this helped the researcher to learn about the key users, artefacts, and other organisational issues. This strategy supported the researcher to explore further issues during the interviews. Interviews are the main data source in interpretive research (Cousins & Robey, 2015; Myers, 2013; Walsham, 2006), which supported the researcher to access participants interpretations

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(e.g., Lee et al., 2015). Green et al. (2007) maintain that the researcher must always be immersed in the data collection to provide analysis beyond the interview transcript, and this was considered for this study. The semi-structured technique was recommended because the participants were free to comment at anytime and on any issue related to the phenomenon understudy. The researcher started the semi-structured interview questions with one of the staff, which provided a better overview of IS operations for ridesharing platforms in Ghana. The locations for the interviews were Accra - Mall, West Hill Mall, Achimota Mall, Uber ridesharing platform company's office in Accra, and Dropping ridesharing platform company's office in Accra. Other locations included Paloma, Kokomlemle; City Hotel, Kokomlemle; Achimota New Station; Achimota Old Station; Zenith University College, La; Dominion University College, Spintex; University of Ghana, Legon; Malata Market, Accra; Tema Hospital; Police Hospital, Accra; Ghana Commercial Bank, Amasaman; Pokuase Taxi Rank; Kasoa New Market; Accra New Town; Trade Fair, La; Ministries, Accra; Church of Pentecost Central, Alajo; and Melcom in North Industrial Area.

The participants were selected through snowballing and purposive sampling (e.g., Miles et al., 2014). The snowballing identified people with lived experience by asking for contacts from the participants after each interview (Fox, 2006, p.14). Purposive sampling is where the researcher selected participants based on the previous choice from fieldwork without being prespecified (Miles et al., 2014, p.46). Klein and Myers (1999) maintain that there should be an interaction between researchers and participants in order to have shared meanings. This strategy, however, was achieved via a diachronic approach (Dronova, 2015). The diachronic approach is used to obtain multiple views or voices from participants. For confidentiality, all names of the participant in this thesis are anonymised.

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Each interview lasted between thirty minutes and one hour with audio recording following the participant's consent, and the recordings were subsequently transcribed. However, when any participant disagreed with the audio recording, the researcher wrote unrecorded interviews and then summarised them immediately after that interview. Additionally, there were field notes typically handwritten on A4 sheets during the interviews to capture key issues. The field notes generated important categories for the interpretation of the transcripts and some key issues during data analysis (e.g., Miles et al., 2014; Sutton & Austin, 2015).

After the interviews, additional follow-ups via telephone, WhatsApp, and e-mail were used to clarify essential points. In the interpretive paradigm, data collection and analysis tend to be concurrent (Klein & Myers, 1999; Miles et al., 2014) and these enabled the researcher to ask further questions that needed clarifications from participants. The interview process continued until a satisfactory number was reached (Ponelis, 2015). In addition, artefact observation and examination (Cousins & Robey, 2015; Myers, 1997) were employed for further data collection. These strategies helped the researcher to gain an in-depth understanding from the inside, based on the users' routine activities with ICT artefacts. Finally, theoretical saturation provided an idea for the researcher to indicate the end of the interview, when no new relevant information was needed (Evans, 2013; Walsham, 1995a). Table 4.1 below provides a detailed breakdown of the interviews conducted and the participants at each unit of analysis.

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Table 4.1: Detailed Data Collection Methods, Timelines, and Durations

Case	Data collection method	Subject	Date and Duration of Interview
Case 1: Uber	Interview	Greenlights Operations Coordinator (1)	22 November 2017; 45 minutes
		Assistant IT Administrator (1)	29 November 2017; 1 hour
		Drivers (22)	12 November 2017 – 30 January 2021; 30 – 35 minutes
		Riders (40)	12 November 2017 – 30 January 2021; 30 – 50 minutes
		Total participants 64	
Case 2: Dropping		CEO (1)	18 October 2017; 1 hour
		Drivers (10)	24 October 2017 – January 2021; 30 – 35 minutes
		Riders (16)	24 October 2017 – 30 January 2021; 30 – 35 minutes
		Total participants 27	
		***Overall total participants* 91**	
	Artefact examination	Uber office – drivers' registration	29 November 2017; 1 hour
		Uber drivers' trip set-up	30 May 2018; 30minutes
		Uber riders' registration and booking	30 January 2018; 30 minutes
		Uber website (7 times)	12 November 2017 – 30 January 2021; 1 hour per visit
		Dropping office – drivers' registration	30 October 2017; 1 hour
		Dropping drivers' trip set-up	14 November 2017; 30 minutes
		Dropping riders' registration and booking	12 January 2018; 30 minutes
		Dropping website (5 times)	12 October 2017 – 30 January 2020; 1 hour per visit

Source: Author's construct

4.8 Data Analysis

Data collection and analysis tend to be concurrent in the interpretive paradigm (Klein & Myers, 1999; Myers, 2019; Walsham, 2006) and these informed the researcher to ask further questions for clarifications in an iterative process. An inductive approach was used for the analysis (Hannes et al., 2015), and this allowed for some themes to emerge. That is, from a specific topic to generalisations by first reading through the data drawn to all aspects of ridesharing platforms. The two cases were analysed with concepts and principles of boundary object theory

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through hermeneutics approach. This approach is primarily concerned with making meaning of textual data by providing a set of concepts (Boell & Cecez-Kecmanovic, 2014; Iivari, 2018; Grabara et al., 2014), which helped the researcher to interpret and understand the multiple texts. Hermeneutics has the view that understanding a research phenomenon is derived through an iterative process between understanding the interdependent meaning of the parts and the whole. Hermeneutics is a philosophy and a mode of analysis in two ways (Iivari, 2018). First, as an approach to human understanding, it offers the philosophical basis for interpretivism (Klein & Myers, 1999; O'hEocha et al., 2012). Second, as a data analysis approach, it helps a researcher to understand what a particular text (written documents) means (Grabara et al., 2014).

In addition to the data analysis, transcribing and rigorous coding were used to identify and interpret issues, similarities, and differences that were revealed through the participants' narratives (Mondada, 2018; Sutton & Austin, 2015). As a result, this strategy helped the researcher to understand what was observed from each participant's perspective through audio-recordings. As Green et al. (2007) maintain, in order to provide analysis beyond the interview transcript, the researcher must always be immersed in the data collection. This technique enabled the researcher to play the recorded audios several times before converting the spoken into the written word for the data analysis.

Walsham (1995a) demonstrates how interpretive researchers access participants' interpretations, filtering the interview data through conceptual apparatus, and feeding a version of events back to others. The researcher coded and analysed the interview transcripts to contextualise the ridesharing platforms to meet the users' needs. More specifically, the interpretive framework is a theoretical approach that involves the systematic analysis of socially meaningful action to arrive at the understanding and interpretation of how people create and maintain their social worlds (Sutton & Austin, 2015). Thus, the way of analysing

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the participants' stories, responses or quotes, and then "restory" them into a framework or theme that makes sense. The analysis ended with the ideas of qualitative interpretive (Klein & Myers, 1999; Myers, 2019; Walsham, 2006) when the researcher reached the saturation point (Miles et al., 2014, p.100). Thus, the study, at a point in time, did not require any further analysis. In order for the researcher to ensure authenticity, criticality, and sense-making as well as strengthen the credibility of the analysis (Walsham, 2006), a request was made for a review from colleagues on the findings. The last step of the within-case analysis was to group the themes, categories, and relevant quotes for their cross-case analyses.

4.8.1 Thematic Analysis

Theme analysis is a process for identifying patterns of shared meaning in a qualitative study (Braun & Clarke, 2019). Themes are not always in the existing data (ibid) but rather how concepts emerged from the study. This approach was used to abstract concepts from the field data, which generated the case description. First, the themes (ridesharing platforms) are qualitative notations that the researcher assigned to the data understudy (Lopez, 2013). The theme generation involved interpretation of the issue under investigation; concepts emerged from the case descriptions. Mapping of research themes (Miles et al., 2014, p.153) was used to map the pattern categories along with quotes from the field notes. Specifically, the researcher used this approach to test the explanation with the data and theoretical concepts relevant to the study.

Categories were the second level used for linking codes from the initial stage, which created coherent descriptive labels coded as features of the phenomenon. The categories (Uber and Dropping) allowed the researcher to identify similarities and differences within the themes and develop subcategories for those themes.

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Codes were the final level and involved different users and IT professionals as separate entities, and these codes were connected for creating a meaningful analysis. The Codes were used to categorise how each participant spoke about aspects of the issue under investigation (e.g., Iivari, 2018) without predicting the outcome of the research (Mkhomazi & Iyamu, 2013).

Furthermore, the researcher used axial coding to extract first-order code, second-order constructs, and aggregates by grouping the themes and categories in line with their relationships (Gioia et al., 2013). Axial coding is a process of examining and grouping large coded data into more abstract categories (ibid). First-order codes (e.g., breakdown information access) were in line with illustrative codes from the participants into more abstract categories. The outcomes of the first-order codes were combined into abstraction to generate second-order constructs (e.g., disrupt real-time activities). The outcomes of second-order constructs were also used to generate the aggregate dimensions such as Internet outages. The approach helped the researcher to reduce the categories by structuring the data into a more manageable for the analysis.

4.8.2 Theory-Driven Analysis

Theoretical integration (e.g., Yardley et al., 2013) of boundary object theory (Stange et al., 2016) was used as a lens to understand and analyse the case studies data from the sociotechnical view of the participants. More specifically, the need to extend the application of the theory to ridesharing platforms was realised by introducing the concepts of users' actions, interactions, and transactions during the case analysis (Chapter 3). The extended concepts of the boundary object theory were based on the research purpose and questions (Chapter 1). The theory, therefore, was used as a "sensitising device" (Ellway & Walsham, 2015) during the analysis and not just a testing instrument. In line with the boundary object theory, the individual

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ridesharing platform (within-case), therefore, was used as the unit of analysis. The analysis of the data from the various ridesharing platforms was important for exploring differences that exist due to the variation in techniques for within-case according to their boundary object, boundary object use, and boundary object environment.

The original concepts of the theory are boundary objects, actors, actions, and interactions, while the principles are to connect various users from different social worlds with common protocols across the boundary. This study extended the four concepts with fifth element called "user-boundary transactions". The need to extend the concepts (Chapter 3) was that Stange et al. (2016) did not include user-boundary transactions, which can emerge when they are connected. The extended construct of the boundary object theory application for this thesis is based on this highlighted reason. The users' activities across each case ridesharing platform involve "user-boundary transactions" such as billing transactions and not just boundary actions and interactions, which emerge when they are connected. The user-boundary transactions concept is a commercial agreement between users to exchange services and funds. In addition, the original "interactions" and "actors" concepts have been contextualised to suit the phenomenon understudy (e.g., Ellway & Walsham, 2015) as "user-boundary interactions" and "users" respectively. The study also contextualised actions as "user-local actions" and "user-boundary actions. The user-local actions show what users activate individually on ridesharing platforms to achieve their goals without affecting each other such as loading riders' app. The user-boundary actions also show what users activate across boundaries, which affect each other such as trip cancellation. The reason for the contextualisation is to make the study clearer for readers to understand.

The analysis also used common and local features of how the boundary object is viewed and used for each case study. This was done in line with each platform's core and complementary

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components. The common features are associated with each platform's core component as administration panel features. The local features are also associated with each platform's complementary components as drivers' and riders' app features. Finally, there was a cross-case analysis from the within-case through boundary object processes to compare their findings on similarities and differences for advantages and contributions to the study (e.g., Leidner, 2020). The approaches, therefore, enabled the researcher to concentrate on the phenomenon understudy, rather than his assumptions.

4.9 Evaluating Interpretive Studies

This thesis followed the most fundamental principles and ethics of interpretive research which distinguishes it from the other two research philosophies in IS, positivism and critical realism. More specifically, interpretivism cannot be evaluated with the same set of positivism or critical realism principles for conducting and reporting on data (Griffee, 2005). In essence, how the principles helped the researcher to understand participants' thoughts and impacts of the phenomenon concern in social and organisational contexts (e.g., O'hEocha et al., 2012; Sarker & Sahay, 2002). This study used Klein and Myers' (1999) proposed set of principles for conducting and evaluating interpretive field studies in IS (see section 8.4). The next two sub-sections provide an overview of the principles and ethical considerations.

4.9.1 Principles of Interpretive Studies

Klein and Myers (1999) outline seven set of principles in IS for conducting and evaluating qualitative interpretive field study. The principles are presented below in terse:

i. **Hermeneutic Circle**: This principle of human understanding of a text is described as a "meta-principle" and it is fundamental to all the other six principles in interpretive studies (O'hEocha et al., 2012). The meta-principle is to make meaning of textual data. This

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principle provides a set of concepts to help a researcher interprets and understands the text or multiple texts about what people have done, said or written about an issue through an iterative process (e.g., Grabara et al., 2014). Hermeneutics is a philosophy and a mode of analysis (Iivari, 2018) by making sense of the world such as the phenomenon understudy with back and front understanding and interpretations (Chughtai & Myers, 2017).

ii. **Contextualisation**: This principle maintains that researchers should understand reality in a research setting to reflect the social historical background of the phenomenon understudy. This means the researcher must provide a better understating for the intended audience to see the trend of the research phenomenon (see Chapter 5). It is a central tenet, which helps researchers to explain the social and technical context of a study (Ellway & Walsham, 2015) to advance the rigour of qualitative interpretive research (O'hEocha et al., 2012).

iii. **Interaction between the researcher and the subjects:** This principle requires a critical reflection on how data are socially constructed through the researcher's interactions with participants (O'hEocha et al., 2012). More specifically, how the interactions influence the research phenomenon for efficient data collection and legible to researchers and participants. For instance, how researchers validate electronic documents and check for accuracy of transcripts of interview data by participants. This principle generates greater trust between the two parties (Schwartz-shea & Yanow, 2012, p.80) for knowledge generation.

iv. **Abstraction and generalisation:** This principle requires that interpretation of data, case analysis, and/or discussion of findings must be connected to the theoretical concepts to understand social action through the abstraction and generalisation of the research data rather than statistical data (Ellway & Walsham, 2015). More specifically, an interpretive case description, case analysis, and discussion of findings are situated in the specific

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context of the theoretical concerns about human understanding and social action generated from the research data (O'hEocha et al., 2012; Walsham, 1995a).

v. **Dialogical reasoning**: This principle requires researchers' attention to possible contradictions with back and front revision between theoretical preconceptions that guided the research and the actual findings that emerged from the study (e.g., Ellway & Walsham, 2015). The researcher, therefore, was sensitised through the lens of boundary object theory to entwine with field data, analysis of research text, and actual findings of the study through rereading.

vi. **Multiple interpretations**: This principle requires researchers to be sensitive to seek possible different narratives among the participants of the study (Ellway & Walsham, 2015). In addition, researchers must confront the inconsistencies of the participants to revise their understanding accordingly. The researcher considered and revised the interpretations of potential differences from the participants' storytelling accordingly, as O'hEocha et al. (2012) posit that the same structure of events can be interpreted in another way.

vii. **Suspicion**: This principle requires researchers to consider the possible "biases" and systematic "distortions" from the participants' narratives collected for the study. The researcher, therefore, was mindful of the interpretations of possible biases or distortions from the participants' narratives from the two cases according to their particular interests (e.g., Ellway & Walsham, 2015).

4.9.2 Ethical Considerations

This study is guided by some principles of right and wrong (Watson, 2019) in accordance with the University of Ghana guidelines for the planning, conducting, storing, and reporting of the research findings. These values guide research with care according to the researcher's

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professional and ethical responsibility (Porra et al., 2014). In essence, ethical code makes researchers honest in practice such as transparency in their meaning or sense-making (Schwartz-shea & Yanow, 2012, p.112).

The ethical considerations for this study include the university guidelines for securing permissions, participants' rights, maintaining confidentiality, working with minors, research integrity and quality, and other risks for handling and publishing data (Miles et al., 2014, p.68-73). In addition, plagiarism is the act of copying and disseminating someone's original ideas as your own (Gunnarsson et al., 2014). This study used Grammarly plagiarism thoroughly to avoid such academic misconduct. The interviews data are treated with the required confidentiality and were only used for research purposes and not disclosed to any third party in line with Ghana's Data Protection Act 2012, "65 (2) Personal data which is processed for research purposes in compliance with the relevant conditions may be kept indefinitely" (Data Protection Act, 2012, p.36). Details of the ethical considerations of this study are presented in Chapter 8 (see Section 8.5).

4.10 Summary and Conclusion

This chapter provided the research paradigm, methodology, and techniques used for the study. It underscored the reasons for the choice of paradigm and qualitative interpretive case study. It also presented how data were collected and analysed. It concluded with the seven set of principles for evaluating interpretive studies and ethical considerations for this study. The next chapter presents the case description.

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CHAPTER FIVE

CASE DESCRIPTION

5.1 Chapter Overview

The previous chapter presented the research methodology that guided the thesis. The current chapter presents the case description of the two selected ridesharing platforms in Ghana. The main section begins with the description of each case from a developing country context of Ghana as follows: Case 1, Uber and Case 2, Dropping. The sub-sections of each case present components, planning and setup, process, reasons, use, and challenges. The chapter concludes with a summary.

5.2 Case Study 1: Uber

Uber is the first company that developed and ran ridesharing apps. It was formally launched in 2010 in San Francisco in the United States of America. Uber is a digitally-enabled transportation company that connects drivers and riders at the touch of a button on a screen. The company operates in over 475 cities in over 75 countries spanning 6 continents including Ghana. It was launched in Ghana in June 2016. The core aspect of the Uber ridesharing platform in Ghana is to provide online transport service for riders precisely in the cities through the use of digital technology. Uber is one of those few technology companies in the world that has been valued at over $50 Billion. This is because the service is on-demand via digital technology and it has brought a revolution in the taxi industry all over the world. Thus, most people argue that Uber should be treated as a taxi business with the same regulations. Others, however, argue that Uber is a digital technology platform that connects drivers and riders for information sharing for trip activities.

The company connects drivers and riders with an opportunity to take charge of their trip activities and in doing so, have control over their own time and money. As a result, the

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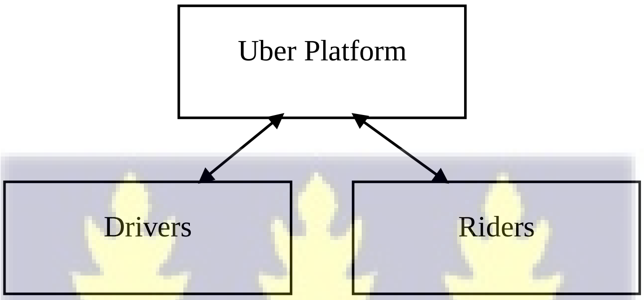
company's ridesharing platform is described as disruptive in Ghana because of its superb performance over the traditional taxi services. In addition, the Uber ridesharing platform is attracting digital technology enthusiasts in Ghana for trip activities, especially among young people who are more ICT knowledgeable. The next sub-sections present the components (Figure 5.1), planning and setup, process, reasons, use, and challenges of the Uber ridesharing platform.

Figure 5.1: Components of Uber Ridesharing Platform



Source: Author's construct

Figure 5.1 is a diagrammatic representation of the Uber ridesharing platform components which shows the relationship between driver and rider user groups. The ridesharing platform is the intermediary or hub of the company that connects drivers and riders as users for trip activities. Drivers are users of the Uber ridesharing platform who send and receive riders' trip information in real-time. Riders, on the other hand, are users of the Uber ridesharing platform who communicate in real-time for trip activities for a fee. The Uber ridesharing platform operates with core (administration panel) and complementary components (drivers' and riders' apps). The administration panel is used for managing, monitoring, and controlling users' activities in real-time. The complementary components are used by users as gateways for accessing the Uber ridesharing platform. Drivers' app provides them with a link on their phones

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for accessing the platform. Riders' app also provides a link on their phones for loading the platform.

5.2.1 Planning and Setup of Uber Ridesharing Platform

Uber came to Ghana as a ridesharing platform company with the aim to provide safe, affordable, and reliable transport. The company did a feasibility study to ascertain whether Ghana has established ICT infrastructure that supports emerging technologies for digital-enabled services. The findings from the feasibility provided the role of the existing infrastructure as enabling digital environment for setup and use of the Uber ridesharing platform. The company considered the following elements in the existing digital environment from the feasibility study for setup: Internet service providers, telecommunication companies (telcos), dealers of communications equipment, banks, and broadcasting stations. They intended to use the Internet for their setup and operations connectivity. The telcos are to provide drivers and riders with cellular networks and data for Internet access. Uber planned to buy computers and communication network components from the dealers. They also intended to advertise for recruitment, pre-screening for drivers, and their service on broadcasting stations.

Additionally, they collaborated with telcos and banks through interoperability for drivers' and riders' information sharing across the platform. Interoperability is a standard that enables different digital platforms or networks to exchange information. Telcos are telecommunication service providers who provide mobile lines and data for communication, Internet access, and mobile money for electronic payment (e-payment). Banks are funds management institutions, and they support riders with e-payment via credit card linked to ridesharing platform companies.

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Uber aimed to provide the ridesharing platform in Ghana to solve drivers' and riders' challenges in the traditional taxi services. According to their feasibility study, riders' challenges in the traditional taxi services were difficult for them to hail a car during peak hours, at the raining time, and at night as well as unfair charges when dealing with unknown destinations. Drivers' challenges also were searching for riders at the same location increases traffic congestion, burning fuel without getting riders, insecurity due to no record for trip activities, and poor route selections for trips. After the feasibility study, the company registered and set up an office in Accra as a digital company for managing, monitoring, and controlling users' information for trip activities. The company then recruited qualified IS/ICT professionals as staff for setups, operations, and other related routine activities. The assistant IT Administrator stated that:

> *The company recruits only ICT professionals as Uber staff because all our activities are paperless. We do not even use a pen and stamp, everything is digital.*

The company had pre-screening for drivers and selected those who were ICT-oriented and able to use the app. The Assistant IT Administrator from Uber explained how drivers were selected for registration as follows:

> *We advertised on the radio that we are pre-screening drivers as partners with a minimum age of 25 years who are ICT-oriented for training. In addition, drivers with a car or willing to partner with vehicle owners. We considered the following valid requirements for selection before registering and training: age, driving license, driving test, car with four doors and air conditioning, Driver and Vehicle Licensing Authority (DVLA) certificate, private car with number plate (white background and black number), commercial insurance certificate with comprehensive cover, and smartphone with a minimum of 3G network standard.*

INTEGRI PROCEDAMUS

The setup involved ridesharing platform core and complementary components from the parent company. The core component is the administration panel used by the IT Administrator and the Assistants. The complementary components are drivers' and riders' apps used by drivers and riders, respectively. The administration panel features were customised to suit drivers' and

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riders' information for trip activities. The administration panel features are users' management form, administrations management form, cars and booking management form, payment management form, and reviews management report.

The *users' management* form ensures who can access the Uber ridesharing platform for what purpose with an authorised username and password. The *administration management form* supports routing activities involving managing, monitoring, and controlling users' profiles, such as verification of drivers' registration details and exchange of information with riders. The *cars and booking management form* is used to match riders' requests to drivers. This function also involves managing, monitoring, and controlling their trip activities in real-time. The *payment management form* is used to manage and control trip fare related activities. The *review management report* is used to manage and evaluate users' activities for performance rating and post-trip reports for auditing.

Drivers' and riders' apps setup involved different features meant for accessing the Uber ridesharing platform for trip activities. The drivers' app component features are registration form, push notification button, trip setup form, end trip button, accept payment button, and rate rider option buttons. The *registration form* is used to register drivers. This function enables drivers to access the Uber ridesharing platform with proof of identity and profile in exchange for identification and reference. The *push notification button* helps drivers to activate the command for justification by accepting or rejecting riders' requests as well as sending trip updates. The *trip setup form* enables drivers to set riders' preferred drop-off location, route selection with estimated arrival time, and payment method. The *end trip button* enables drivers to stop at the riders' preferred destination for the final fare for payment with associated trip completion details. The *accept payment button* feature helps drivers to collect the trip fare from

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riders by cash or get invoice notification from e-payment. The *rate rider option buttons* assess riders' trip behaviour for a review.

The riders' app features are registration form, request Uber ride form, trip cancellation button, payment method form, and rate driver option buttons. The *registration form* creates riders' profile with proof of identity before getting access to the Uber ridesharing platform. Riders use this function anywhere to register without the need for Uber staff supervision. The *request Uber ride form* helps riders to set the following: location, destination, car type with fare estimate, number of passengers, and schedule a car for e-hailing. The *trip cancellation button* is used to stop the booked car before drivers' arrival for pick-up. Pick-up is where riders get inside the car before drivers set up and go. The *payment methods form* provides riders with options to settle the trip fare via e-payment or cash. The *rate driver option buttons* evaluate drivers' performance during the trip for a review.

The setup also involved other supporting communication channels and integrated services, namely, Internet, Google map, GPS, short message service (SMS), e-mail, website, and payment (via credit card, mobile money, and cash). *Google map* is an electronic or web mapping service used to provide directions and real-time traffic information. This function supports users to navigate to a preferred location for trip directions and estimate completion time. *GPS* is used to identify location names. This function provides a sensor that automatically activates users' location addresses for request matching and location updates, movement patterns, and traffic flow information.

The company installed and configured the administration panel, drivers' app, and riders' app components together with the other associated channels to suit the Ghanaian context. The

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configuration involved customising and linking language, country code, date and time, and currency; Google map for route selection based on landmarks; and GPS for location identification and traffic flow information. The configuration also involved customising and linking SMS and e-mails for users' communications for registration. The company configured e-payment for riders who wish to pay via credit card and mobile money directly into its account and cash payment to drivers. Furthermore, the setup enabled the company to create profiles for the staff according to their status of operating and customised drivers' commissions. The company finally executed the ridesharing platform into operational for users in June 2016. The Assistant IT Administrator described how the platform was installed for use as follows:

> *The infrastructure is from our parent company, we have configured and customised it to suit the Ghanaian context. The company registered some drivers for try test before making the platform ready for users' registration.*

A pilot test for drivers' registration for the app was done at the company's office. After that, the normal or standard registration for drivers was done. Eligible registrants were those with a compatible mobile phone and who had already gone through a pre-screening process. One of the drivers explained the process for their app registration and access to the Uber ridesharing platform as follows:

> *Registration for drivers' app requires smartphones with Internet-enabled and driven test. The administrators assist drivers at the company's office in the process. After the registration, drivers then access the platform with a password and current photo via selfie each time we want to be connected.*

The type of cars required for Uber ridesharing has introduced a new market for vehicle manufacturers. Uber has a standard for selecting cars to meet the service. The requirement prevents some drivers who are unable to meet the standard from partner with the company. The cars used for the Uber ridesharing platform also attract riders. The cars are physical infrastructure used by drivers. One of the drivers explained the registration process involves cars and his expectations as:

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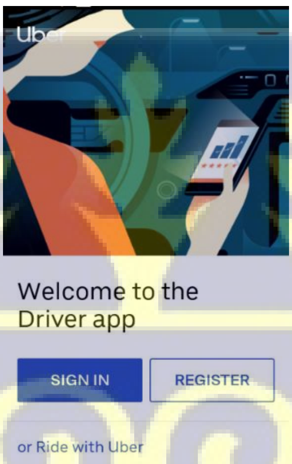
Uber requires private cars in good shape for registration without any security features. I recommend the company should accept cars with a tracking system and camera-enabled only. The tracking system can monitor cars' locations without depending on mobile phones' GPS associated with drivers. This function can remotely stop our cars when snatched by armed robbers. The cars with cameras can also record activities, which happen inside the vehicles.

Drivers' app registration collects and stores information about them (drivers' profile) once in order to access the Uber ridesharing platform as the company sees them as users. Figure 5.2 below shows an example of the drivers' registration process and access, which was demonstrated to the researcher during the field study.

Figure 5.2: Drivers' Registration Process



5.2.2 Process of Uber Ridesharing Platform

This section shows the process of the Uber ridesharing platform for drivers' and riders' trip activities. The Uber ridesharing platform connects them within the company's geolocation via the apps under the management of the administration panel. The administration panel is the centralised and automated matching and pricing system. The process for drivers' and riders' trip activities across the Uber ridesharing platform involves eleven detailed stages. Although, the entire process of drivers' and riders' information sharing for trip activities is physical-digital. The physical component involves driving the car and cash payment. The digital component involves the real-time sharing of information via the Uber ridesharing platform

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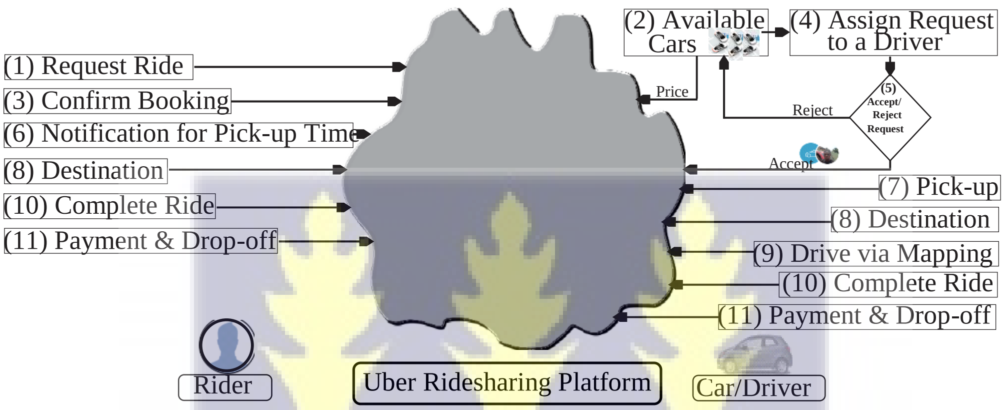
from the request stage to the payment & drop-off stage. A rider uses his/her app to request a ride by inputting and sending a request to the Uber ridesharing platform. The Uber ridesharing platform instantaneously computes a proposed fare based on the available cars within the geolocation of the riders' source and destination addresses for confirmation of booking. Figure 5.3 below shows a graphical representation of the Uber ridesharing platform process between drivers and riders.

Figure 5.3: Process of Uber Ridesharing Platform



Source: Author's construct

The platform assigns the request to the available driver or redirects a driver to the riders' source address for acceptance. If a driver rejects the riders' requests, the Uber ridesharing platform automatically reassigns another driver until approval. Once the request is approved, the platform automatically provides drivers with the riders' source address, name, and photo without the destination address. Riders, on the other hand, receive drivers' profile such as name, photo, and car details. The Uber ridesharing platform provides drivers and riders with access to exchange information until the end of the trip for payment & drop-off, which is the last stage of the platform process.

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5.2.3 Reasons for using Uber Ridesharing Platform

The reasons why drivers and riders use the Uber ridesharing platform are because of its available functions for quality trip activities. The platform enables riders to book rides at convenience for pick-up at their preferred location. This online booking (match demand) saves riders a considerable amount of time to manage their activities whiles waiting for the cars. This function is riders' major concern for using the Uber ridesharing platform because it enables them to choose a car/driver and cancel the trip when not interested.

The platform also enables drivers to accept a series of riders' requests in close proximity. This match supply is drivers' concern because they are able to provide the service to meet riders' needs. This function saves drivers a lot of time and burning of fuels to avoid roaming without getting a rider. Flexibility is another reason why drivers use the Uber ridesharing platform. This function associated with the Uber ridesharing platform enables drivers to provide riders with a quality trip. A driver said this:

> *I am a former taxi driver and prefer to use the Uber ridesharing platform because it is flexible. It always assigns me to a rider whose destination is near to my residence when I am signing off.*

Automatic billing for the affordable fare is another reason why drivers and riders use the Uber ridesharing platform. This function provides openness for them to manage the trip fare and payment without any talk or misunderstanding. The automatic billing also provides estimated fare, which inspires riders via different apps to compare fares from other platforms for their final decision. One of the riders expressed why she uses the Uber ridesharing platform as follows:

> *As for me, Uber is Godsent — clean vehicles, well-mannered drivers, and affordable fare based on the automatic billing system. Today, I can book any car of my choice from the two options available on the platform. Uber always consider*

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riders first for quality trip activities. Even though Uber charges a penalty for trip cancellation, which is added to the next book, the fare is still affordable.

Riders use the Uber ridesharing platform because of legitimacy. This function provides genuine evidence of riders' trip with related time, location, and cost. It also enables riders to get their travel allowances without any dispute with their employers. Nowadays, some institutions have adapted the Uber ridesharing platform as a legitimate means of transportation service for their employees. They recognise and accept ridesharing as genuine and proper for their employees to use for trip activities. This adaptation by some institutions minimises corruption because it provides verifiable evidence of riders' trips with associated costs. One of the riders said this:

I always use the Uber ridesharing platform for official assignments in Accra. This is because my organisation accepts only evidence of travel before payment.

The use of Uber ridesharing platform ensures accountability. Riders use the platform because they can account for their trips to meet their organisational report, unlike the traditional taxi services. This accountability associated with the Uber ridesharing platform provides assurance for organisations to evaluate their employees' performance related to trip activities. Thus, the evidence of travel with the associated source and destination addresses also ensure accountability. The Uber ridesharing platform provides drivers and riders with unrestricted access due to the type of private cars they use. This function widens areas of their operations without a limit, especially in some business locations where traditional taxis are not allowed. Thus, the Uber ridesharing platform increases drivers' areas of operation and income generation compared to the traditional taxi services. One of the drivers said this:

The Uber platform company requires only private cars from drivers. My car has been registered as a commercial vehicle but I operate as a normal private car. This is because my car is not like the traditional taxi with a commercial registration number and colours (yellow and another colour). Places with "taxi is not allowed" descriptions limit commercial cars from entering, unlike vehicles associated with Uber.

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The platform provides drivers and riders with the best route selections and location identification. Thus, both user groups enjoy the automatic direction and destination address for flexible route. One of the drivers described why he uses the Uber ridesharing platform in terms of unlimited operating environments as follows:

> *Uber has a higher class than the traditional taxi services because of its digitally-enabled service. The platform provides me with a series of riders' requests everywhere, especially where the traditional taxis are banned. This saves time to pick riders around while taxi drivers may spend time searching for some.*

Another driver also explained his reasons for using the Uber ridesharing platform as follows:

> *As for me, I use Uber which is popular but limits drivers to work for eight hours a day. I also use other ridesharing platforms beyond Uber's limitations. This strategy enables me to switch between different ridesharing platforms for more riders and hours.*

The Uber ridesharing platform supports riders to book cars at their convenience. Riders have options for pick-up points, choice of driver/car, cancellation of service, and mode of payment. The pick-up point is the riders' preferred location such as home, church, and school. They also have the option to book cars at their convenient time and do other things until arrival for pick-up by drivers. Some of the riders pointed out what inspires them to use the Uber ridesharing platform as follows:

> *The platform creates smart cities for riders to enjoy convenience, affordable rides 24/7, and optimise cars utilisation. Smart cities support riders to quickly move around the cities. Sometimes, I park my car and use Uber because it is economical. It is fast and I can pick up and drop off at my convenient time and preferred location. Uber keeps track of my profile for post-trip activities, which enables me to communicate with drivers for any action.*

Drivers and riders also use the Uber ridesharing platform because of traffic flow information and location updates via Google map and GPS. The Google map and GPS are used for digital address system. This system supports the company to manage drivers' and riders' locations

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and directions virtually. The Greenlights Operations Coordinator narrated how their platform reduces traffic jams to improve drivers' and riders' trip activities as follows:

> *Constant use of the Internet enables us to communicate with drivers across our platform for traffic flow information. We also redirect drivers via Google map and GPS associated with the platform to occupy empty locations to meet riders' needs. This strategy avoids many cars operating at a specific location.*

Drivers and riders use the Uber ridesharing platform because of the e-payment function. This function minimises taxi robbers and contact diseases such as coronavirus disease 2019 (COVID-19) due to its cashless payment. In terms of security based on real-time recordings, the Uber IT Administrator and Assistants keep track of drivers' and riders' profiles for trip activities. Drivers use the Uber ridesharing platform because of its real-time monitoring function that can provide recordings to track snatched cars and riders who refuse to pay. They believe that the information can support them to track and find their stolen cars. They also believe that the information can support them to collect their money from riders who refuse to pay before drop-off. This function has improved drivers' confidence to provide riders with trip service anywhere and anytime without fear in Ghana. The Greenlights Operations Coordinator narrated the role of monitoring drivers' and riders' trip activities as a form of security as follows:

> *What makes Uber unique is that Greenlights Operators monitor and control drivers' and riders'* communications *24/7 across the ridesharing platform. The company also keeps recordings of trip activities including locations of cars. This strategy discourages taxi fraud.*

A driver expressed why he uses the Uber ridesharing platform as a form of security as follows:

> *This era of the Uber ridesharing platform has improved my activities without fear. This is because the platform provides me with riders' profile such as photo, contact number, and name for both online and offline information exchange for identification. The platform has minimised my business risks including operating at night and unknown locations as well as riders who refuse to pay for the trip.*

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Concerning riders' security associated with the Uber ridesharing platform, they believe that the Uber staff role of monitoring and controlling drivers in real-time can track records for post-trip activities. Further, riders can share their trip details with families and friends, such as drivers' name, phone number, car registration number, pick-up time, and destination address. A rider explained his goals concerning the security as follows:

> *I always share my trip details provided by the Uber ridesharing platform with my friends for security reasons. This is because the information can be used to trace my location for any help when it is needed.*

5.2.4 Use of Uber Ridesharing Platform

The process for drivers' and riders' local actions, communications, and transactions across the Uber ridesharing platform consists of three main stages. Namely, data collection for riders' requests, request matching and response, and pick-up and drive. Drivers and riders communicate on the platform for information sharing. They also communicate outside the platform for information sharing via text (SMS and WhatsApp), voice call, video call, and face-to-face.

Data collection for riders' requests: The first stage for riders to access the Uber ridesharing platform is to download and install the app from Google Play Store or Apple Store on smartphones (users' mobile phones) via the Internet. The installation process involves riders' registration for creating a profile with name, photo, e-mail, and phone number. The registration process is confirmed by text messages and/or e-mails when done, and this enables riders to take part on the Uber ridesharing platform. Riders get a notification for confirmation of registration without going through the process again. Riders then open the app to book ride (ride request) via the platform with the associated profile. The open process automatically fetches riders' configuration location addresses via GPS associated with the app, which enables the platform to link the request location to available cars in close proximity. Figure 5.4 below shows an

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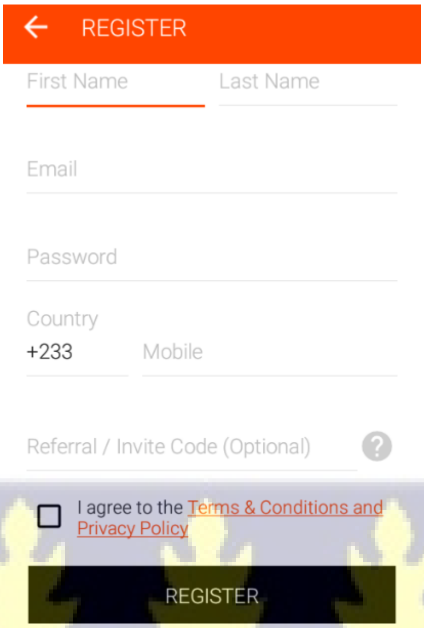
example of the riders' registration process, which was demonstrated to the researcher during the field study.

Figure 5.4: Riders' Registration Process



If the GPS is not active, then the process automatically provides an option for riders to turn on location service (activate location address) via the app. A rider also explained the process for loading the app for accessing the Uber ridesharing platform as follows:

> *I have the Uber app on my phone, which enables me to get access to the ridesharing platform for ride requests without the need to provide my name, contact, and source address.*

The Uber ridesharing platform has two sections of drivers' interface features. The first section of the drivers' interface features after log-in and verification before getting access to the platform are name, current photo, car details, and current location. These features enhance riders' safety in using the system. The name feature shows the driver's tag for easy communication and identification. The photo loads the current snapshot of drivers each time they are connected for face verification and approval, especially to check for face mask due to

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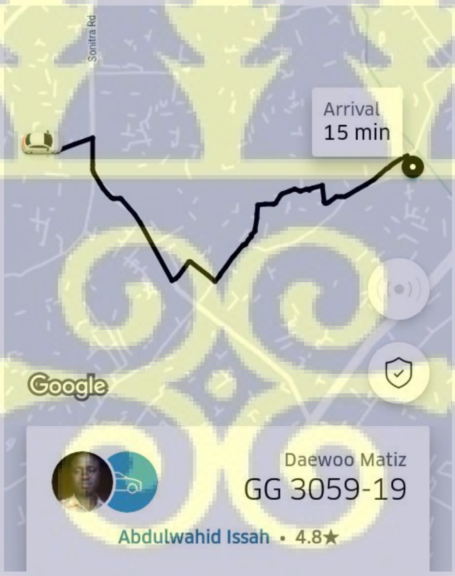
COVID-19 protocols. The car details provide the model type and licensed number via text for real-time management and monitoring.

The second section of the platform feature for drivers are matching request, accept or reject request, riders' profile, trip setup (destination set), start trip, end trip, and rate rider. These features are explained throughout the entire Uber's riding process, in which drivers have a maximum of eight hours to work in a day. Drivers have to wait at this section until they are connected to riders for the necessary action. Figure 5.5 below shows drivers' first interface on the Uber ridesharing platform with different communication features, which was demonstrated to the researcher during the field study.

Figure 5.5: Driver's Profile



Concerning riders, the Uber ridesharing platform has three sections of interface features. The first section is about booking a ride, which consists of pick-up location and where to use for the request process. The pick-up location icon shows riders' source address via Google map and GPS. The where to icon involves entering the destination address or selecting it in the form

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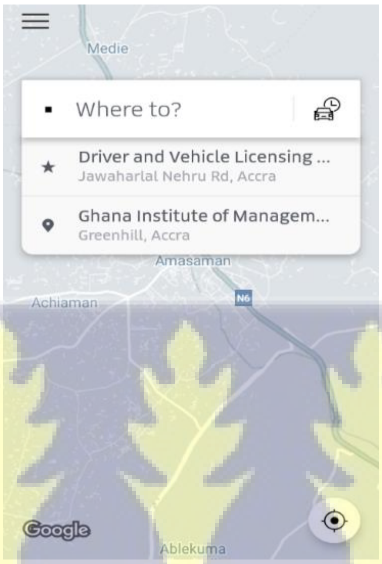
of image communication via the associated Google map and GPS. Riders provide the required details in this section of the Uber ridesharing platform's interface features before moving to the second section. Figure 5.6 below shows riders' first interface on the Uber ridesharing platform for booking, which was demonstrated to the researcher during the field study.

Figure 5.6: Riders' Requests Setup



The second section interface for riders of the Uber ridesharing platform features are car type and fare, payment options (via credit card, mobile money or cash), 1-4 riders, arrival time, confirm Uber, and schedule a ride. The type and fare features enable riders to choose a car with the associated bill. Riders then confirm Uber booking with a specific car and the estimated fare, either UberX or Connect. The payment options enable riders to settle the trip fare via credit card, mobile money or cash. The 1-4 icon shows the maximum number of riders allowed to use the car. The arrival time shows riders' minutes available for pick-up after confirmation. The confirm Uber enables riders to approve the booking for requests matching. Schedule a ride allows riders to set a preferred window for later pick-up with a specific date and time. Drivers, on the other hand, have to wait at this stage until they are matched to accept riders' requests.

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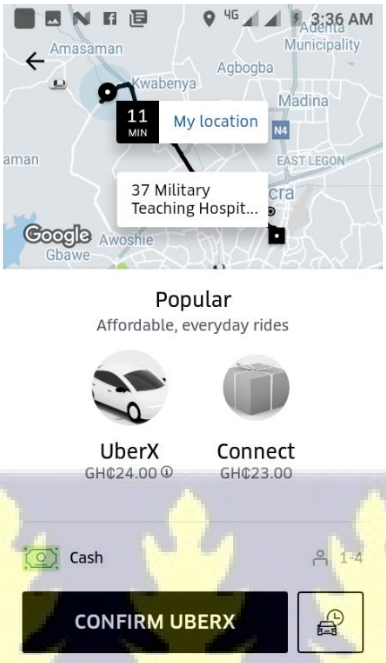
Figure 5.7 below shows the second interface of riders' requests on the Uber ridesharing platform for confirmation, which was demonstrated to the researcher during the field study.

Figure 5.7: Riders' Requests Confirmation



On the platform, riders can change car type and mode of payment in text and image communication. The platform, therefore, stores riders' profile permanently after the booking, which is used at anytime for reference. On the other hand, the profile is used for penalty charges in the next booking in case of ride cancellation. One of the riders explained the process for booking a ride on the Uber ridesharing platform as follows:

> *Ride booking is done only on the Uber ridesharing platform in real-time. Riders have the option to provide destination address, select car type with the associated fare, and mode of payment.*

Drivers at this first stage of the Uber riding process, on the other hand, have to wait until they are matched to riders within the company's coverage area for the necessary action. The third section riders' interface of the Uber ridesharing platform features are drivers' profile, car

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location, arrival time, cancelling e-booking, check for arrival, payment, and rate driver. These features are explained within the second and third stages of the Uber riding process next.

Request matching and response: This matching stage of the process reduces wait time for drivers and riders. Matching is where the platform dispatches riders' requests to available cars in close proximity for drivers' approval. This function performs "demand by riders", "direct by the platform" or "Uber staff", and "supply by drivers" task. Figure 5.8 below shows the matching process on the platform, which was captured during the field study.

Figure 5.8: Matching Riders' Requests

The process involves the ridesharing platform or IT Administrator and Assistants dispatching riders' requests to available cars nearby. The IT Administrators are the central dispatchers who can also match riders' requests to a nearby driver in the form of animation or video after confirmation for pick-up with a charge and mode of payment. On the other hand, drivers decide whether to accept or reject the riders' requests. This section of matching is not known to drivers, which prevents them from seeing the destination address of the request and any other form of payment before their decisions. If the assigned driver rejects, then the ridesharing platform quickly reassigns the request to another driver or redirects free drivers by the IT Administrator or Assistant to that location until it is accepted with notification. All these processes are done

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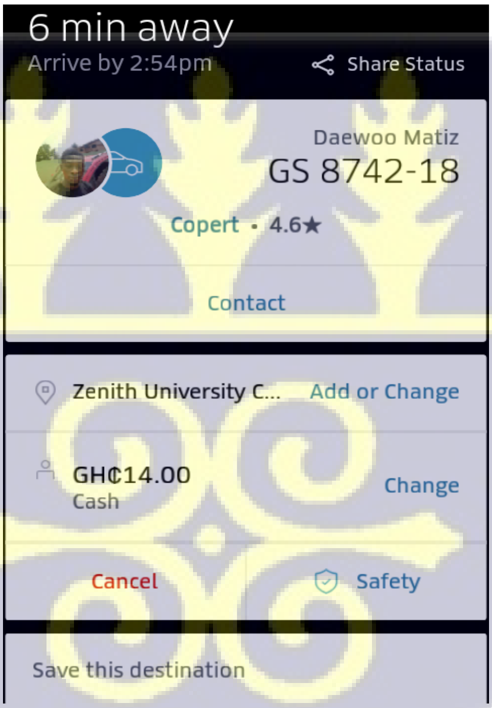
in real-time decisions via the Uber ridesharing platform with less waiting time, as drivers and riders are conscious of saving time. One of the drivers explained what happens when he is not ready to accept riders' requests as follows:

> *Free drivers who are not ready can reject the trip requests when linked by the Uber ridesharing platform.*

After confirmation by drivers, the Uber ridesharing platform automatically predicts a time for pick-up between drivers' and riders' location addresses. Figure 5.9 below illustrates the approved driver's details to a rider. This figure was captured during the field study.

Figure 5.9: Drivers' Exchange Profile



The approved drivers' details such as name, photo, car type, car colour, and car registration number are shown to riders with a pick-up time. On the other hand, riders' details such as name, photo, and cellphone number, are shown to drivers. Interestingly, there is a variation in prices over time for riders on the Uber ridesharing platform, which can help them book now or later for a better price as the company charges a minimum of seven Ghana cedis (GH₵7.00). At this

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stage, riders are charged with a penalty of five Ghana cedis (GH₵5.00) in case of trip cancellation after drivers' approval and pay in the next booking. One of the drivers explained the request matching and response process on the ridesharing platform as follows:

> *The Uber ridesharing platform links riders' requests to free drivers within that specific area for approval.*

Drivers, on the other hand, do not have access on the Uber ridesharing platform to select riders based on the trip details. They are linked automatically to riders without knowing the trip details. One of the drivers narrated the issue as follows:

> *The Uber ridesharing platform constrains drivers to have access to riders' destination address and mode of payment before request acceptance.*

The request matching and response process provides drivers with openness to a series of riders' requests. This process eliminates time loss in searching for riders, unlike the traditional taxis. This section confirms driver's acceptance of riders' requests. One of the riders explained this transaction with drivers as follows:

> *The Uber ridesharing platform links my trip request to a driver for approval in real-time without the need to waste time.*

In addition, the Uber IT Administrator and Assistants always use drivers' profile such as residential address for request matching. This part of the process enables drivers to set destination for set-up and set-off their businesses, which matches riders' requests within that proximity automatically. A driver described the economic benefits of set-destination from the Uber ridesharing platform as follows:

> *The set-destination function on the Uber ridesharing platform enables drivers when signing out to get only riders whose destination addresses are within the same route.*

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After the approval for request matching, drivers and riders communicate via the platform for trip updates on the remaining time and location until arrival for pick-up. Alternatively, drivers and riders communicate outside the platform via SMS or WhatsApp, voice or video call for updates on the remaining time until arrival for pick-up. Drivers' and riders' locations or nearby popular places are linked to the Uber ridesharing platform via Google map and GPS for easy identification. The nearby popular places are used in case the location is unknown by Google map. One of the drivers explained directions for locating riders as:

> *What the Uber ridesharing platform does is to link me to riders' locations via Google map for directions. The map does not have every part in Ghana so I normally use other means to get the exact location for pick-up, such as a rider describing his/her location via text message or phone call.*

Before drivers' arrival for pick-up, riders have the option to cancel the trip for the Uber ridesharing platform to reassign that driver to the next available request. One of the riders explained the trip cancellation option before arrival for pick-up as follows:

> *Using the Uber ridesharing platform is flexible because riders have option to stop the booked ride before drivers' arrival when not ready.*

Pick-up and drive: The final stage of the process is pick-up and drive. This stage involves pick-up, drive, on-trip, payment, rate, and drop-off. Riders track the arrival of cars with an estimated time on the platform for pick-up from drivers. Sometimes, drivers send messages via SMS or WhatsApp, or make voice calls outside the Uber ridesharing platform for updates on remaining time and notifications for pick-up at arrival for riders' acknowledgement. At arrival, drivers send a message or call riders to come to the park location by describing their cars with model type, colour, and even dress code for acknowledgement. Since the details of riders, cars, and drivers are available on the platform, they easily locate each other for a pick-up. Figure 5.10 below shows both users' actions for locating each other before pick up at the riders' preferred source location. The picture was captured during the field study.

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Figure 5.10: Identification for Pick-up

Riders identify drivers' arrival, then pick up with destination address and go. One of the riders said this:

> *Riders can travel to anywhere at anytime because the Uber ridesharing platform provides us with accurate trip information for auditing. The platform provides me with trip details such as car colour, vehicle registration number, drivers' photo and name, and pick-up time.*

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Drivers, on the other hand, identify riders for pick-up at the source based on the riders' actions and readiness. One of the drivers narrated this:

> *The Uber ridesharing platform enables drivers to know the source location and rider's photo for identification before pick-up.*

One of the drivers also explained how riders are identified for pick-up at the source location as follows:

> *Drivers get further information for identification by interacting with riders via text messages and phone calls before pick-up. The additional details include riders' attire and description of the exact location for pick-up.*

Once the pick-up takes place, riders then provide destination addresses and mode of payment via face-to-face interaction outside the Uber ridesharing platform. Drivers use the details for settings or trip setup before drive. Drivers have no option at this stage to reject riders' requests on the ridesharing platform after knowing the destination address and mode of payment. However, traditional taxi drivers can reject riders when they are not interested in the riders' requests. Figure 5.11 below shows both users' interactions via face-to-face for destination address and mode of payment for trip setup. The picture was captured during the field study.

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Figure 5.11: Users' Interactions for Trip Setup

Drivers then set the pick-up and destination addresses according to the riders' data with automatic (dynamic) billing. Thus, a trip set-up is based on travel time estimates between the two addresses, which can be tracked by riders. Travel time prediction provides route options with an estimated arrival for drivers to match and predict the trip completion between the two addresses. One of the drivers said this:

> *Drivers interact with riders after pick-up via face-to-face for the destination address and mode of payment. These details support us to drive with direction and other trip activities digitally.*

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One of the drivers also explained the trip set-up associated with the Uber ridesharing platform as:

> *The Uber ridesharing platform enables drivers to provide the trip setup for the best route, estimated time for arrival, and mode of payment without the need to negotiate with riders.*

Drivers have no option to cancel the trip after knowing the destination and mode of payment. Some of the drivers, for instance, are not comfortable with e-payment because the company deducts commissions and any outstanding debt immediately. One of them said this:

> *Drivers are restricted to access riders' destination address and payment options on Uber's ridesharing platform. The company is aware that some of us may reject riders' requests when the trip is not interesting.*

Drivers then opt for the fastest route with real-time traffic information for speed prediction and they drive after the platform has computed the travel time predictions. Some drivers with intelligent matching and predicting travel time always reduce the waste time for riders to enjoy the affordable fare. Riders are always concerned with affordable fares while drivers are concerned with average earnings. The on-trip involves mapping technologies in the form of text, image, and video communications such as Google map for directions. This function provides location updates for drivers and riders for flexible routing. The mapping technologies guide drivers on the Uber ridesharing platform with automatic directions and location updates during the trip without any directional support from riders or anyone. Figure 5.12 below shows drivers' trip setup before take-off, which was captured during the field study.

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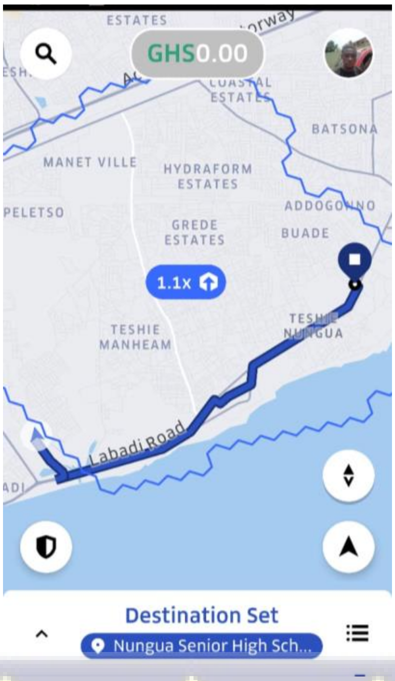
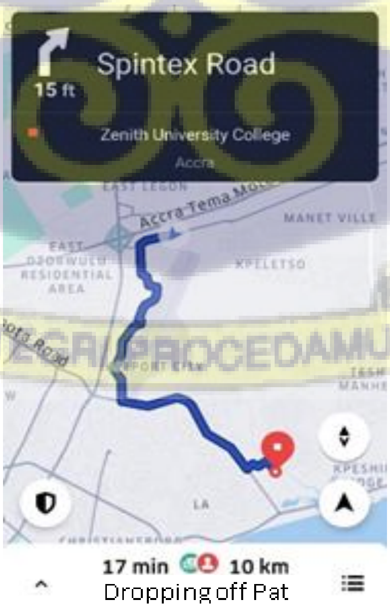
Figure 5.12: Destination Settings



Thus, the platform provides drivers with the best route for convenience and efficiency in trips as a strategy to address the traditional taxi services' challenges such as traffic jams in fast-growing cities. Figure 5.13 below shows how this trend shapes the relationship between drivers' and riders' trip activities, which was captured during the field study.

Figure 5.13: Digital Mapping for Directions



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This trend is shaping the relationship between drivers' and riders' information sharing for a fast trip in the form of smart cities. One of the drivers described the uniqueness of the on-trip process as follows:

> *Drivers activate start trip after set-up. The platform automatically provides me with a fast and traffic-free direction during the trip without asking anyone for assistance. The city map is now on my mobile phone for easy mobility.*

Another driver also explained how on-trip from the Uber ridesharing platform offers a transparent dashboard for modification to fit riders' specifications during the trips as follows:

> *The platform has improved drivers' performance in the cities for smart activities. What I need for a trip is to set the destination address from the riders' pick-up location and drive. The platform then provides me with the best route for driving without any human assistance for smart activities in the cities.*

Riders have no option during the trip to activate anything on the Uber ridesharing platform before the end. The platform limits riders to make phone calls or any other action when not comfortable with the trip. One of the riders explained this constraint as follows:

> *Riders have no complaint function on the Uber ridesharing platform to activate the company or police for help during the trip.*

Payment can be cash or electronic, which involves dynamic charges as one of the major challenges in ridesharing. The dynamic charges are where the prices can be high or low based on real-time demand and supply conditions after pick-up. Charges are based on the distance covered in kilometres and demand predictions of riders' sessions. The charges start immediately drivers have activated pick-up riders with assigned time and trip completion associated with traffic and any trip interruption. The platform provides drivers and riders access to watch the bill for payment during the trip until arrival at the destination for the fare settlement. One of the drivers explained what happens after pressing the end trip as follows:

> *Drivers get to know the actual trip fare after activating the end trip at the rider's preferred location for payment collection before drop-off.*

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The platform automatically prompts riders to pay the amount. The summary provides details of the trip including rate per minute, time elapsed, distance covered, and fare. Drivers end the trip then collect payment from riders with invoice and drop-off at the preferred unrestricted location. This payment (cash or e-payment) part of the Uber ridesharing platform is gaining more popularity than the traditional taxi services. As a result, the price estimation changes if initial surcharges differ from the destination based on the trip interruptions. One of the riders explained the dynamic charges and payment for using the Uber ridesharing platform as follows:

> *The platform always gives me a forecast of the price for booking a ride to justify its cost-effectiveness. The price is dynamic. It sometimes goes up or drops lower than the initial estimated charge at the end of the trip for payment. Even when it goes up, still it appears more affordable than the traditional taxi services.*

One of the riders also narrated the payment options associated with the Uber ridesharing platform before drop-off as follows:

> *Riders have three options on the Uber ridesharing platform for trip payment before drop-off. The payment options are credit card, mobile money, and cash. Sometimes I pay with mobile money without the need to travel with cash. This function from the platform prevents taxi robbers.*

Another rider also narrated what riders exchange for the trip after knowing the bill at the required location before drop-off as follows:

> *Riders settle drivers after the trip without any negotiation via credit card, mobile money or cash. I always pay with cash directly to drivers after knowing the fare before drop-off.*

The company set charges on the platform and automatically takes a commission on payment at the end of the trip with a summary. Drivers receive all physical cash payments via face-to-face communication outside the platform after the end trip before approval for drop-off and pay commission to Uber. However, riders' e-payments are received directly into Uber's account

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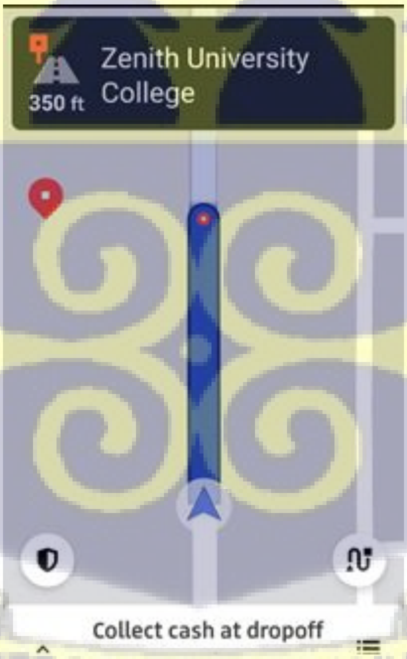
with notification of payment to drivers for an acknowledgement before drop-off. One of the drivers narrated that:

> *The Uber ridesharing platform has reduced payment-related tasks for drivers and riders. The platform operates in real-time and synchronises charges for drivers and riders without any negotiation for payment, irrespective of the trip condition. The company always notifies me with SMS (invoice) of the rider's e-payment with a commission before drop-off. The e-payment is good because it makes drivers and riders cashless for the trip, which mitigates taxi fraud.*

Drop-off is the end of the Uber riding process for riders to get out of the car after they have paid for their charges. The Uber ridesharing platform reminds drivers to collect cash at drop-off of riders' destination, as shown in Figure 5.14 below, which was captured during the field study.

Figure 5.14: Destination to Drop-off



Drivers collect cash payment from riders after end trip without any negotiation for the trip fare before drop-off. Figure 5.15 below shows the interactions between drivers and riders for cash payment after end-trip before drop-off. The picture was captured during the field study.

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Figure 5.15: Cash Payment before Drop-off

Once the trip is over, drivers and riders have rate option buttons for evaluating each other via symbolic communication on the platform according to their trip behaviour. Rate enables riders to know the status of drivers' performance for driving and trust. A driver expressed how the rate option buttons work on the Uber ridesharing platform as follows:

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I always encourage riders to complete the rate options on the platform before drop-off. This is because the company always assigns riders according to drivers' performance. Uber always sends me trip reports via e-mail such as my performance and earnings.

After drop-off, drivers and riders maintain their digital relations outside the platform, such as post-trip complaints of riders' items left in the car for later retrieval. The post-trip activities also provide a reference for Uber and other security agencies for any complaint. A rider narrated the post-trip activities as follows:

The post-trip activities enable me to get my item in case left in the car by communicating with the driver via voice call.

The use of the Uber ridesharing platform can be improved to attract more drivers and riders in a particular context. The platform must include safety complaints features connected to security agencies, such as 191 for calling the police in case of emergency. One of the riders narrated this with respect to the improvement of the Uber ridesharing platform use in Ghana as:

The company must introduce free phone or video calls via the platform that can be activated for support when riders suspect something strange from drivers such as unprofessional conduct.

On the other hand, some drivers use the Uber ridesharing platform to perform untoward goals. These drivers' personal goals are different from how the platform was developed to support them to provide riders with a quality trip. For instance, some drivers accept riders outside the Uber ridesharing platform without trip recordings. This strategy is possible because the vehicles used by the drivers in Ghana are known to some riders. The strategy enables some riders to manually hail cars associated with the Uber ridesharing platform. Thus, drivers bypass the platform to pick up riders and bill them manually like the process of the traditional taxi services. This conflict goal is possible because the drivers are independent contractors of the

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Uber ridesharing platform company without any legal form to control their activities outside the platform. One of the drivers said this:

> *I sometimes pick riders who request for a short distance trip and bill them with a minimum fare without using the Uber ridesharing platform. This bypass avoids trip commission for the Uber company.*

Another untoward goal is how drivers use shared profiles such as phone numbers for unnecessary interactions with riders after the trip. Some drivers take advantage of the phone numbers to communicate with riders after the trip for other businesses beyond the intended goals for using the Uber ridesharing platform. One of the riders explained how drivers are negatively using the platform for another goal as:

> *Some of the Uber drivers always take advantage of my contact to call me for unnecessary conversation because I am a lady.*

In addition, some riders have untoward goals for using the Uber ridesharing platform. For instance, some riders abscond payment by running away while others even attack drivers at night and/or at a strange place. Some also attack drivers and snatch their cars in remote areas. Some riders intend to negatively use the Uber ridesharing platform because they do not provide their genuine records such as name and photo for registration. This is because riders' registration can be done at anywhere without any system or Uber staff to verify proof of records. Such weaknesses in the riders' registration process of the Uber ridesharing platform enable or facilitate conflicts. More specifically, riders are negatively using the Uber ridesharing platform beyond the intended goal. Another untoward goal is how riders use their details to book for others. Riders are using the Uber ridesharing platform negatively to book rides with their details only for use by others other than themselves. This untoward goal is only known through the experiences of drivers. Those conflicts tend to happen because the riders register to access the Uber ridesharing platform without any legal form of identification. The registration process only uses mobile numbers for unique identification. A mobile number is

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not a legal form of identification or directly linked to a legal form of identification in many developing countries. This weakness in the structural process of the Uber ridesharing platform also enables or facilitates conflicts. Ghana is now using national ID (Ghana Card) for a re-registration of mobile numbers as a legal form of identification. If this process is completed, opportunities for untoward goals are likely to reduce since riders can be legally identified by their mobile numbers.

5.2.5 Challenges when using Uber Ridesharing Platform

The trend introduced by the Uber ridesharing platform in Ghana has shaped the relationship between drivers and riders; however, some challenges affect their usage of the platform effectively. Thus, the Uber ridesharing platform has constraints that drivers and riders face in Ghana, which disrupt the platform's use. Internet outages in Ghana disrupt all the real-time 24/7 communications across the Uber ridesharing platform. The Greenlights Operations Coordinator expressed the negative consequence of the Internet in Ghana as follows:

> *We depend on the Internet for all our activities 24/7. But Internet outages in Ghana disrupt our real-time managing, controlling, and monitoring of drivers' and riders' profiles.*

A driver explained this constraint for using the Uber ridesharing platform as follows:

> *Internet outages disrupt drivers to provide riders with location updates before arrival.*

Poor digital addressing system affects drivers and riders in locating places without landmarks in Ghana. Most of the unpopular places without landmarks and new sites are not captured on the Google map. This limitation of Google map associated with ridesharing platforms affects drivers' and riders' location identifications. A driver explained the consequence of the poor

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digital address system for directions and locations in Ghana via the Uber ridesharing platform as follows:

> *The Uber ridesharing platform uses Google map and GPS for identifying places virtually in Ghana but poor digital address system affects these activities. I have noticed that most new and unpopular places are not captured by Google map. These issues prevent drivers from locating some places in Ghana.*

Moreover, incompatible mobile phone with a minimum of 3G cellphone wireless network standard prevents drivers and riders from installing and using Uber apps. One of the drivers said this:

> *I was forced to buy an additional phone because my first one was not compatible with the drivers' app.*

Another constraint for using ridesharing platforms in Ghana is the lack of public phone charging systems and services. Public charging systems and services provide convenient access for drivers and riders who are outside their homes to charge their mobile phone's batteries rundown. Public phone charging systems are always available in places such as malls, sports centers, and airports for drivers and riders to charge up their mobile phone batteries in order to stay connected on ridesharing platforms. The lack of such a system in Ghana affects especially riders to book rides and perform other activities on ridesharing platforms when their phone batteries are running down. The real-time activities across the Uber ridesharing platform are multimedia and operate with other programmes such as GPS. The multimedia function combines text, video, graphic, and sound for drivers and riders to use the platform. These activities drain or consume more mobile phone batteries power. This constraint causes riders' mobile phone batteries to run down, especially when dealing with the platform for long hours of trip, unlike drivers with the charging system. One of the riders explained this issue as:

> *We are in a digital age but Ghana has no public phone charging systems and services in popular places such as a stadium. Riders find it difficult to restore battery power for ride requests and other activities when needed at public places.*

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I sometimes travel with a power bank to charge my battery when needed. The power bank just supports me for a short period as it cannot last for a longer time.

In addition, emerging issues such as COVID-19 put fear in drivers and riders and ultimately discouraged the use of the ridesharing platforms as a result of the fact that foreigners mostly use the system in Ghana. The movement of riders, especially those from overseas is one of the chances for spreading COVID-19 in Ghana. Drivers and riders are likely to contract the disease from foreigners who use the Uber ridesharing platform in Ghana and may be infected. The viruses spread through physical contact with an infected person, exchange of items with an infected person, and handling what has been touched and used by an infected person such as cash. A driver described the effect as follows:

Most riders realised that COVID-19 in Ghana came from overseas. This initially puts fear on our riders. But because most overseas riders make payments via electronic, this issue has mitigated riders' fear to use our service.

The Uber ridesharing platform has introduced artificial intelligence in its verification features for real-time drivers' identification checks for a mandatory nose and face mask. This function prevents drivers who are unable to meet the requirements from operating. A driver narrated the challenges of COVID-19 and new rules from the company as:

COVID-19 has changed our verification for the normal maximum of eight hours of online activities. This time, the verification process via selfie checks the nose mask before getting access to the platform. In addition, COVID-19 has brought extra cost and work for drivers.

5.3 Case Study 2: Dropping

Dropping is a company that provides a ridesharing platform in Ghana. The company was set up in December 2016 in Ghana and officially launched in June 2017. It is the third established ridesharing platform in Ghana and the only company with three categories of cars for riders in one app, namely, taxi, private, and comfort. The options, however, enable riders to choose the

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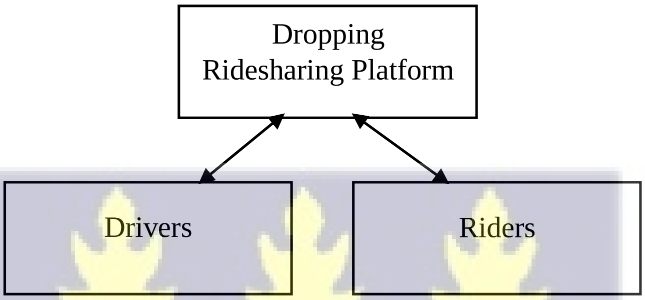
way they want to travel. The taxi category offers riders with the painted taxis in Ghana. The private includes hire cars while comfort provides a high-end luxury option for those who prefer such cars. The company operates in three cities, namely, Accra, Tema, and Kumasi. The purpose of the company is to link drivers and riders for information sharing for trip activities. The next sub-sections present the components (Figure 5.16), planning and setup, process, reasons, use, and challenges of the Dropping ridesharing platform.

Figure 5.16: Components of Dropping Ridesharing Platform



Source: Author's construct

Figure 5.16 above represents the Dropping ridesharing platform diagram by showing how it connects driver and rider user groups. The operation is backed by digital technology that establishes communications between drivers and riders. The platform is the intermediary and central controller that connects them as users for information sharing for their trip activities. Drivers are users on the Dropping ridesharing platform who send and receive riders' trip information in real-time. Riders are also users on the Dropping ridesharing platform who communicate with drivers in real-time for trip activities. The Dropping ridesharing platform operates with one core component (app-based mobility service) and two complementary components (drivers' and riders' apps).

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5.3.1 Planning and Setup of Dropping Platform

The Dropping company aimed to provide a ridesharing platform in Ghana to solve drivers' and riders' challenges in the traditional taxi services. Riders' challenges in the traditional taxi services were difficult for them to hail a taxi during peak hours, at the raining time, and at night as well as unfair charges when dealing with unknown destinations. Drivers' challenges were many of them searching for riders at the same location, which always increase traffic congestion; burning fuel without getting a match; insecurity due to no record for trip activities; and poor route selections for trips. The Chief Executive officer (CEO) who is also the IT Administrator described the setup process as follows:

> *We registered and set up an office in Accra as a digital company for managing, monitoring, and controlling drivers' and riders' trip activities. The company then recruited qualified ICT professionals for the ridesharing platform setup to meet drivers' and riders' needs. We also included interoperability with telcos and banks for information exchange.*

The company had pre-screening and selected qualified drivers who are ICT-oriented and able to use the system, which is digital infrastructure. The CEO explained how the drivers were selected for registration as follows:

> *We used two approaches to get drivers. First, we contacted some traditional taxi drivers with ICT knowledge who were willing to partner with us. Second, we advertised on radio and TV that we are pre-screening drivers with cars and a minimum age of 25 years who are ICT-oriented as partners. We considered the following valid requirements for selection before registering: age, valid driving license, car with four doors and air conditioning, DVLA, private or commercial car with number plate, commercial insurance certificate with comprehensive cover, and user's smartphone with a minimum of 4G.*

The cars required for the Dropping ridesharing platform also create a new market for vehicle dealers. However, the company accepts cars with a particular standard without considering security features such as tracking system and cameras. These features can improve the trip activities to overcome issues such as car snatching and off-platform activities. A driver explained what the company should require for selecting vehicles as follows:

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> *Dropping should accept vehicles with a tracking system only to improve drivers' and riders' safety by monitoring the cars' movement in real-time. The company should also consider drivers' vehicles with camera-enabled for registration to record activities outside the platform.*

The setup for providing the service involved the app-based mobility service or administration panel, drivers' app, and riders' app. The app-based mobility service is the core component of the Dropping ridesharing platform, which was customised by the IT Administrator for managing, monitoring, and controlling drivers' and riders' trip activities. The drivers' and riders' apps are complementary components used by drivers and riders, respectively. The administration panel features are users' management form, administrations management form, cars and booking management form, payment management form, and reviews management report.

The *users' management* form ensures authorised drivers and riders have access to the Dropping ridesharing platform with a username and password. The *administration management form* enables the Dropping IT Administrator with routing activities for managing, monitoring, and controlling users' profiles, especially drivers' details for registration and update. The *cars and booking management form* matches riders' requests to drivers, redirects drivers to occupy empty space to avoid many of them operating at the same location, provides location and time updates, and controls drivers working hours. The *payment and management form* is used to manage and control fare rate and currency format; drivers' commission; and riders' trip fare payment via credit card, mobile money, and cash. The *review management report* supports managing and evaluating drivers' and riders' trip activities for performance rating and post-trip reports for auditing.

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The complementary components (drivers' and riders' apps) setup involved different features that support users to access the Dropping ridesharing platform for trip activities. The drivers' app component features are registration form, push notification button, trip setup form, end trip button, accept payment button, and rate rider option buttons. The *registration form* enables drivers to register with prerequisite information for the platform access as trip providers. A successful drivers' app registration through pilot testing was done at the company's office with the prerequisite information. The reason for drivers to register at the office is that their documents are verified by the Dropping staff. Meanwhile, the normal registration is ongoing with the same requirements as drivers are recognised as independent contractors. A driver narrated the registration process and the platform access as follows:

> *Drivers' registration is done only at the Dropping's office with Internet and camera-enabled mobile phone. We are then allowed to use the platform with a password and current photo via selfie each time before access is granted for getting riders.*

The *push notification button* is used to enable drivers to justify riders' requests for accepting or rejecting. Drivers also use it for real-time trip chatting with riders. The *trip setup form* sets the address for riders' preferred drop-off location, route selection with estimated arrival time, and payment method. The *end trip button* is used to stop the cars at the riders' preferred destination for the final fare payment with associated trip completion details. The *accept payment button* enables drivers to collect trip fares directly from riders by cash or get an invoice from riders' e-payment made to Dropping's account via credit card or mobile money. The *rate rider option buttons* are used to evaluate riders' behaviour for a review.

The riders' app component features are registration form, request Dropping ride form, trip cancellation button, payment method form, and rate driver option buttons. The *registration form* is used to create riders' profile with proof of identity for getting access to the Dropping

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ridesharing platform. This function is used anywhere without the need for Dropping staff supervision because it does not need any document for authentication. The *request Dropping ride form* is used to set source location, destination, car type with the estimated fare, number of riders, and reserve ride for booking. The *trip cancellation button* is used to cancel the booked Dropping ride when riders are not ready before drivers' arrival for pick-up. The *payment methods form* is used to provide riders with options to settle the trip fare by electronic directly to Dropping's account or cash to drivers. The *rate driver option buttons* are used to assess the trip performance for a review.

The setup also involved other supporting communication channels and integrated services, namely, Google map, GPS, SMS, e-mail, website, and payment (via credit card, mobile money, and cash). For instance, Google map provides trip routes in line with landmarks and street networks, while GPS deals with location addresses, trip times, and trip patterns for real-time monitoring and managing. The company finally became operational.

5.3.2 Process of Dropping Ridesharing Platform

This section shows the process of the Dropping ridesharing platform for drivers' and riders' information sharing for trip activities. The Dropping ridesharing platform connects drivers and riders with apps via a centralised and automated matching and pricing system within the company's coverage area. The process for drivers' and riders' trip activities across the Dropping ridesharing platform consists of eleven detailed stages. Even though the entire Dropping ridesharing platform process involves physical-digital activities. The physical component involves driving the car and cash payment. The digital component, on the other hand, involves real-time information sharing via the Dropping ridesharing platform from the initial riders' requests to the final payment stage. A rider uses his/her app on a mobile phone to request a ride via the Dropping ridesharing platform for drivers' acknowledgement. After

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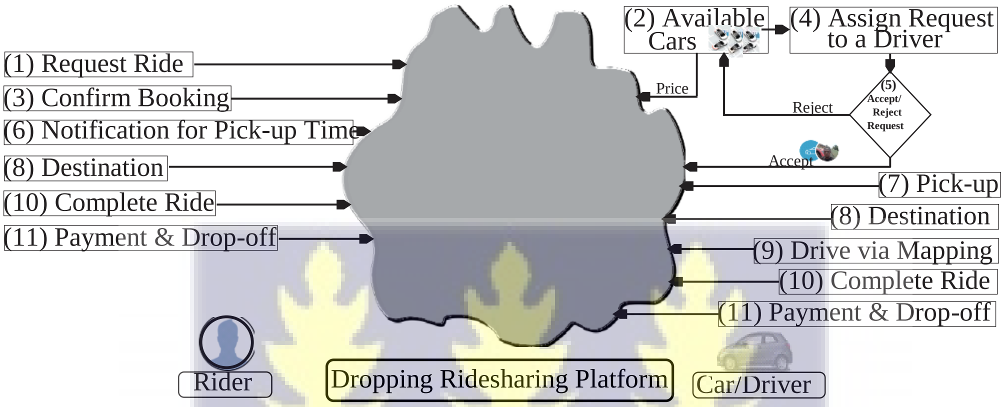
sending the request, the Dropping ridesharing platform in real-time provides riders with available cars within the geolocation for estimated fare based on the source and destination addresses. The next step of the process is where the Dropping ridesharing platform assigns the request to available drivers for acceptance or rejection. Figure 5.17 below shows a graphical representation of the platform process for drivers' and riders' trip activities.

Figure 5.17: Process of Dropping Ridesharing Platform



Source: Author's construct

The platform reassigns another driver until the request is accepted in case a driver rejects it. Once the request is accepted, the Dropping ridesharing platform then provides drivers with riders' profile for acknowledgement such as source address for pick-up, name, and photo. On the other hand, riders receive drivers' profile for acknowledgement such as name, photo, and car details. The Dropping ridesharing platform provides drivers with riders' details and directions for pick-up then drive until arrival at the destination for payment & drop-off. The payment & drop-off is the last step of the process, which ends the entire drivers' and riders' local actions, communications, and transactions via the Dropping ridesharing platform. More specifically, drop-off is where riders get out of the car after payment when the trip is completed.

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5.3.3 Reasons for using Dropping Ridesharing Platform

Drivers and riders use the Dropping ridesharing platform because of its functions that meet their needs. The reasons are what inspire them to use the platform to achieve their objectives. The platform provides drivers and riders with online booking (match demand) and accepting cars (match supply), automatic billing for affordable fare, unrestrictedness, Google map and GPS for traffic flow information, and real-time recordings to track snatched cars and riders who refuse to pay. Accept requests enable drivers to get a series of booking in close proximity. The Dropping ridesharing platform matches drivers' supply to riders' demand. This match supply broadcasts riders' demand to available free drivers in close proximity for approval. This function saves drivers a considerable amount of time and fuel for roaming and searching for riders without getting a match. This is because it supplies drivers' needs by getting riders. Drivers use the Dropping ridesharing platform because of its flexibility. The platform provides drivers with ease of operating to suit riders' needs. The platform enables drivers to get a series of riders' requests. The automatic billing associated with the Dropping ridesharing platform provides drivers and riders with transparent billing, which generates an affordable fare. This function provides openness for drivers and riders to manage the trip fare and payment without any challenge. The automatic billing generates affordable fares for riders, especially for a short distance. One of the drivers expressed why such a function inspires him to use the Dropping ridesharing platform as follows:

> *We are free from riders' notion of overcharging. The platform does everything concerning billing without drivers' interruption. This saves drivers' time for bargaining trip fares with riders, which could be low or high. Thus, it supports drivers without negotiating the trip fare with riders for affordability.*

One of the riders narrated what inspires him to use the Dropping ridesharing platform as follows:

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The platform enables me to book a car from three options anywhere within the coverage of the company. Today, I can compare the estimated fare of Dropping to other ridesharing platforms before my final decision.

The Dropping ridesharing provides riders with legitimacy and accountability. Most institutions prefer their employees to use the Dropping ridesharing platform because of the associated proof of travel for easy trip payment. The Dropping ridesharing platform provides riders with a trip summary, which includes pick-up location, distance covered, destination address, and fare. This legitimacy provides evidence of riders' trips; this eliminates corruption. Riders use the platform because it also provides accountability to justify their reports. Thus, evidence of trip activities associated with the Dropping ridesharing platform enables riders to provide a statement of their travel expenses. One of the riders said this:

I always use the Dropping ridesharing platform because I can justify my trip with evidence for travel allowance. The evidence of travel also helps me to justify accountability for my trips.

Riders also use the Dropping ridesharing platform because of its convenience. This function associated with the platform provides riders with options to choose a car/driver and their preferred pick-up location as well as time. It also enables them to cancel the trip when not ready. One of the riders explained why she uses the platform as follows:

I use the Dropping ridesharing platform because it is available at anytime. I can book a ride at my preferred date and time. The platform also creates smart cities for riders to enjoy, fast trip, affordable ride 24/7, and optimise car utilisation. Sometimes, I park my car and use Dropping because it is economical.

The unrestrictedness (unlimited operating environment) allows drivers to work everywhere for pick-up and drop-off riders without any restriction. This function is based on the type of private cars that drivers use. Most places in Ghana have "taxi is not allowed" restriction. This restriction prevents the traditional taxis from operating at those places, unlike ridesharing platform cars. The Google map and GPS associated with the Dropping ridesharing platform

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provide traffic flow information, location updates, and directions for driving. These functions support drivers to control the city maps for smart trip activities in the form of smart cities. The Google map and GPS provide drivers and riders with a digital address system for locations and directions; these are managed in real-time by the company. The e-payment associated with the ridesharing platform encourages drivers and riders to use the system because they believe its cashless function can minimise taxi robbery and prevent them from contacting diseases.

Security is drivers' and riders' concern for using the Dropping ridesharing platform. This function provides drivers with recordings to track snatched cars and riders who refuse to pay before drop-off. Riders also use the function to share their trip details with families and friends for safety reasons. Drivers and riders believe that their trip activities can be monitored, controlled, and managed in real-time for reviews and reports via app-based mobility service by the Dropping IT Administrator. The IT Administrator keeps track of recordings of drivers' and riders' activities as well as locations of cars. The recordings function enables drivers to know the location and movement of their cars. This function also ensures drivers get their money from riders who refuse to pay for the trip fares before drop-off. Riders also believe that the recordings can be used for post-trip activities. One of the drivers explained the reason why he uses the Dropping ridesharing platform concerning the security function for pre, during, and post-trip activities as follows:

> *Drivers are safe from riders who fail to pay their bills at the end of the trip. Dropping keeps track of drivers' and riders' profiles for post-trip reviews and reports. This function has mitigated risks for trip activities.*

5.3.4 Use of Dropping Ridesharing Platform

The drivers' and riders' actions, communications, and transactions across the Dropping ridesharing platform for the trip activities involve three key steps, namely, data collection for

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riders' requests, request matching and response, and pick-up drive. The platform enables drivers and riders to use text, image, and video to activate their activities. The text provides a description of objects for visual narratives. The image provides a pictorial representation of items for easy identification. The video provides animations of object movements. They also communicate outside the platform via SMS or WhatsApp, voice call, video call, and face-to-face.

Data collection for riders' requests*:* The riders' registration can be done anywhere with a compatible mobile phone and Internet-enabled without the support of Dropping staff. The process involves downloading and installing the riders' app simultaneously from the Google Play Store on users' smartphones. During the installation, the process requires riders' information such as name, phone number, e-mail, and profile photo. The app installation collects and stores information about riders (riders' profile) once for accessing the Dropping ridesharing platform without going through the registration process again. The registration process for creating riders' profile is confirmed by e-mail when done. Riders get an account for automatic login, which enables them to take part and identify themselves on the platform. Figure 5.18 below shows riders' registration, which was captured during the field study.

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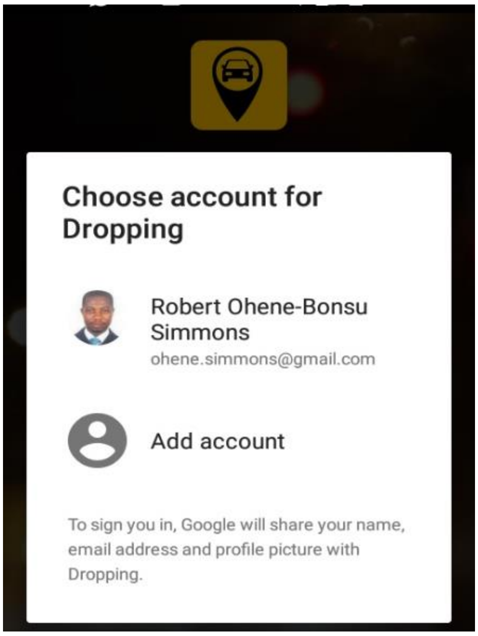
Figure 5.18: Riders' initial Account Creation



During the login or open the app, which can be done at anytime, the process automatically fetches riders' configuration location address if it is active via GPS. Else, it will provide riders steps to enable location address for the app services. One of the riders explained the process required for using the Dropping ridesharing platform as follows:

> *The first thing to consider before booking a ride on the platform is to install the riders' app with a minimum of 4G mobile phone via Internet. The installation and registration steps work together and involve full name, phone number, e-mail address, and photo. After my registration, the process automatically displayed my location address on the platform for a ride request.*

The Dropping ridesharing platform has two interfaces for drivers and three for riders' trip activities with different features. The first interface for drivers is login for proof of identity; riders do not have this requirement. This interface enables drivers to capture their recent photos and activities. Riders' interface in this first section includes e-booking options, welcome, name, location address, where to, and recent search location as well as a welcome message. The ride booking options at this interface are now, reserve, for others, and airport. The book now provides riders with estimated time of car arrival, car type, and fare, which they have to confirm

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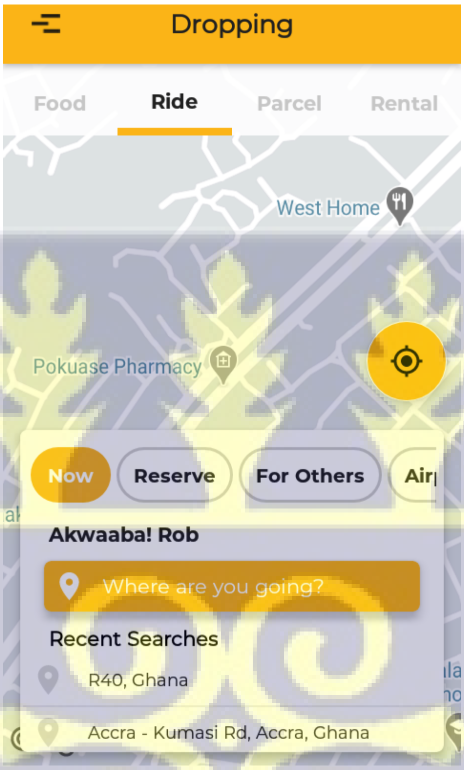
in the next interface. The reserve offers riders options to select a date and time in advance for the booking. Select for others gives riders the option to book for someone with a name and phone number. The airport option provides riders with a list of nearby airports for selection without entering the destination address. Figure 5.19 below shows riders' booking options. The figure was captured during the field study.

Figure 5.19: Riders' options for Booking



The welcome displays the rider's name before the next action for proving the destination address. The platform automatically picks and shows the location address for pick-up, then provides riders with options to select or type the destination address. This strategy also enables riders to select a landmark for easy identification in case the intended location is not recognised. The platform uses Google map for navigation to indicate riders' location, which links to available free cars in close proximity.

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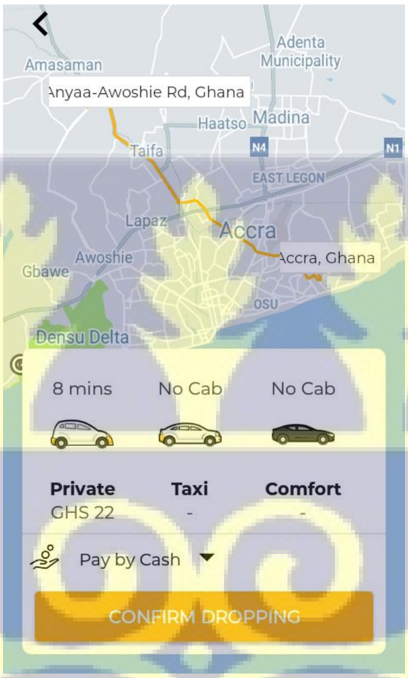
The second riders' interface involves Google map, which shows cars in close proximity with the associated fare for them to confirm or cancel. Riders have options to confirm Dropping booking with three different car types, estimated fare, mode of payment with cash or e-payment, maximum seats allowed 4+1, location of the available car, and estimated arrival time. The cancel provides an option for riders to terminate the booked ride before arrival for pick-up. Figure 5.20 shows the riders' booking process, which was captured during the field study.

Figure 5.20: Riders' Booking Confirmation



Booking confirmation is the final interface for drivers' and riders' trip activities. Drivers then have options to provide riders with trip activities 24/7 through real-time activities. The last riders' interface features work within the second and third stages of the Dropping ridesharing platform process. These are drivers' profile, car location, cancel, check for arrival, payment, and rate. The drivers' profile feature displays name, photo, car number, and car type for riders' identification for pick-up and safety. Cars location provides riders with updated information on drivers coming before arrival. The check for arrival icon shows that the car is at the preferred

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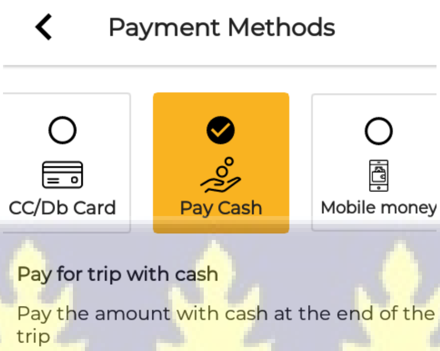
location for pick-up and go. The cancellation enables riders to stop the trip when not ready. The payment provides riders with options to settle the trip bill via credit card, mobile money or cash. The rate enables riders to assess drivers' performance during the trip. The interface for trip payment is shown in Figure 5.21 below with different features. This figure was captured during the field study.

Figure 5.21: Payment Method



Request matching and response: This stage of the Dropping ridesharing platform process involves broadcasting and matching riders' requests to available free drivers with pick-up time in close proximity. Drivers are also redirected within the company's coverage area to occupy empty space to avoid many of them operating at the same location. The Dropping ridesharing platform, therefore, tracks the position of riders' requests in real-time and links them for approval by the nearby free drivers. The platform does the matching of riders' requests to available free drivers within that geolocation. However, drivers make the final decision to accept or reject without knowing the destination address, associated fare, and mode of payment. In case a driver rejects the ride booking, the platform redirects the request until approval.

After the approval, the platform shares drivers' and riders' profiles for identification in real-time, their locations, and pick-up time. The shared details provide safety assurance under the

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IT Administrator's real-time supervision as drivers and riders are always strangers in a car. The shared details include drivers' and riders' profiles, ride particulars, updates on their locations, and time remaining for arrival. The platform then provides drivers with Google map for route selection to the riders' location. Google map uses only popular places in Ghana for drivers' directions. On the other hand, areas in Ghana without landmarks are not available on Google map and this issue affects drivers to locate riders effectively. One of the drivers explained the use of Google map associated with the Dropping ridesharing platform for locating riders' places as follows:

> *Google map associated with the Dropping ridesharing platform provides links to locate riders at popular places in Ghana. I always ask riders to describe and send me their locations via text message for easy identification, in case the location is not captured on Google map.*

Drivers at this stage continue to communicate with riders across the platform for updates on location and time until arrival at the source address for pick-up. Thus, drivers use the platform to get trip updates on arrival time and location from riders' requests. Alternatively, drivers communicate with riders outside the Dropping ridesharing platform for confirmation and arrival time via WhatsApp, voice call or video call. The request matching and response provide drivers and riders with benefits for trip activities within the cities. Examples include low waiting time, convenience, and efficiency. A rider explained the process of the Dropping ridesharing platform as follows:

> *What every rider needs on the Dropping ridesharing platform is to book a ride at a convenient location and time. Riders then wait for the platform to provide a driver, car details, and pick-up time.*

The matching provides drivers with openness for a series of services by dispatching them to incoming riders' requests. This process involves time management, which eliminates drivers' and riders' waste of time for searching. Riders have an option to cancel the approved booking by drivers before arrival without any penalty. This communication via the platform enables

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drivers to stop going to the location for pick-up from riders' cancellations. A driver expressed the economic benefits of this process as:

> *The Dropping ridesharing platform has changed my searching strategy for riders in Accra. This time, I drive with a focus based on the city maps without wasting time and fuel for roaming and searching for riders. This is because the platform always alerts me for approval of riders' requests when I am free.*

Pick-up and drive: This section is the final stage of the Dropping ridesharing platform process, which involves pick-up, drive, on-trip, payment, rate, and drop-off. The platform alerts riders for arrival and pick-up as they track the cars with the estimated time. Drivers, alternatively, notify riders outside the platform via WhatsApp, voice call or video call on arrival for pick-up. After confirmation of arrival, drivers and riders communicate via voice call to know the car's exact parking location for pick-up and go. They describe themselves including the car details for identification and pick-up via face-to-face communication at the source location. The details for identification include car model, car colour, and dress code of drivers and riders.

Furthermore, the shared profiles via the Dropping ridesharing platform enable drivers and riders to locate each other for a pick-up easily at the agreed location. Drivers then identify riders for pick-up at the source and drive to the destination with the necessary actions. Riders, on the other hand, identify drivers' arrival, then pick up with destination address and go. Thus, riders sit in the car after locating it for pick-up by drivers. After the pick-up also involves face-to-face communications where riders provide drivers with destination address and mode of payment for trip setup. Figure 5.22 below shows interview with a driver concerning interactions with riders via face-to-face for trip setup; this picture was captured during the field study.

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Figure 5.22: Interactions for Trip Setup

The payment could be in the form of cash or e-payment via credit card or mobile money. Drivers then set the source and destination addresses according to the riders' data with automatic billing. The billing is based on trip time estimate between the two addresses. Set destination involves drivers' setting their meters at zero charges for reading after pick-up, which can also be tracked by riders. Interestingly, trip time prediction and route selection from the setup provide options for drivers to match and predict the time between the two set addresses. Drivers then opt for the fastest route via Google map with real-time traffic flow

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information and GPS navigation app for speed prediction and update on location. In addition, the setup enables drivers to select the mode of payment before take-off.

After setup and drive, riders use the Dropping ridesharing platform to get trip updates on locations, arrival time, and fare by drivers during the trip. On the other hand, the platform restricts riders from some input during the trip for their safety. For instance, the Dropping ridesharing platform has no features for riders and drivers to send a complaint about help via text message and/or phone call during the trip. The platform limits riders to get help from the company or security agencies in case of unprofessionalism by drivers. Some experienced drivers can match and predict trip time to reduce waste time. This strategy also contributes to the affordable fare and the fast trip activities for riders. One of the drivers shared his experience as:

> *The Dropping ridesharing platform has improved my driving activities in Accra 24/7. This time, there is no fear and talk to negotiate with riders on fares because the platform does everything automatically.*

The on-trip is when drivers take off from the source location to the destination address, which encompasses mapping technologies with Google map and GPS. Google map provides flexible routing while GPS deals with location updates, especially when drivers are dealing with an unknown place. Figure 5.23 below shows how this trend shapes the relationship between drivers' and riders' trip activities, which was captured during the field study.

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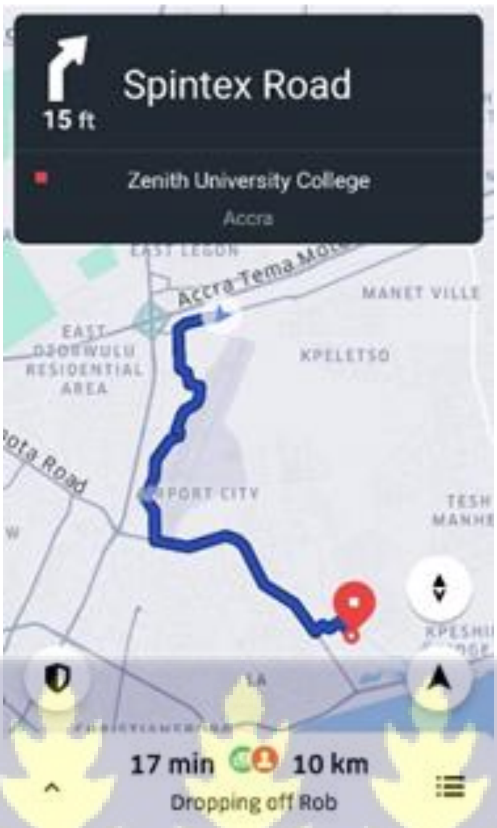
Figure 5.23: Digital Mapping for Direction



Drivers take off with Google map for the best route from the Dropping ridesharing platform without asking anyone for help according to the destination address. During the trip, the Dropping IT Administrator monitors and manages the record for post-trip activities and reviews. The platform provides updates on the remaining time to complete the trip, specific location, distance covered, and fare, irrespective of any interruption by riders or the road. One of the drivers explained how the Dropping ridesharing platform provides information during the trip as:

> *The Dropping ridesharing platform has enhanced my trip activities in Ghana, especially when dealing with location addresses. Most traditional taxi drivers see me as a different driver who operates with a computer system for digital mapping and automatic billing during the trip.*

Payment for fare is in the form of cash or electronic, and this payment uses transparent dynamic billing. The consequence is that the price estimation can change if actual surcharges differ from

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the estimation, which can be high or low based on real-time demand and supply conditions during the trip. The company charges a minimum of GH¢5.00 and the reading starts immediately drivers activate the start trip. The charges are based on the rate per minute, distance covered in kilometres, time spent, and demand predictions of riders' sessions. Drives press the end trip after arriving at the riders' preferred destination. The platform then displays the final bill for riders to acknowledge, as they describe the outcome as affordable fare. This stage provides the summary where drivers activate the end trip then collect payment and drop off riders after the acknowledgement. Thus, the platform alerts riders to pay drivers with the final amount according to the mode of payment selected, then prompts drivers to collect the amount at drop-off. One of the riders explained the payment method associated with dynamic charges for using the Dropping ridesharing platform as follows:

> *The trip charges are not stable, unlike traditional taxis. Sometimes, I pay less or more than the price estimation when the trip is over. I always ask drivers to choose the best route to avoid paying more than the price estimation.*

The company then takes commissions on payment at the end of every trip. All the e-payments go directly into Droppings' account, whiles drivers receive the cash payments. A driver narrated what happens with and after payment as:

> *What makes the Dropping ridesharing platform unique is that every trip payment provides drivers with a certain percentage for insurance. Drivers receive cash payments while e-payments go to the company's account via credit card and mobile money. The e-payments are safe because they mitigate taxi fraud due to their cashless system.*

The final section of the Dropping ridesharing platform process is drop-off. This function occurs after riders have paid for their charges via cash or e-payment with invoice confirmation by drivers. After cash payment, riders collect change from drivers inside or outside the car when that action is required before drop-off. Figure 5.24 below shows a driver collecting change from a driver after drop-off, which was captured during the field study

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Figure 5.24: Change Collection after Drop-off

Once the trip is over, the platform provides drivers and riders options to rate each other, which is optional. The rate enables them to know the status of each other's performances and experiences. The company then keeps track of drivers' and riders' profiles for reference and review for fraud complaints. The information may also be required by the security agency in case of taxi fraud. After drop-off, drivers and riders communicate outside the platform via voice call for any post-trip activity or business, and this kind of communication can be used for retrieval of any item left in the car. Figure 5.25 below shows the rate driver after arrival and payment via credit card, which was captured during the field study.

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Figure 5.25: Rate Driver

Some drivers, on the other hand, use the Dropping ridesharing platform to perform untoward goals. These untoward or personal goals are contrary to the original purpose of the Dropping ridesharing platform to solve problems associated with drivers' and riders' trip activities. The problems include drivers searching for riders without getting a match. Drivers' untoward goals for using the platform are accepting riders without using the platform and use of the shared profile such as phone numbers for unnecessary interactions. First, cars associated with ridesharing platforms in Ghana have become popular with easy identification by some riders. This strategy enables some drivers directly to accept riders without the use of the platform. Thus, drivers have introduced an off-platform strategy to pick riders and bill them accordingly without the need to pay a commission to the company. This conflict goal is possible because the drivers are independent contractors of the company without any legal form to control their off-platform activities. Second, some drivers use shared profiles such as phone numbers to

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interact unnecessarily with riders after the trip. This post-trip business between drivers and riders is beyond the intended goals of the Dropping ridesharing platform.

Some riders also have personal goals for using the Dropping ridesharing platform. They intend to abscond payment by attacking drivers at night and/or at a strange place. Some riders also intend to commit crimes by snatching the cars from drivers. This is possible because they do not provide genuine records such as name and photo for registration. Further, riders' registration can be done at anywhere without any system or the Dropping staff to verify proof of records. The registration process checks only for phone numbers. Such weaknesses in the process of the Dropping ridesharing platform's registration enable or facilitate conflicts. Thus, riders are negatively using the Dropping ridesharing platform beyond the intended goal.

Another untoward goal is how riders use their details only to book rides for others. Riders are negatively using the platform to book rides with their details for use by others other than themselves. This untoward goal by riders is only known through the experiences of drivers. Those conflicts tend to happen because there is no legal form of identification for riders' app registration. The registration process only accepts mobile numbers for identification. A mobile number is not a legal form of identification or directly linked to a legal form of identification in many developing countries. Such weakness in the structural process of the Dropping ridesharing platform also enables or facilitates conflicts. Ghana is now undergoing a process of re-registration of mobile numbers with national ID as a legal form of identification. Opportunities for riders' personal goals can likely be reduced because they can be legally identified by their mobile numbers after the process.

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5.3.5 Challenges when using Dropping Ridesharing Platform

The Dropping ridesharing platform has challenges that affect drivers and riders when using the platform to achieve their objectives. Although digital technology innovation for the Dropping ridesharing platform enables drivers and riders to perform different functions to suit their needs, there are also constraints. The CEO narrated drivers' and riders' challenges for using the platform as follows:

> *Our work depends on the Internet for 24/7 real-time activities. But Internet outages in Ghana create challenges for our real-time managing, monitoring, and controlling of drivers' and riders' activities. The consequences of Internet outages involve communication breakdown between drivers and riders, stoppages in synchronising drivers' traffic flow information and location updates, stoppages in keeping track of drivers' and riders' profiles in our system for safety, and discrepancy in fares between drivers' and riders' interfaces.*

One of the drivers underscored digital technological constraints, which sometimes affect the ability to achieve the goals for using the Dropping ridesharing platform as follows:

> *The Dropping ridesharing platform is far better than the traditional taxis but there are some technological challenges. These challenges sometimes affect my trip activities. Some of the constraints are poor digital addressing system for locating unpopular and new locations as Google map deals with only landmarks; unreliable Internet connectivity due to outages; and incompatible smartphones for Dropping apps. The apps require a minimum of 4G network standard. The company also recommends cars with a tracking system for security purposes, which affects some of us. Some drivers even add more features such as cameras in their cars to improve security.*

One of the riders explained some challenges regarding the use of the Dropping ridesharing platform, which sometimes affect her to enjoy the reality as follows:

> *Riders always have a problem with software bugs due to programming errors in the app. This challenge always interrupts our trip activities, which sometimes terminates or freezes the app from communicating across the Dropping ridesharing platform.*

The use of ridesharing platform requires enough phone battery power to stay connected due to its real-time activities with other associated applications such as GPS. This issue affects riders

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when they are outside their homes or offices. This is because they are not able to charge the phone battery in order to make ride requests. This situation is as a result of the lack of public charging systems and services in Ghana. A rider explained the battery issue without public phone charging systems in Ghana as follows:

> *I always find it difficult at church to book ride with a low phone battery due to the lack of charging systems in Ghana to charge phone batteries when needed. Consistent online trip activities also consume my phone battery power, especially for long-distance, unlike drivers with a charging system.*

Due to the lack of public charging systems and services, some riders always travel with a mobile phone power bank. The power bank is a battery backup used to recharge mobile phones. This charging system supports riders to charge their battery when it runs down. This innovation enables riders to stay connected on Dropping's ridesharing platform. COVID-19 pandemic is another factor associated with the use of the platform. Drivers are required to wear a nose mask for face verification before access is granted on the platform. A driver said this:

> *Most riders believe that COVID-19 in Ghana came from overseas. This issue creates fear and panic, especially when drivers are collecting cash payments from overseas riders. This is because the nature of the COVID-19 is an airborne disease that spreads via physical contact. It has also created an extra cost for us such as buying nose masks and sanitisers. The sanitisers are used to clean our seats and doors after each trip. This process creates extra work for drivers.*

5.4 Chapter Summary

This chapter presented the case description for the two selected ridesharing platform companies. It presented the background and components of each case. Planning and setup, process, reasons, and use of each case were also presented. In addition, the chapter presented drivers' and riders' challenges for using each case. The next chapter presents the case analysis.

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CHAPTER SIX

CASE ANALYSIS

6.1 Chapter Overview

The previous chapter presented the case description for Uber and Dropping ridesharing platforms. The current chapter uses boundary object theory (discussed in Chapter 3) for the case analysis. This chapter is divided into two sections. The first section presents within-case analysis with the platform as a boundary object for each case from a developing country context of Ghana. Each case also presents the following sub-sections: i) platform as a boundary object components and features, ii) use of platform as a boundary object components and features, and iii) factors that constrain use of platform as boundary object. The second section presents the cross-case analysis of the two ridesharing platforms. The chapter concludes with a summary.

6.2 The Uber Platform as a Boundary Object

The Uber platform is the first case study and it exemplifies a boundary object that connects the divergent group of users to achieve their goals. It is analysed in the following sections: Uber platform as a boundary object components and features, reasons for using the system, use of Uber platform as a boundary object components and features, and challenges for using the system.

6.2.1 Components and Features of Uber Platform as a Boundary Object

The Uber platform as a boundary object has components and features that connect the divergent group of users for information sharing to achieve successful trip activities. The components are the different modules, which have features according to each specific role.

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First, the **Uber platform components** consist of administration panel, drivers' app, and riders' app. The administration panel is the core component of the platform that manages the drivers' and riders' apps. The drivers' app is a complementary component used by drivers. Drivers automatically become part of the users of the app after a successful registration. The riders' app is another complementary component used by riders. Riders automatically become part of the users of the app after a successful registration. Table 6.1 below shows components of the Uber platform as a boundary object.

Table 6.1: Components of Uber Platform as a Boundary Object

Components	Types
• Administration panel • Driver app • Rider app	• Main component • Complementary component • Complementary component

Source: Author's construct

Second is the **Uber platform features.** These are the features of the three components. The users identify and use the Uber platform according to its common and local features. Table 6.2 below shows common and local features of the Uber platform as a boundary object.

Table 6.2: Common and Local Features of Uber Platform as a Boundary Object

Common Features	Local Features	
	Driver app	Rider app
• Users' management form • Administrations management form • Cars and booking management form • Payment management form • Reviews management report	• Registration form • Push notification button • Trip setup form • End trip button • Accept payment button • Rate rider option buttons	• Registration form • Request Uber ride form • Trip cancellation button • Payment methods form • Rate driver option buttons

Source: Author's construct

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The **common features of Uber platform** are associated with the administration panel for their functions and use. *Users' management form* represents Uber staff who are in charge to manage and control users' profiles. The function is used to ensure who can access the platform for what purpose with an authorised username and password. Thus, Uber IT Administrator and Assistant manage and control users' profiles for a particular role and level of activity.

Administration management form represents the Uber staff ability to manage, monitor, and control users' real-time activities. The function supports the Uber IT Administrator's and Assistants' routing activities involving managing, monitoring, and controlling users' profiles, especially drivers' details for registration and updates. *Cars and booking management form* represents managing and controlling riders' requests. This function is used to manage, monitor, and control cars to meet riders' requests in close proximity. Another function is tracking users' movement patterns in real-time for monitoring and managing their information sharing for trip activities across boundaries for safety assurance.

Payment management form represents managing trip transactions. The function involves managing and controlling the trip rate, currency format, and riders' fare for payment via credit card, mobile money or cash. Other functions include payment reminder, notice of fare collection, and commission for drivers' payment. *Review management report* represents managing and assessing users' performance. This function is used to manage and evaluate users' activities for performance rating and post-trip reports for auditing. Thus, to know users' thoughts on their experience with the Uber platform by determining the need for improvement.

The **local features of Uber platform** are associated with drivers' and riders' apps. The local features are standard and show directions for using the boundary effectively in line with users' task breakdown.

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Registration form represents users' details. Users activate it to fill in their details for registration. This function is used by users to access the platform with proof of identity and profile exchange for identification and reference. *Push notification button* represents drivers' ability to justify riders' requests. Drivers press it to activate the command for justification by accepting or rejecting riders' requests in close proximity without knowing the destination address. It also includes a chat function, which helps drivers to push information to riders concerning the remaining time, current position, and arrival for pick-up.

Trip setup form represents set destination details. This function is used to set riders' preferred drop-off location, route selection with estimated arrival time, and payment method. *End trip button* represents completing the activities for a summary. Drivers press it to stop the car at the riders' preferred destination for final fare payment with associated trip completion details. *Accept payment button* represents collect trip fare or justify e-payment notification. Drivers press it to collect the trip fare from riders by cash or get an invoice from e-payment via credit card or mobile money. *Rate rider report* indicates performance assessment. It is used to assess riders' trip behaviour for a review.

With the riders' app features, *registration form* is used to register riders with the required details. This function gives riders access to request rides on the Uber platform. *Request Uber ride form* represents riders' booking details. This function is used to set location, destination, car type with fare estimate, number of riders, and schedule a ride. *Trip cancellation button* indicates riders' option to cancel booked rides. Riders press this function to stop the trip when they are not ready. This function enables drivers to avoid going to the source location for pick-up. *Payment methods form* represents riders' options to settle the trip fare. It enables riders to make fare payments to Uber's account via credit card or mobile money associated with banks or telcos, respectively. This transaction across boundaries is based on standardisation for

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interoperability among the organisations. Riders can also pay cash to drivers in the car before drop-off. *Rate driver option buttons* indicate trip providers' performance assessment. This function is used to evaluate drivers' performance during the trip for a review.

6.2.2 Reasons for using Uber Platform as a Boundary Object

The divergent group of users use the Uber platform as a boundary object because of the special functions that support them to achieve their goals. The functions provide management, monitoring, and control via the administration panel for quality trip activities, which inspire users to use the platform. The driver user group goals are linkage, flexibility, traffic update, unrestrictedness, and security. The rider user group goals also are transportation, legitimacy, accountability, security, and convenience. Both user groups' goals are also relevant due to the context of developing countries as Uber is an international firm. The traditional taxi services in Ghana lack these goals. More importantly, the features associated with the boundary object are facilitating other goals for users to meet their needs.

Linkage provides drivers with opportunities to accept a series of riders' requests in close proximity. This is the drivers' main goal for using the boundary object, which is also in line with Uber's platform goals. The boundary object links riders' requests to available free drivers in close proximity for trip activities. The drivers believe that the linkage or match supply can help them to avoid wasting time and fuel searching for hours without getting a match. More specifically, the drivers believe that the boundary object can match their supply to meet riders' demands to get more revenue.

Flexibility enables drivers to get riders according to the drivers' profile, such as residential address. Apart from the Uber's platform goal of matching riders' demands to supplies, the

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boundary object also uses drivers' residential addresses when signing off to match requests. This function also enables drivers to get riders accordingly when signing in. The flexibility also includes automatic billing, which eliminates the need to negotiate trip fares with riders. Drivers believe that automatic billing makes their business more friendly because it eliminates manual trip charging, which could be favourable or unfavourable.

Unrestrictedness allow the drivers to work everywhere without any restriction due to the type of private cars they use, especially where the traditional taxis are banned from operating. This function encourages the users to use the Uber platform because the cars can work at any location to meet their needs. Cars associated with the Uber ridesharing platform are physical components and operate like private vehicles, unlike the traditional taxis with commercial registration numbers and colours. This goal is the drivers' major concern for using the boundary object because it enables them to get more revenue due to the unlimited area of operation. It also provides riders with opportunities to pick up and drop off at their preferred location without any restriction.

Traffic update provides location name, directions, and traffic flow information. This drivers' goal for using the boundary object is based on the Google map and GPS navigation associated with the Uber platform. The two functions improve users' trip activities, especially for traffic flow information and trip directions. The strategy eliminates traffic jams. It also enables drivers to control city maps on their mobile phones for fast activities in the form of smart cities. The GPS also provides location updates for the users to know their movements. Some riders even use the function to update their families or friends at their exact location for security purposes. Thus, riders are positively using the boundary object beyond the goals of the Uber platform to meet their needs.

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Security is the use of the boundary object to track drivers' movement patterns in real-time for monitoring and managing their information. This goal for both user groups concerning the security purpose is due to the recording function as part of the platform goals. The recording function inspires users to use the boundary object because they believe their trip activities are tracked for a review. Drivers believe that the Uber platform's real-time functions can provide them with recordings to track snatched cars and riders who refuse to pay. The recordings keep track of vehicles' movement for location updates and this enables drivers to get their snatched cars and money from riders who refuse to pay before drop-off.

Riders also believe that the recording function for *security* purposes associated with the Uber platform can track users' records for post-trip activities. This function works in real-time that keeps track of users' activities for post-trip reviews and reports. It has improved the users' confidence in their trip activities anywhere and anytime without fear even when the destination is unknown to them. Thus, the administration panel keeps track of their pre, during, and post-trip activities for any decision. Riders use this opportunity to retrieve items in case they are left in the car after the trip. Both users also believe that real-time managing, monitoring, and controlling keep track of their recordings for post-trip activities and reviews relating to their complaints.

Legitimacy provides riders with trip evidence for authentication. Most institutions have adopted the Uber platform as a legitimate means of travel for payment. This function associated with the Uber platform enables rider user group to use the boundary object instead of the traditional taxi services. This is because the boundary object provides riders with a summary for proof of travel; thus, there is a provision for a genuine and proper form for claiming trip allowance. The boundary object keeps track of riders' activities to justify a trip report. This riders' goal for

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using the Uber platform also minimises corruption associated with a trip where they can request for travel allowance without any evidence.

Accountability is an assurance that enables riders to evaluate their trips to meet their institutional requirements. This function of the boundary object inspires riders to use the Uber platform. This riders' goal also works with legitimacy associated with the Uber platform. Thus, riders can account for their trip transactions across boundary to meet their institutional needs. The evidence of travel enables riders to prepare their trip reports for better auditing.

Convenience is how riders have options for pick-up points, choice of driver/car, cancellation of service, and mode of payment. This riders' goal is a major concern for using the Uber platform because it suits their needs. Riders can request a vehicle of their choice via the boundary object at a preferred location such as home, mall or office and watch the progress of the car until arrival for pick-up. Riders are also able to cancel the booked ride via the boundary object when not ready or interested before drivers' arrival for pick-up. This riders' goal for using the Uber platform also enables them to pay the trip bill in their preferred mode via cash, credit card or mobile money.

Beyond the two user groups' goals, some of them also have untoward goals for using the boundary object, and these are clear examples of conflicts and appropriations. Some drivers have untoward goals for using the boundary object. They accept riders outside the Uber platform and use the shared profile for post-trip business. Cars associated with the Uber platform have become easy to identify by some riders. The Uber platform's goal is to link riders' requests to drivers for trip activities. Due to the popularity of drivers' cars for providing the service, some of them have taken this advantage to accept riders' requests with manual

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billing without the use of the boundary object. This is possible because drivers own the cars and they are also independent contractors of the Uber ridesharing platform company without any legal form to control their off-platform activities. The Uber platform does not keep records of drivers' and riders' activities for such untoward goal. Another untoward drivers' goal is how they use the shared profile for unnecessary post-trip business with riders. Some drivers take advantage of riders' phone numbers for other business interactions contrary to the intended goal for using their shared profile. Some drivers also attack riders. These personal goals are only known through the experiences of riders. Thus, drivers are negatively using the boundary object beyond the intended goals of the Uber platform.

Some riders also have untoward goals for using the boundary object, namely, abscond payment, endanger the driver or commit a crime, and use their details to book rides for others. Some riders refuse to pay before drop-off without any genuine record for identification. This untoward goal is possible because the Uber platform uses riders' name, e-mail, and phone number for registration. Some riders use different names and e-mails for registration rather than their real details. The Uber platform uses only riders' phone numbers for identification. A mobile number is not a legal form of identification in Ghana. Such weakness in the Uber platform structural process enables or facilitates conflicts. Ghana has started re-registration of mobile phone numbers with national ID to uniquely identify users. This exercise is likely to minimise such untoward goal when done as riders can be legally identified according to their mobile numbers. Some riders also use their details to book rides for others without any record to track the traveller's activities via the boundary object. Some also attack drivers by snatching their cars, especially at remote locations. Thus, riders are negatively using the boundary object different from their intended goals. These untoward or personal goals are only known through the experiences of some drivers.

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6.2.3 Use of Uber Platform as a Boundary Object Components and Features

The divergent group of users' actions, interactions, and transactions across boundaries provide a means to achieve their goals for using the platform. With reference to the study's theoretical framework (see Figure 6.1), three user goals were identified, namely, user-local actions, user-boundary interactions, and user-boundary transactions. They view and use the Uber platform as a boundary object according to its features. The detailed analyses are presented next according to the users' local and boundary use of the components and the associated features.

Local actions (user-local actions) support the users to activate their trip activities individually without affecting each other across boundaries. Thus, the individual user group directs engagement for actions on and outside the platform. First, *driver user group local actions on the Uber platform are* register and load drivers' app, and this enables them to accept riders' requests in close proximity. The drivers' registration process is real-time. The registration involves downloading and installing the Uber app via Google Play Store or Apple App Store on a compatible mobile phone with a minimum of 3G network standard. The registration process occurs at Uber's office with the following accepted information: drivers' details, driving test code, and car details. The drivers' registration details are date of birth, phone number, e-mail address, residential address, landmark location, and photo. The driving test code justifies certified drivers; this is based on the company's pre-screening and training. Table 6.3 below shows the divergent group of users' actions across boundaries.

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Table 6.3: Qualitative evidence of users' actions on ridesharing platforms as boundary objects (enablements)

Second-order constructs and First-order codes	**Illustrative quotation(s)**	**Respondent**
Overarching dimension: **Platform entry** 1. User registration a. Register	*We advertised on the radio that we are pre-screening drivers as partners with a minimum age of 25 years who are ICT-oriented for training. In addition, drivers with a car or willing to partner with vehicle owners. We considered the following valid requirements for selection before registering and training: age, driving license, driving test, car with four doors and air conditioning, DVLA certificate, private car with number plate (white background and black number), commercial insurance certificate with comprehensive cover, and smartphone with a minimum of 3G network standard.*	*Assistant IT Administrator*
	Registration for drivers' app requires smartphones with Internet-enabled and driven test. The administrators assist drivers at the company's office in the process.	*Driver*
	Uber company requires drivers with a particular standard of private cars for registration without any security features. After the successful vehicle inspections, drivers are allowed to install the app from Google Play Store on their smartphone for registration.	*Driver*
	Drivers without cars are allowed to provide evidence to partner with vehicle owners for registration. The registration for drivers' app enables us to access riders' requests from the Uber ridesharing platform.	*Driver*
	Registration for drivers' app requires a high class of vehicles. I recommend the company should accept cars with a tracking system and camera-enabled only. The tracking system can monitor cars' locations without depending on GPS from drivers' mobile phones. This function can remotely stop cars when snatched by armed robbers. The cars with cameras can also record activities, which happen inside the vehicles.	*Driver*
	Riders' registration requires a smartphone with Internet connection. The registration involves loading Uber riders' app from Google Play Store and then providing user details anywhere without any support. The details involve name, e-mail and password, country code, and phone number.	*Rider*
	Registration for riders' app generates a link for accessing the Uber ridesharing platform. The installation is once and it is a small megabyte, which does not consume much storage space on my phone.	*Rider*
b. Load app	*Drivers are required to load the app each time we want to get riders from the Uber ridesharing platform. The drivers'*	*Driver*

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	app provides a link on our phones for easy access via Internet connection. *I ways activate the riders' app on my phone to get connected to the Uber ridesharing platform for ride requests without logging in with a password. The process automatically activates my location address via GPS.*	*Rider*
Platform utilisation 2. Uber platform access c. Establish proof of identity	*Drivers establish proof of identity with username, password, and current photo via the app each time we want to access the Uber ridesharing platform.*	*Driver*
d. Secure access	*After getting access to the Uber ridesharing platform, drivers are allowed to get riders from any location without the need to waste time and fuel in search of passengers.*	*Driver*
3. Accept trip booking e. Booking	*What I need before booking a ride is to get connected to the platform. Then I just enter or select my destination address, mode of payment, and confirm Uber ride.* *Uber ridesharing platform enables me to get cars at convenience without the need to waste time at the roadside in search of vehicles*	*Rider* *Rider*
f. Cancel trip request	*Drivers have the option to reject riders' requests on the Uber ridesharing platform when not ready without any punishment.*	*Driver*
g. Accept trip request	*The Uber ridesharing platform broadcasts riders' requests to drivers. This action enables drivers to accept riders' requests without the need to waste time and fuel in search of passengers. The platform always shows me only riders' requests for approval with a pick-up location without destination and charge. I have noticed that if destination and charge are shown to drivers, then these can discourage some of us from accepting uninterested riders' requests.* *What I like about Uber is its set-destination. The staff always give me a priority for matching riders' requests within my location whenever I set up or off my business. This option is economical as it enables me to accept riders' requests within my route to save fuel and time.*	*Driver* *Driver*
4. Arrival for pick-up: h. Trip Cancellation	*Riders can cancel the booked ride when not ready before drivers' arrival. Trip cancellation attracts a penalty for riders in the next booking.*	*Rider*
i. Prompt for arrival	*Drivers always activate arrival on the Uber ridesharing platform at the exact source location, which prompts riders for identification and pick-up.*	*Driver*
j. Check for arrival	*I always monitor the remaining time on the Uber ridesharing platform to check for drivers' arrival.* *Uber has improved my travel activities in cities. The platform provides me with driver's contact to communicate for arrival confirmation via WhatsApp, video or voice call.*	*Rider* *Rider*
User identification 5. Identification for pick-up k. Identify car	*Uber ridesharing platform provides me with drivers' details, such as car colour, vehicle registration number, and photo. This information enables me to identify the booked car for pick-up*	*Rider*

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l. Identify rider	*Drivers sometimes interact with riders outside the platform via text messages and phone calls for further information for identification and pick-up. Since the Uber ridesharing platform shares drivers' profile with riders, the shared information such as photo enables us to locate each other.*	*Driver*
User set-up 6. Trip information m. Collect destination and mode of payment	*Drivers collect destination address and mode of payment from riders after the pick-up. This is because the Uber ridesharing platform just links drivers to riders without all the trip details.*	*Driver*
7. Trip set-up before take-off n. Set-up destination address, direction, and mode of payment	*After pick-up with trip details, drivers provide the Uber ridesharing platform with the destination address and mode of payment. The destination address enables us to choose the best route with the associated trip completion time. I use more than one driver's app and the process is the same as the other platforms.*	*Driver*
8. Activate start trip with digital directions o. Activate start trip	*Drivers activate start trip after set-up. The platform automatically provides me with a fast and traffic-free direction during the trip without asking anyone for assistance. The city map is now on my mobile phone for easy mobility.* *The platform has improved drivers' performance in the cities for smart activities. What I need for a trip is to set the destination address from the riders' pick-up location and drive. The platform then provides me with the best route for driving without any human assistance for smart activities in the cities.*	*Driver* *Driver*
User rating 9. End trip for summary and payment p. Activate end trip	*Drivers activate the end trip at the rider's preferred location for summary and payment before drop-off.*	*Driver*
q. Activate e-payment	*Uber ridesharing platform enables me to make trip payment via credit card, mobile money or cash to suit my needs before drop-off. The e-payment associated with the Uber ridesharing platform minimises tax fraud due to its cashless approach.*	*Rider*
r. Justify e-payment invoice	*Drivers get an invoice of riders' payment via credit card or mobile money directly into the Uber ridesharing company's account at the end of the trip before drop-off. All cash payments are received by drivers directly from riders before drop-off at the required destination.*	*Driver*
10. Assess trip performance s. Activate rate options	*Uber ridesharing platform enables drivers to rate riders' attitudes during the trip before drop-off.* *Riders have options on the Uber ridesharing platform to rate drivers according to the trip performance before drop-off.*	*Driver* *Rider*

Source: Author's construct

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The car registration involves the owner (the driver or a partner), model, colour, plate number, valid driving license, photo of the car, valid DVLA certificate, and valid commercial insurance certificate. At the successful registration (drivers' app), the company interacts with drivers as users with a confirmation code via SMS and e-mail. The drivers' app provides a link with a password and current photo to access the Uber platform without going through the registration process again. Those actions occur before drivers get the link on their mobile phones as the gateway for accessing the Uber platform (i.e., user-local actions without affecting riders). Drivers load the app to access the platform for a maximum of eight hours a day. The goal of the load action is to open the Uber platform to accept or reject riders' requests.

Second, *rider user group local actions on the Uber platform* are register and load riders' app in order to book rides at convenience. Thus, riders' user-local actions do not affect drivers. The rider user group registration process involves downloading and installing the app via Google Play Store or Apple App Store on a compatible mobile phone. The compatible mobile phone requires a minimum of 3G network standard. Riders provide the company with their name, phone number, e-mail, and photo during the registration process. The company interacts with riders for confirmation code via SMS on their mobile phones for a successful profile registration. The riders' app provides a link for accessing the platform without going through the registration process again. The goal of the load action is to open the Uber platform to book a ride at convenience. Table 6.4 below shows factors that constrain users from using ridesharing platforms.

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Table 6.4: Qualitative evidence of users' constraints on ridesharing platforms as boundary objects

Second-order constructs and First-order codes	Illustrative quotation(s)	Respondent
Overarching dimension: **Registration constraint** 1. Registration requirements a. App installation limitation	*Installation of Uber drivers' app requires a smartphone with a minimum of 3G network. Drivers with a lower version are unable to install the app.*	*Driver*
	I was forced to buy a new smartphone with 3G when I wanted to install the Uber riders' app. This is because my old phone was not compatible with the app.	*Rider*
Information and reversal constraint 2. Hide information and restrict drivers after approval b. Unknown trip details before accepting requests	*Ridesharing platforms constrain drivers to have access to riders' destination address and mode of payment before accepting the trip request.*	*Driver*
c. Denied drivers from trip cancellation after acceptance	*Drivers are not allowed on the Uber ridesharing platform to cancel riders' requests after acceptance.*	*Driver*
d. Restrict riders to link trip details to drivers	*Uber ridesharing platform limits riders to provide trip details directly to drivers unless face-to-face outside the platform.*	*Rider*
Location constraint 3. Stoppage in real-time information e. Restrict Location updates	*Uber ridesharing platform depends only on the Internet for location updates. Poor Internet connectivity disrupts drivers to provide riders with location updates before arrival.*	*Driver*
4. Insufficient digital address system f. Limited information for location identification	*Drivers sometimes find it difficult to locate riders effectively because most places in Ghana are not on Google map associated with the Uber ridesharing platform for location identification.*	*Driver*
Complaint constraint 5. Lack of features for complaint g. Prevent riders to send complaints via the platform	*Uber ridesharing platform disables riders to send a complaint to the company during the trip in case of unprofessional drivers.*	*Rider*

Source: Author's construct

User-boundary actions are what the users activate independently across boundaries to achieve a particular goal, which affect each other's activities. A user is someone who creates, uses, and shares information with others on the Uber platform. Thus, users view and direct engagement

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for actions on and outside the platform. First, *driver user group actions on the Uber platform* are accept requests, cancel riders' requests, prompt for arrival, set trip, end trip, receive e-payment invoice, and rate. Accept riders' requests action on the platform enables drivers who are free to approve the booked ride. This action saves a considerable amount of time and fuel by getting riders in close proximity. It also provides drivers with safety to avoid taxi fraud due to prior knowledge of riders' profile. Cancel riders' requests action allows drivers to reject the offer when not ready without knowing the trip details, such as destination address and mode of payment. Since Uber operates in real-time, the staff who are in charge quickly re-assign another driver to meet the request in case of rejection.

After accepting the riders' requests, drivers take off to the source location for pick-up and prompt for arrival on the Uber platform. This action enables riders to search for the car after getting arrival information on the Uber platform for pick-up. Drivers set trip after pick-up for the destination address, mode of payment, and best route before take-off. This action enables the driver user group to feed the platform with riders' trip information for the best route, estimated time for arrival, location updates, and estimated fare before take-off. This action provides drivers with traffic flow information to avoid jams, arrival time, location updates, and automatic billing. In addition, this user-boundary action creates smart cities by controlling the city maps for fast trip activities. The users' activities are managed, monitored, and controlled via the administration panel in real-time with GPS by the Uber IT Administrators. The GPS traces users' movement patterns and traffic flow information for monitoring and managing their trip activities across boundaries. This action provides safety assurance for users to avoid taxi fraud because they know that the trip activities are being tracked in real-time. This innovation is coming up because the cars associated with the Uber ridesharing platform have

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also become part of the boundary object with a tracking system and camera, which can be stopped remotely.

The Uber staff also manage and control fare rate and currency format; drivers' commission and working hours; riders' trip fare payment via credit card, mobile money, and cash; redirect riders' requests; monitor drivers' activities; and update drivers on riders' decision. Drivers then activate end trip at the riders' destination, which generates the final fare for completion before payment and drop-off. The next drivers' action on the Uber platform is to receive riders' e-payment (i.e., invoice of e-payment) via credit card or mobile money before drop-off. The final drivers' action is the rate option. This option is used to assess riders' attitude during the trip before drop-off at the required destination.

Driver user group actions outside the Uber platform are rider identification, collect trip details, and drop-off. Users identify themselves with photos at the agreed source location for pick-up and collect trip details, including destination address and mode of payment for trip setup. The agreed source location for pick-up has no restriction that provides drivers with unlimited operating environments in the cities to work. The last driver user group action outside the Uber platform is to collect cash payment from riders at the end of the trip before drop-off. Drop-off is where drivers allow riders to come out from the car at the preferred location without a restriction. Furthermore, driver user group action outside the Uber platform includes using other platforms via different apps for accessing more riders. Drivers, therefore, have become multiple users across different ridesharing platforms as boundary objects for accessing riders without a limit.

Rider user group actions on the Uber platform are ride booking, cancelling e-booking, check for arrival, e-payment, and rate. Ride booking provides riders access to select car type with the

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associated fare, mode of payment, and maximum number of 1-4 passengers allowed. Alternatively, riders can schedule a ride in advance by setting a pick-up window with date and time within two days as well as comparing fares from different platforms. Riders' goal of this action is to get cars in close proximity or at convenience. In addition, riders' goal is to know the booked car and the driver for safety before pick-up. Cancelling e-booking action enables a rider to stop the booked ride when not ready for a penalty in the next booking. Riders check for the arrival of the booked car with the source address on the Uber platform before pick-up for the trip. E-payment provides access for riders who wish to make payment on the Uber platform as boundary object via credit card or mobile money. This e-payment minimises the chance of getting or spreading COVID-19, unlike cash payment. User-boundary actions provide means for trip payment from external financial digital accounts linked the Uber platform before drop-off. Rate is the last user-boundary action before drop-off, which enables users to assess each other's trip performance.

Rider user group actions outside the Uber platform are car identification, destination address, and drop-off. Riders identify the booked car for pick-up outside the Uber platform and then sit in for the necessary action. This action is to provide drivers with the destination address for the trip. It also enables drivers to know the destination address for the trip before take-off. The final riders' action outside the platform is drop-off from the car. Riders drop off after successful payment via electronic or cash; this ends the trip.

The users' boundary and local actions across the Uber platform could be mandatory or optional. The **mandatory actions** are the users' required options on the Uber platform used to accomplish the trip activities. The mandatory actions, however, are subject to specific interface trip activities available for users, and this must be accomplished for a decision to be taken before access is granted to the next action. They include all the users' actions across the Uber

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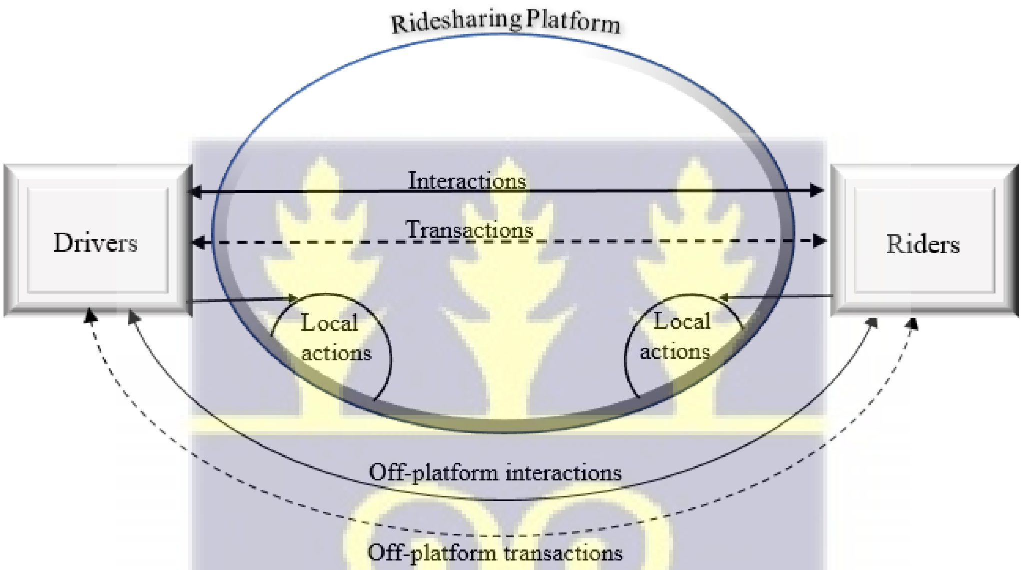
platform except the rate driver and rider option buttons. The **optional actions** are the users' options on the Uber platform generally used to perform nonmandatory trip activities. The optional actions are rate driver and rider option buttons; these do not affect the trip activities when selected or ignored on the Uber platform. Figure 6.1 below shows the users' local actions, interactions, and transactions across boundaries.

Figure 6.1: Theoretical Framework for Users' local actions, interactions, and transactions across Ridesharing Platform



Source: Author's construct

User-boundary interactions are processes of sharing trip information between users across boundaries. More specifically, what users perform across boundaries affects each other's needs, irrespective of their social worlds. The interactions occur on and outside the Uber platform for information sharing throughout the entire trip. On the Uber platform, interactions occur between the users with digital objects. On the other hand, outside the Uber platform, interactions occur between the users via SMS or WhatsApp, voice call, video call, and face-to-

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face. The user-boundary interactions for trip activities involve three stages, namely, riders' requests, requests matching and response, and pick-up and drive.

First, *the riders' requests* (book ride or e-hailing) involve the use of the Uber platform to book rides from drivers to accept or reject within the company's network coverage. The booking process automatically fetches riders' configuration location address via GPS. If the riders' location address is inactive, then the process automatically provides an option to turn on location service (activate location address). This strategy enables the Uber platform to link riders' request location to available cars in close proximity for interaction with drivers. Riders then provide destination address or select it via Google map associated with the platform. They choose car type and mode of payment (cash, mobile money or credit card) on the Uber platform before final confirmation for e-booking. The car types are UberX and connect. The two addresses (source and destination) and car type enable the Uber platform to justify riders' estimated fare and arrival time for pick-up.

Second, *request matching and response* broadcast riders' requests to available free cars in close proximity within the Uber's coverage area, where drivers have options to accept or reject the offer. Drivers use the Uber platform to accept or reject the riders' requests without knowing the trip details. Thus, accept or reject request gives drivers options on the platform to get a series of riders in close proximity or ignore the offer when not ready. Trip cancellation provides drivers access to ignore the request before profiles are exchanged for users' identification. On the other hand, drivers cannot cancel the trip when rider user group details are known. In case a driver rejects the request, the Uber platform or IT Administrators redirect it to the available free car in close proximity until the booking is accepted. Table 6.5 below shows users' interactions on the Uber platform as a boundary object.

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Table 6.5: Users' Interactions on Uber Platform as a Boundary Object

	Driver-rider interactions	Rider-driver interactions
Information	• Drivers use the Uber platform to accept or reject ride requests for a trip from riders' booking • Drivers use the platform to cancel the ride for the trip from riders' requests • Drivers use the platform to accept ride requests for riders' photo, name, contact, and source address provided by riders for the trip • Drivers use the platform to get trip updates on arrival time and location from riders' requests • Drivers use the platform to stop going to the location for pick-up from riders' ride cancellation • Drivers use the platform to provide car arrival for pick-up for the trip at source location from riders' requests • Drivers use the platform to provide trip setup with destination address, mode of payment, and route selection then drive as provided by riders • Drivers use the platform to provide trip updates on locations, arrival time, and fare for riders' notification • Drivers use the platform to provide end trip with a summary for distance covered, time spent, and trip fare for riders' acknowledgement • Drivers use the platform to get invoice of e-payment for the trip from riders' fare settlement • Drivers use the platform to rate the trip performance based on the riders' behaviour	• Riders use the Uber platform to request ride for a trip from drivers to accept or reject • Riders use the platform to get redirected of ride requests from drivers' cancellation • Riders use the platform to get drivers' profile and car details from drivers' acceptance • Riders use the platform to get a car at convenience for the trip from drivers' approval • Riders use the platform to cancel the booked ride for the trip from drivers' approval • Riders use the platform t to check for car arrival for pick-up and go provided by drivers • Riders use the platform to get estimated arrival time and fare from drivers' trip setup • Riders use the platform to get trip updates on locations, arrival time, and fare indicated by drivers during the trip • Riders use the platform to get end trip with a summary for distance covered, time spent, and trip fare from drivers' justification • Riders use the platform to pay for trip fare with credit card or mobile money for drivers to acknowledge with receipt before drop-off • Riders use the platform to rate the trip performance based on the drivers' attitude

Source: Author's construct

Redirect the request provides real-time linking of users until they are matched. The Uber platform or Greenlights Operations Coordinator also redirects drivers to occupy empty space to prevent many cars from operating at the same location. This strategy avoids traffic jams.

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After the acceptance, the Uber platform exchanges drivers' profile with riders for identification and interactions; thus, there is proof of users' details. Riders use the platform to get drivers' profile after acceptance. Drivers also use the platform to get riders' profile for the trip. The driver user group profile consists of photo, name, cellphone number, car model, and car registration number. The rider user group profile also consists of photo, name, cellphone number, and source address with pick-up directions.

After the users' profiles are exchanged, users-boundary interactions provide locations update and associated remaining time until the arrival for pick-up. Thus, riders use the Uber platform to get a car at convenience for the trip from drivers' approval. Alternatively, users interact outside the Uber platform before arrival via WhatsApp, voice call, and video call. Drivers use voice or video calls outside the platform to tell riders on remaining arrival time for pick-up to justify the trip's readiness. Update on arrival time enables users to get ready for pick-up at the source location when drivers are getting closer. Drivers then continue to use the Uber platform to get trip updates on arrival time and location based on the riders' requests. The Uber platform provides drivers with the best route via Google map to riders' source location. Google map associated with the Uber ridesharing platform deals with popular places in Ghana for locating riders. Drivers, therefore, have introduced a new strategy by asking riders' locations via text messages and/or phone calls to overcome the limitation of locating riders from areas not captured by Google map. Table 6.6 below shows users' interactions outside the Uber platform as a boundary object.

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Table 6.6: Users' Interactions outside Uber Platform as a Boundary Object

No.	Interaction format	Information
1	Text (SMS and WhatsApp)	• Drivers use SMS or WhatsApp to send remaining arrival time for pick-up for riders to accept for waiting • Drivers use SMS or WhatsApp to send arrival for pick-up at source location for riders to agree on for pick-up and go
2	Voice call	• Drivers use voice call to tell riders on remaining arrival time for pick-up at the source location for riders to justify readiness for the trip • Drivers use voice call to indicate arrival at source location for riders to confirm of coming for pick-up and go • Riders use voice call to tell drivers for retrieval of items in case left in the car after the trip for drivers to justify for collection
3	Video call	• Drivers use video call to tell riders for update on remaining arrival time for pick-up at the source location for riders to justify readiness for the trip • Drivers use video to call for arrival at source location for riders to confirm of coming for pick-up and go
4	Face-to-face	• Riders use face-to-face to provide drivers with destination address and mode of payment for drivers to do trip setup before take-off • Drivers use face-to-face to collect cash payment of trip bill at the destination for riders to settle the fare before drop-off

Source: Author's construct

Before arrival at the riders' location for pick-up, the Uber IT Administrator and Assistant monitor drivers' movement with traffic flow information via the administration panel. Location update gives users an alternative way to interact outside the platform via voice call for drivers' current location and estimated arrival time. Riders can cancel the booked ride at this stage; this attracts a penalty that must be paid in the next booking.

Cancelling trip provides riders with an option on the platform when they are not ready or when they change their decision, thereby stopping drivers' approval for pick-up. In case a rider cancels the trip, the Uber platform prompts the driver of the cancellation.

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Finally, *pick-up and drive* enable drivers to use the Uber platform to provide car arrival for pick-up for the trip at the source location from riders' requests. Check for arrival enables rider user group to interact with drivers to verify the booked car at the source location for pick-up. Riders then use the Uber platform to check for car arrival for pick-up and go. Digital address system via Google map and GPS associated with the Uber platform as a boundary object supports drivers in finding riders' source location for pick-up. The shared profiles then provide users access for identification and pick-up at the rider's source location according to their photos and car registration number. Arrival for pick-up provides an alternative way for drivers to interact outside the platform with riders. This approach enables the users to find each other at the source location via text, voice call, and video call. Thus, drivers use WhatsApp, voice or video call to notify arrival for pick-up at the source location for riders to agree.

Identification, pick-up, and drive occur outside the Uber platform. These functions enable users to identify themselves at the source location for riders to get on board and then provide drivers with trip details. Drivers then identify riders for pick-up at the source and drive to the destination address as agreed. Riders, on the other hand, identify drivers' arrival then pick up with destination address and go. The pick-up involves riders opening the car door physically and then sitting in for interactions. After pick-up, users interact face-to-face for the destination address and mode of payment for trip setup before take-off. Riders at this stage use face-to-face to provide destination address and mode of payment for drivers to do the trip setup and then drive accordingly. The face-to-face interactions as well as riders opening the car door with their hands, however, create fear and panic for users due to the chance of getting or spreading COVID-19. This is because COVID-19 started from overseas and spreads easily among people, and most riders who use the Uber platform are overseas tourists. The interaction enables drivers to use the Uber platform to make the trip setup provided by riders. The trip setup involves

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arrival time and pick-up time, destination address, best direction for traffic flow, and mode of payment (cash, credit card or mobile money). The setup generates estimated fare and time for the trip completion. Riders then use the Uber platform to get the estimated arrival time and fare from drivers' trip setup.

Trip update enables drivers to take off and continue their interactions across the Uber platform for directions, locations, estimated time for arrival, and automatic billing for riders' notification. Riders, on the other hand, use the Uber platform to get trip updates on locations, arrival time, and fare from drivers during the trip until arrival. The Uber IT Administrators continue to monitor and manage the trip activities via the administration panel in real-time before users arrive at the destination for drop-off. At the riders' destination, which could be at any location without restriction, drivers use the Uber platform to provide the end trip with a summary for payment. The summary includes distance covered and associated waste time, which provides access for riders' acknowledgement. Thus, drivers end trip and then collect payment with invoice and drop-off as settled by riders. Riders then use the Uber platform to get the end trip with the summary for fare settlement from drivers' justification. They make fare payments with invoices and drop-off at the preferred location based on the drivers' approval.

E-payment and drop-off function is where riders use the Uber platform to pay for the trip fare via credit card or mobile money for drivers to acknowledge with receipt; thus, it is the payment made to end the trip activities. Riders who wish to make e-payments continue the interactions across boundaries with their credit card accounts associated with banks or mobile money with telcos. E-payments go directly into the company's account for invoice confirmation. After the successful e-payment, drivers use the Uber platform to receive an invoice from riders' fare settlement as evidence before drop-off.

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Alternatively, riders use cash payment outside the Uber platform to settle the trip fare directly to drivers before drop-off. Drivers use face-to-face interaction to collect cash payments for the trip at the destination from riders who wish to settle the fare with physical money before drop-off. Users-boundary interactions provide means to rate each other's performance according to the trip before drop-off, which is optional. Drivers use the Uber platform to rate the trip performance based on the riders’ behaviour. Riders, on the other hand, use the Uber platform to rate the trip performance based on the drivers’ attitude. Post-trip is users’ interactions outside the Uber platform after drop-off via voice call. This function involves friendship and retrieval of riders’ item in case they are left in the car.

User-boundary transactions are the users' agreement to exchange exchangeable services and funds for trip activities across boundaries. More specifically, what users perform as part of their trip activities, which affect each other for using the Uber platform. The User-boundary transactions are in two parts, namely, on the platform and outside the platform. Both transactions run through the entire trip process between the divergent group of users. Ride booking is the starting point of users’ transactions across the boundaries, where riders’ requests are connected to available drivers for acceptance. Thus, the real trip activity is provided by the driver user group. Trip setup and management transaction occurs on the platform where drivers provide the available riders’ information after pick-up. Drivers feed the Uber platform with collected information for real-time trip control and monitoring before take-off.

Billing transaction provides payment details for riders to pay according to the trip provided by drivers. The payment details include rate per minute, time elapsed, distance covered, and fare. This transaction is real-time and controlled by the Uber IT Administrator and Assistants without any disruption, irrespective of Internet outages which may create discrepancies in the

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fare between users after the end trip. Table 6.7 below shows users' transactions across boundaries.

Table 6.7: Qualitative evidence of Users' Transactions across Uber Platform as a Boundary Object

Second-order constructs and First-order codes	**Illustrative quotations**	**Respondent**
Overarching dimension: **Booking transaction:** 1. Rider booking transaction a. Exchange riders' requests for drivers' approval	*Riders make requests via the ridesharing platform for drivers' approval.*	*Rider*
Trip transaction 2. Trip setup and management transaction b. Drivers set trip details provided by riders	*Drivers use the additional information from riders for trip setup and management after pick-up.*	*Driver*
Service transaction 3. Billing transaction c. Payment details for the service	*Riders make payment via credit card or mobile money directly into Uber's account or cash to drivers according to the trip provided.*	*Rider*
4. Electronic/cash payment transaction d. Trip payment	*Drivers activate end trip after providing the service for riders to pay the bill accordingly.*	*Driver*
e. Acknowledge payment	*Drivers receive notification of riders' e-payment for acknowledgement before drop-off.* *Drivers receive cash payment from riders for justification before drop-off.*	*Driver*

Source: Author's construct

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Payment transaction consists of two groups, namely, e-payment and cash. E-payment transaction occurs on the Uber platform where riders pay for the trip provided by drivers. Riders make this payment via credit card or mobile money directly into Uber's account instead of cash payment before drop-off. This transaction is based on standardisation for interoperability

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among Uber, banks, and telcos for users' information transfer compatibility. The credit card supports riders with global payments of bills from their banks after the trip provided by drivers directly into Uber's account. Mobile money service from the telcos provides riders with an e-payment option of fares directly into Uber's account. The e-payment minimises touching physical cash for trip payments. On the other hand, cash payment transaction occurs outside the Uber platform where riders pay for the fare with physical money directly to drivers for the trip provided before drop-off. Acknowledgement of successful transaction and payment operate in real-time on the Uber platform. This function enables the Uber IT Administrators to manage riders' e-payment via credit card or mobile money for the trip provided by drivers, thus, service transaction. After the successful transaction, the Uber IT Administrators provide riders with notification of e-payment receipt and drivers with invoice and commission before drop-off to end the process.

In addition to the use of Uber platform, innovations are coming up by some drivers because of the new type of access of cars to the new market and how the vehicles also have become part of the boundary object. This innovation based on the new type of cars to the new market is due to the standard of vehicles required for the service. The cars must also be camera-enabled with a tracking system because they have become part of the boundary object. The camera can be used to record users' activities outside the platform. The tracking system is used to stop snatched vehicles remotely because the cars have also become part of the boundary object. The Uber platform must also include complaint features, which can be easily activated by users via phone and/or video call. These features can be linked directly to the security agencies for safety in case of unprofessionalism during the trip.

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6.2.4 Factors that Constrain use of Uber Platform as a Boundary Object

The challenges when using the Uber platform as a boundary object are what disrupt the users for effective 24/7 real-time trip activities. These are Internet outages, poor digital address system, lack of public phone charging systems and services, working condition, and car model. First, Internet outages interrupt drivers' actions, interactions, and transactions across boundaries for route directions and invoice for riders' payments. Riders are also disrupted for their actions, interactions, and transactions across boundaries for location identification and e-payment. Table 6.8 below shows qualitative evidence of contextual factors that prevent drivers and riders from using ridesharing platforms as boundary objects.

Table 6.8: Qualitative evidence of contextual factors influence users use of Ridesharing Platforms and their achievement

Second-order constructs and First-order codes	Illustrative quotations	Respondent
Overarching dimension: **Internet outages:** 1. Disrupt real-time activities a. Breakdown information access	*We work with the Internet for all our activities. But Internet outages in Ghana interrupt our real-time managing, controlling, and monitoring of drivers' and riders' activities. The consequences involve communication breakdown between drivers and riders, stoppages in synchronising their traffic information flow and location updates, and stoppages in tracking their profiles for safety.* *We operate with the Internet for 24/7 to meet users' needs. But Internet outages affect our real-time monitoring and managing of users' activities across our ridesharing platform.*	Greenlights Operations Coordinator IT Administrator
b. Prevent loading users' apps	*Loading riders' app for accessing the ridesharing platform requires Internet connection. We do not have reliable Internet service in Ghana, which affects our online activities relating to ridesharing platforms.*	Rider
Poor digital address system: 2. Disrupt location identification c. Unable to locate unmapped areas	*The poor digital address system in Ghana disables drivers' directions to locate riders effectively as Google map and GPS navigation app associated with the ridesharing platforms operate with only landmarks. This issue makes it difficult, especially when looking for riders in areas without landmarks. I always interact with riders via text message and phone call outside the platforms for location identification to solve the problem.*	Driver
d. Unable to locate new sites	*Drivers are unable to locate my resident for pick-up because I live at a new site, which is not popular. They always call me via text message or phone call for my location description such as*	Rider

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	building colour and type. The description of my resident always enables drivers to locate directions outside the ridesharing platform for pick-up.	
Lack of public phone charging systems and services 3. Disable users with battery rundown e. Unable to restore phone battery power	*There is no public phone charging systems and services in some places such as malls and churches in Ghana. These issues prevent me from getting connected to the Uber ridesharing platform to book rides when my phone battery runs down. Sometimes, I travel with a power bank to charge my battery.*	Rider
4. Multimedia programmes f. Demand more battery power	*Ridesharing platforms run concurrently with navigation programmes such as GPS and Google map. These associated programmes drain users' mobile phone batteries to run down without a charging system to restore them when we are out of our homes and offices.*	Rider
Working condition 5. Use multiple apps g. Limited working hours	*Some ridesharing platforms limit drivers to work for eight hours a day. I normally work for more than eight hours a day. This is because I have also installed more drivers' apps on my phone, which support me to use different ridesharing platforms for more riders and working hours.*	Driver
h. Change in process	*COVID-19 has changed our verification for the normal process for using ridesharing platforms. This time, the verification process via selfie checks the nose mask before getting access to the platforms. COVID-19 has brought extra cost and work - drivers must sanitise doors and seats after each trip.*	Driver
Car model 6. Standard vehicles required i. Insufficient security	*Cars used by ridesharing platform drivers are of high class but some of them lack sufficient security. I recommend the company should accept cars with a tracking system and camera-enabled only. The tracking system can monitor cars' locations without depending on drivers mobile phones' GPS.* *Uber company checks vehicles with tracking system as an additional function for registration and this is optional. This function can remotely stop our cars when snatched by armed robbers. The company should also include vehicles with cameras. The cars with cameras can record activities, which happen inside the vehicles. This is because I use a camera for recording activities that occur in my car for security purposes.*	Rider Driver
j. Market demands of cars	*Ridesharing platform companies require drivers to register with a specific car. This requirement increases the market demand for cars.*	Driver

Source: Author's construct

The consequences involve interaction breakdown between drivers and riders; stoppages in synchronising automatic billing for affordable fare, drivers' traffic information flow, and

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location updates; and stoppages in keeping track of users' profiles for real-time management, monitoring, and control.

Second, poor digital address system disables drivers' directions to find riders effectively at unpopular and new sites as Google map and GPS navigation app associated with the Uber platform operate with only landmarks in Ghana. These unpopular and new sites not captured by the digital address system prevent drivers from locating riders at the exact location for pick-up and drop-off. Due to this contextual factor, both users interact outside the boundary objects for further information for identification and pick-up. This includes riders describing the exact location with a building type and colour for easy identification by drivers.

Third, working condition associated with the Uber ridesharing platform company constrains drivers to work beyond a certain number of hours a day. This contextual factor limits drivers to work for a maximum of eight hours a day. Due to this factor, some drivers also use additional apps from different ridesharing platform companies to work beyond the limited working hours. This innovation makes drivers multiple users across boundaries to meet their intended working hours a day. In addition, change in the Uber ridesharing platform company's process of working due to the COVID-19 pandemic influences its platform use. The process of verifying before access is granted affects drivers. This is because they are required to wear nose mask for real-time checking via selfie according to Uber's requirement. This contextual issue also creates extra cost and time for drivers. The extra cost is where drivers are required to buy nose masks and sanitisers. The extra time involves how drivers are required to sanitise their car doors and seats after each trip.

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Fourth, lack of public phone charging systems and services in Ghana affect users with mobile phone battery running out to stay connected on the Uber ridesharing platform. The constraint affects users outside their homes and offices to charge their mobile phone battery due to the multimedia programmes associated with the Uber platform that run concurrently. The running programmes drain more mobile phone battery power. This issue affects especially the riders' mobile phones batteries; they run out quickly, unlike drivers with charging system in their cars. Some riders use power banks to charge their phone batteries when they are at public places such as malls and churches. This innovation by riders enables them to get and stay connected on the boundary object for their trip activities.

Finally, car model required by the Uber ridesharing platform company affects some drivers to meet the standard. Drivers are required to have all the features demanded by the company to improve the quality of providing trips to meet riders' needs. This standard affects some drivers with different vehicles to use the Uber ridesharing platform. Some drivers have even gone beyond the requirement to improve their security system outside the boundary. The security features involve a vehicle tracking system and camera. The tracking system enables drivers to stop snatched cars by thieves remotely. This innovation by drivers has also made the cars as part of the boundary object. Thus, the boundary object has gone beyond the Uber ridesharing platform to include car. The camera enables drivers to record what happened inside and outside their cars for review in case of riders' attitude. This innovation also improves users' security in addition to the recordings of their trip activities via the Uber ridesharing platform. Furthermore, due to this contextual factor, innovation is coming up from vehicle manufacturers with a new type of access to a new market.

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6.3 The Dropping Platform as a Boundary Object

The Dropping ridesharing platform is the second case study and it represents a boundary object that connects the divergent group of users to achieve their goals. It is analysed in the following sections: Dropping platform as a boundary object components and features, reasons for using the system, use of Dropping platform as a boundary object components and features, and challenges for using the system.

6.3.1 Components and Features of Dropping Platform as a Boundary Object

The Dropping platform as a boundary object has components and features that connect the divergent group of users to achieve their goals. The components are the individual modules, which have features according to each specific role.

First, the **Dropping platform components** consist of administration panel (app-based mobility service), drivers' app, and riders' app. The administration panel is the core component of the platform that manages and controls drivers' and riders' apps. The drivers' app is a complementary component used by drivers. The riders' app is another complementary component used by riders. Thus, the platform operates with two divergent group of users under the IT Administrator's supervision. After the successful registration, the users then have drivers' and riders' apps as complementary components of the Dropping platform. Table 6.9 below shows components of the Dropping platform as a boundary object.

Table 6.9: Components of Dropping Platform as a Boundary Object

Components	Types
• Administration panel • Driver app • Rider app	• Main component • Complementary component • Complementary component

Source: Author's construct

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Second is the **Dropping platform features.** These are the features of the three components. The users view and use the Dropping platform according to its common and local features. The common features are associated with the administration panel component. This component is managed, monitored, and controlled by the Dropping IT Administrator. The local features are associated with drivers' and riders' app components to meet the divergent group of users' needs. The local features are standard and show directions for using the Dropping platform effectively in line with users' task breakdown. Table 6.10 below shows common and local features of the Dropping platform as a boundary object.

Table 6.10: Common and Local Features of Dropping Platform as a Boundary Object

Common Features	Local Features	
	Driver app	Rider app
• Users' management form • Administrations management form • Cars and booking management form • Payment management form • Reviews management report	• Registration form • Push notification button • Trip setup form • End trip button • Accept payment button • Rate rider option buttons	• Registration form • Request Dropping ride form • Trip cancellation button • Payment methods form • Rate driver option buttons

Source: Author's construct

The **common features of the Dropping platform** are associated with the app-based mobility service (administration panel) component for different functions and use to suit users' needs. *Users' management form* represents Dropping IT Administrator's ability to manage and control users for creating their profiles. This function ensures authorised users have access to the Dropping platform with a username and password.

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Administration management form represents managing, monitoring, and controlling users' profiles. The function enables the Dropping IT Administrator's routing activities for managing, monitoring, and controlling users' profiles, especially drivers' details for registration and updates. *Cars and booking management form* represents managing and controlling riders' requests. This function supports the Dropping IT Administrator to manage, monitor, and control cars to meet riders' requests in close proximity.

Payment management form represents managing payment transactions. This function involves managing and controlling rate and currency format; drivers' commission; and riders' trip fare payment via credit card, mobile money or cash. *Review management report* represents managing and assessing users' performance. The function supports managing and evaluating users' trip activities performance and post-trip reports for auditing. Thus, this function helps to know users' thoughts based on their experience to determine the need for improvement.

The **local features of the Dropping platform** are associated with drivers' and riders' apps for their functions and use. *Registration form* is used to indicate drivers' and cars' details. It helps drivers to access the Dropping platform with the login password and name for identification and profile exchange for a reference. *Push notification button* indicates drivers' ability to justify riders' requests. This function enables drivers to justify riders' requests for acceptance or rejection.

Trip setup form indicates set destination details. This function involves set address for riders' preferred drop-off location, route selection with estimated arrival time, and payment method. *End trip button* indicates complete the trip for a summary. This function stops the car at the riders' preferred destination for the fare payment with associated trip completion details.

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Accept payment button indicates collect trip fare or justify e-payment notification. This function is used to collect trip fare directly from riders by cash or get an invoice from e-payment made to Dropping's account via credit card or mobile money. *Rate rider option buttons* represent performance assessment. This function supports drivers to evaluate riders' behaviour for a review before drop-off.

For the riders' app features, *registration form* represents their identification details. It helps riders to get access to the Dropping platform with a password and login name. *Request Dropping ride form* indicates riders' booking details. Riders press this function to set source location, destination, car type and estimated fare, number of riders, and reserve a ride. *Trip cancellation button* shows riders' option to cancel the booked ride. It allows riders to activate cancel to reject the booked ride before drivers' arrival for pick-up.

Payment methods form represents riders' options to settle the trip fare. This function is used to make payment via credit card or mobile money associated with banks or telcos, respectively, directly to Dropping's account. Riders may also pay cash to drivers in the car before drop-off. *Rate driver option buttons* represent performance assessment. The function is used to assess the drivers' trip performance for a review.

6.3.2 Reasons for using Dropping Platform as a Boundary Object

The Dropping platform as a boundary object has special functions that inspire the divergent group of users to achieve their goals. The functions for achieving users' goals are managed, monitored, and controlled by the Dropping IT Administrator via the administration panel as the company is a local firm founded by Ghanaians. The driver user group goals for using the

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boundary object are linkage, flexibility, traffic update, unrestrictedness, and security. The rider user group goals also are transportation, legitimacy, accountability, security, and convenience.

Linkage provides drivers with opportunities on the Dropping platform to meet riders' demands in close proximity. This function associated with the Dropping platform is the drivers' main goal for using the boundary object. Drivers get their match across the boundary object for them to provide riders with quality trips accordingly. This strategy minimises drivers' waste of time and fuel searching for riders without getting a match. More importantly, the drivers believe that this goal for using the boundary object can enable them to get more riders with less operating cost to increase revenue.

Flexibility is how drivers' profile such as residential address is used to get riders accordingly. Besides the Dropping's platform goal for broadcasting riders' requests for approval, the boundary object also uses drivers' residential addresses when signing off to match demands. Drivers enjoy the flexibility of using the boundary object because they can get riders accordingly when signing in or off. The boundary object also enables drivers to bill riders automatically without the need to negotiate for a trip fare. Drivers believe that this function makes their business more friendly to attract a lot of riders than the traditional taxi services. This is because it eliminates manual billing for riders, which could be favourable or unfavourable.

Unrestrictedness exempts drivers from pick-up and drop-off riders where the traditional taxis are banned to operate. Most business places in Ghana restrict the traditional taxis to operate but cars associated with ridesharing platforms can pick up and drop off riders without any restriction. This is due to the type of private cars associated with the Dropping platform. The

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cars are physical components used by drivers for providing riders with a quality trip. The unrestrictedness associated with the boundary object inspires most drivers because they can work at any location to meet their needs as well as riders' preferred locations. This goal also enables drivers to get more revenue due to the unlimited area to work.

Traffic update enables drivers with real-time location name, direction, and traffic flow information. This drivers' goal works in real-time via the Google map and GPS navigation associated with the Dropping platform. These functions improve the users' trip activities in line with location updates and best route for traffic flow information; this eliminates traffic jams. Drivers use the boundary object because they believe the Google map can support them to control the city maps for fast trip activities in the form of smart cities. The GPS also enables users to know their location names for better movements. Some users are positively using the boundary object beyond the intended goals of the platform because they can update their families and/or friends with their locations during the trip for security purposes.

Security provides real-time monitoring and managing of drivers' movement patterns across the boundary object. This users' goal for using the boundary object is based on recordings of their trip activities in real-time. The recording function assures that users' activities across the boundary object are tracked for review. Drivers believe that the recordings can enable them to track their snatched cars and riders who refuse to pay for a trip.

Also, rider user group's goal concerning the *security* associated with the Dropping platform is how to get records for post-trip activities. This security function works in real-time to keep track of users' activities for post-trip reviews and reports. This users' goal for using the boundary object has improved their confidence in their movements 24/7 without fear even

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when the destination is new to them. More specifically, both users believe that the boundary object keeps track of their activities for a review.

Legitimacy enables rider user group with evidence to establish proof of travelling. Recently, most institutions have adopted the Dropping platform as a legitimate means for trip payment. The function inspires most riders to use the boundary object for their trip activities instead of the traditional taxis. This is because the boundary object provides riders with evidence of travelling involving source and destination addresses, pick-up date and time, duration, and bill. The trip evidence provides riders with a genuine and proper form for getting their travelling allowance. More importantly, riders' activities via the boundary object enable them to justify their trip report. Further, this goal for using the Dropping platform eliminates corruption for some riders who use to request for travel allowance without any trip.

Accountability enables riders to justify the amount used for travelling according to their institutional budget. Riders use the boundary object because this function enables them to evaluate and justify their travelling allowance. This riders' goal also is in line with legitimacy associated with the Dropping platform. More specifically, riders use the boundary object because they are able to account for their trips to meet their institutional needs.

Convenience enables riders to book rides at their preferred date, time, and location for pick-up. Riders also have options for choice of driver/car, cancellation of service, and mode of payment. This is the riders' main goal for using the Dropping platform because it suits their needs. This is because they can book rides via the boundary object at their comfortable places such as home and office and do other things until a notification for arrival and pick-up. They can also cancel the booked ride when not ready before drivers' arrival for pick-up. This riders' goal for using

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the boundary object also enables them to settle the trip fare via cash, credit card or mobile money.

Both users also have untoward goals beyond their intended ones for using the boundary object, which are clear examples of conflicts and appropriations. Some drivers' untoward goals are accepting riders without using the Dropping platform and using the shared profile for post-trip business. Some drivers accept riders directly without any information about both users via the boundary object. This drivers' untoward goal is based on the popularity of cars associated with the boundary object that can be identified and hailed by riders. Some drivers use this opportunity to pick up riders at the roadside and then negotiate the trip fare manually for the service. This drivers' conflict for using the boundary object is possible because they are regarded as independent contractors by the Dropping ridesharing platform company. Also, some drivers use shared profiles such as phone numbers via the boundary object for post-trip business. This drivers' untoward goal is how they use the riders' phone numbers for unnecessary post-trip business outside the boundary object. This goal is different from how both users' profiles are shared for trip activities. More specifically, drivers are negatively using the boundary object to perform different goals to suit their needs. These drivers' untoward goals for using the boundary object are only known through the experiences of riders.

Furthermore, some riders have untoward goals for using the Dropping platform. These are abscond payment, endanger the driver or commit a crime, and use their details to book rides for others. Abscond payment is where some riders use to drop off without settling the trip fare. This strategy is possible because some riders use incomplete or different records such as name and photo for registration. Riders' registration requires only phone numbers for verification and identification. In Ghana, a mobile number is not a legal form of users' identification. Such

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weakness in the structural process of the Dropping platform enables or facilitates conflicts. Ghana is now using national ID for re-registration of mobile phone numbers for users' identification. Users' mobile phone numbers can be used legally to identify them when the process is done successfully. This exercise can eliminate such untoward riders' goal for using the boundary object. Another riders' untoward goal is how they use their details only to book rides for other travellers. Some riders are negatively using the boundary object contrary to their intended goals. They book rides for others without information about those who intend to use the service or travel. All the riders' untoward goals for using the boundary object can only be known through the experiences of some drivers.

6.3.3 Use of Dropping Platform as a Boundary Object Components and Features

The divergent group of users' actions, interactions, and transactions across boundaries provide means to achieve their goals for using the Dropping platform as a boundary object with the associated features. In line with the study's theoretical framework (see Figure 6.1), three user goals or activities were identified, namely, user-local actions, user-boundary interactions, and user-boundary transactions. The detailed analyses are presented next.

Local actions are what the users activate individually via drivers' and riders' apps without affecting each other across boundaries. Thus, how the divergent group of users view and direct engagement for actions on and outside the Dropping platform as a boundary object. First, *driver user group local actions on the Dropping platform* are register and load drivers' app, which provide the opportunity to accept riders' requests in close proximity. Table 6.11 below shows the divergent group of users' actions across boundaries, user-boundary actions.

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Table 6.11: Users' Actions across Dropping Platform as a Boundary Object

	Driver	Rider
On Platform	Register: Drivers install and setup drivers' app on compatible mobile phones for a successful registration	Register: Riders install and setup riders' app on compatible mobile phones for a successful registration
	Load drivers' app: Drivers activate drivers' app to access the platform	Load riders' app: Riders activate riders' app to access the platform
	Accept requests: Drivers who are free accept riders' requests on the platform	Ride booking: Riders select car type and mode of payment on the Dropping platform
	Cancelling riders' requests: Drivers who are not ready cancel the riders' requests without knowing the rider, destination address, and mode of payment	Cancelling e-booking: Riders cancel the booked ride.
	Prompt for arrival: Drivers prompt riders on the Dropping platform for arrival and pick-up	Check for arrival: Riders check for drivers' arrival then pick-up
	Set trip: Drivers show pick-up then set trip destination, mode of payment, and best route before take-off	E-payment: Riders make e-payment on the Dropping platform via credit card or mobile money at the end of the trip
	End trip: Drivers end trip at riders' destination for final fare collection	
	Receive e-payment invoice: Drivers get invoice of riders' payment via credit card or mobile money at the end of the trip before drop-off	
	Rating: Drivers rate riders according to riders' attitude during the trip before drop-off	Rating: Riders rate drivers according to drivers' trip performance before drop-off
Outside Platform	Rider identification: Drivers identify riders with photo then pick-up	Car identification: Riders locate car for pick-up then sit in it
	Collect trip details: Drivers collect riders' destination and mode of payment for the trip	Destination address: Riders provide destination address for the trip
	Drop-off: Drivers collect final fare from riders after end trip, then drop-off at destination	Drop-off: Riders make payment and drop-off at destination

Source: Author's construct

Thus, user-local actions are performed by drivers on the Dropping platform without affecting riders. The local actions are done before getting access to the platform as the link on drivers' mobile phones. The registration process for the driver user group involves installing and setting up the app from the Google Play Store or Apple App Store on a compatible mobile phone (a

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minimum of 4G network standard) in real-time. Drivers provide the company with personal and car details. The personal details are date of birth, phone number, e-mail address, residential address, landmark location, and photo. The car details are the owner whether the driver or a partner, model, colour, plate number, valid driving license, picture, valid DVLA certificate, and valid commercial insurance certificate. The drivers' details are inspected at the company's office by the Dropping staff for the app registration. The goal of drivers' registration action is to become a Dropping user for accessing the platform for providing riders with quality trip activities. Drivers then activate the Dropping platform by loading the app link from their mobile phones with login password, username, and current photo. The app provides a gateway for accessing the platform in real-time to meet rider user group's needs 24/7 working periods without a limit. The goal of the load action is to launch the Dropping platform for drivers to accept riders' requests in close proximity without any restriction for a car to pick up.

Second, *rider user group local actions on the Dropping platform* are register and load riders' app in order to book rides at convenience. The registration can be done at anytime, anywhere and the process involves installing and setting up riders' app from the Google Play Store on a compatible mobile phone. The compatible mobile phone requires a minimum of 4G network standard. Riders provide the company with their name, phone number, e-mail, and photo for the registration. Load riders' app action is a gateway for accessing the Dropping platform without going through the registration process again. The goal of the load action is to open the Dropping platform for riders to book rides at convenience. Riders perform those local actions before getting access to the platform as the gateway on their mobile phones.

User-boundary actions are what the divergent group of users activate independently across boundaries to achieve a particular goal, which affect each other's activities. Thus, users view

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and direct engagement for actions on and outside the Dropping platform. *Driver user group actions on the Dropping platform* are accept requests, cancel requests, prompt for arrival, set trip, end trip, receive e-payment invoice, and rate riders.

Accept requests action on the Dropping platform enables drivers who are free to approve riders' requests in close proximity. This action saves drivers a considerable amount of time, energy, and fuel as they will not be roaming and searching for riders without getting a match. It also provides drivers with safety to avoid taxi fraud and riders running away without payment due to the available information. Cancelling riders' requests action enables drivers to reject the booking when not ready without knowing the trip details. Due to the real-time function of the Dropping platform, in case a driver rejects the request, another one is automatically re-assigned. Thus, the platform or platform provider quickly re-assigns another driver to meet the riders' needs. Prompt for arrival is used to alert riders of drivers' readiness for pick-up at the source location. After accepting the riders' requests, drivers take off to the source location with pick-up address via Google map, then activate arrival on the platform. This action also enables riders to monitor the location updates on the Dropping platform until the car (driver) arrives for identification and pick-up.

Set trip is used to provide riders' destination address and mode of payment by drivers. This action enables drivers to know the best route with traffic flow information, estimated time for arrival, location updates, estimated fare, and mode of trip payment before take-off from the source location. End trip is used to stop the entire process by drivers at the riders' preferred destination. Drivers then activate the end trip on the Dropping platform at the riders' destination, which generates the final trip details for payment before drop-off. They receive e-payment invoices from riders via credit card or mobile money for justification on the platform

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before drop-off. Rate is the last drivers' action on the Dropping platform used to assess riders' attitude during the trip after payment notification before drop-off.

Driver user group actions outside the Dropping platform are rider identification, collect trip details, and drop-off. Rider identification is used by drivers to locate each other physically at the source location before pick-up. Drivers activate this action to identify riders with photos at the approved location for pick-up without any restriction. Collect trip details is used to get riders' destination address and mode of payment via face-to-face interaction. This action enables drivers to get the trip detail after pick-up before take-off. The last drivers' action outside the Dropping platform is to collect cash payment from riders at the end of the trip before drop-off at any location without a restriction. Drivers have also become multiple users across the Dropping platform as a boundary object for accessing more riders. Driver user group actions outside the Dropping platform include accessing other platforms as boundary objects via different drivers' apps. This function makes drivers multiple users for accessing riders across boundaries.

Concerning the *rider user group actions on the Dropping platform* are ride booking, cancelling e-booking, check for arrival, e-payment, and rate. Ride booking provides riders access to select destination address, book option (now, reserve or for others), car type with the associated fare, and mode of payment. The car types enable riders to make option to suit their needs. The goal of this action is for riders to get cars in close proximity with the best option for affordable fare. Moreover, this action enables riders to have an idea about the source address and drivers' profile for safety assurance before the trip, and this can be disclosed to their family members or friends. The goal of the registration action is to have a link as rider user group for accessing the Dropping platform. Cancelling e-booking action enables the riders to stop the confirmed Dropping ride when not ready without any penalty in the next booking. Riders then check for

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the arrival of the booked rides with the source or pick-up address on the platform before the trip. E-payment is used to settle the trip fare directly to the Dropping's account. This action provides riders who wish to settle trip fares directly into Dropping's account via credit card or mobile money for drivers to justify evidence of e-payment. This e-payment minimises the chance of spreading or getting COVID-19 and taxi robbers, unlike paying via physical cash. This action enables riders to pay for trip fares from their external financial digital accounts linked to the Dropping platform before drop-off. Rate is the last riders' action on the Dropping platform for assessing drivers' trip performance before drop-off.

Rider user group actions outside the Dropping platform are car identification, destination address, and drop-off. Car identification is used to identify the assigned vehicle. This action enables riders to identify the assigned cars for pick-up outside the Dropping platform at their required locations without any restriction. The next action is to provide drivers with the trip destination address in the cars. This action enables drivers to know the destination address for trip setup before take-off. The final riders' action outside the Dropping platform is drop-off. This action enables riders to come out of the car at their preferred destination. Riders make payment with cash to drivers or pay electronically to the company before drop-off at the end trip.

The users' boundary and local actions across the Dropping platform could be mandatory or optional. The **mandatory actions** are the available users' required options on the Dropping platform used to accomplish the trip activities. The mandatory actions, however, are subject to the specific users' interface trip activities, which must be completed for a decision to be taken before access is granted to the next available action. These include all the users' actions across the Dropping platform except the rate driver and rider option buttons. The **optional actions** are items on the Dropping platform used by users to perform the nonmandatory associated trip

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activity. The optional actions are the rate driver and rider option buttons, which do not affect the users' trip activities when selected or deselected.

User-boundary interactions are sharing of the users' profiles for trip activities across boundaries. More specifically, what users perform across boundaries which can affect each other. The user-boundary interactions for information sharing for the entire trip's activities occur in two ways, namely, on and outside the Dropping platform. On the Dropping platform interactions occur between the users with digital objects. These objects are used for activating the functions for information sharing. Outside the Dropping platform interactions, however, occur between the users via SMS or WhatsApp, voice call, video call, and face-to-face. The divergent group of users' interactions across boundaries for trip activities involve three stages, namely, riders' requests, requests matching and response, and pick-up and drive.

First, r*iders' requests* involve opening the app to launch the Dropping platform within the company's network coverage via the Internet. This is where riders hail cars of their choice on the platform at their convenience. Riders then use the Dropping platform to request rides from drivers to accept or reject. The ride booking process automatically fetches riders' configuration location addresses via GPS. If the riders' location address is inactive, then the process automatically provides an option to turn on the location service for accessing the Dropping platform. Table 6.12 below shows users' interactions on the Dropping platform as a boundary object.

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Table 6.12: Qualitative evidence of Users' Interactions across Dropping Platform as a Boundary Object

Second-order constructs and First-order codes	**Illustrative quotations**	**Respondent**
Overarching dimension: **Platform connection:** 1. Request confirmation a. Riders' requests	*Riders' requests are connected to available drivers for acceptance with the associated pick-up time.*	*Rider*
b. Drivers' approval	*Drivers always interact with me via phone call for their readiness for pick-up.*	*Rider*
2. Profile exchange c. Riders' pre-trip details	*Drivers use the additional information from riders for trip setup and management after pick-up.*	*Driver*
d. Drivers' and vehicle details	*Riders' interactions via the ridesharing platform enable us to get details of drivers and cars.*	*Rider*
Users' update 3. Update before pick-up e. Arrival time	*Riders make payment via credit card or mobile money directly into the Dropping's account or cash to drivers according to the trip provided.*	*Rider*
f. Pick-up location	*I always interact with riders via phone call to justify their exact pick-up location.*	*Driver*
g. Trip cancellation	*Ridesharing platform enables me to cancel a trip when not ready. This option enables drivers to avoid coming to my location for pick-up.*	*Rider*
Pick-up interactions 4. Arrival for pick-up h. Justify arrival and pick-up location	*I always interact with riders for arrival and location for justification before pick-up.*	*Driver*
i. Car identification for pick-up	*Although, the platform gives me details of the car for pick-up, I also interact with drivers after seeing the vehicle for justification before pick-up.*	*Rider*
j. Destination and payment details	*Drivers ask for destination address and mode of payment from riders in the car before trip set-up.*	*Rider*
End trip interactions 5. End trip k. Justify drop-off location	*I always tell drivers to stop the car at my preferred location before drop-off.*	*Driver*
l. Trip summary	*Drivers end the trip at the required destination for distance covered, time spent, and fare for riders' justification.* *Drivers activate end trip after providing the service for interacting with riders to pay the bill accordingly.*	*Driver*
m. Fare payment and acknowledgment	*After knowing the fare at the end of the trip, I interact with drivers for a successful payment before drop-off.*	*Rider*

Source: Author's construct

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This strategy enables the platform to link the source location to available free cars in close proximity or redirect drivers to meet riders' needs. The Dropping platform provides riders with their names; there is also a space to input destination address, and current location. Riders provide destination address or select it via Google map associated with the Dropping platform. This process enables riders to select car type with associated fare; book options whether to book now, reserve or book for someone; and mode of payment either credit card, mobile money or cash before final ride confirmation. The two addresses and car type enable riders to know the estimated fare, location of the available car, and arrival time for pick-up from drivers' acknowledgement.

Second, *request matching and response* broadcast riders' booking to available free cars in close proximity within the Dropping's coverage area, where drivers have options to accept or reject without knowing the trip details. This is how drivers use the Dropping platform to accept or reject the riders' requests. Request matching is where the Dropping platform connects riders' booked rides to available free drivers in close proximity. Drivers can then use the platform to cancel the booked ride when not ready. In case a driver rejects the request, the platform or Dropping IT Administrator re-assigns it to an available free car until it is accepted. Riders' interactions via the Dropping platform enable them to get redirected of their requests from drivers' cancellation. Redirect the request is used to re-assign free drivers in close proximity for acceptance.

Additionally, the Dropping IT Administrator redirects drivers to occupy empty space to prevent many cars from operating at the same location. This function avoids traffic jams as one of the advantages for users. After drivers' approval, the Dropping platform then exchanges drivers' profile with riders for identification and interactions as well as directions for pick-up. The proof

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of users' profiles provides means to identify themselves for safety assurance before pick-up as they may be unknown for the first time. Drivers use the Dropping platform to accept the request for riders' photo, name, cellphone number, and source address provided. Table 6.13 below shows users' interactions outside the Dropping platform as a boundary object.

Table 6.13: Users' Interactions outside Dropping Platform as a Boundary Object

No.	Interaction format	Information
1	Text (SMS and WhatsApp)	• Drivers use SMS or WhatsApp to send remaining arrival time for pick-up for riders to accept for waiting • Drivers use SMS or WhatsApp to send arrival for pick-up at source location for riders to agree on for pick-up and go
2	Voice call	• Drivers use voice call to tell riders on remaining arrival time for pick-up at the source location for riders to justify readiness for the trip • Drivers use voice call to indicate arrival at source location for riders to confirm of coming for pick-up and go • Riders use voice call to tell drivers for retrieval of items in case left in the car after the trip for drivers to justify for collection
3	Video call	• Drivers use video call to tell riders for update on remaining arrival time for pick-up at the source location for riders to justify readiness for the trip • Drivers use video to call for arrival at source location for riders to confirm of coming for pick-up and go
4	Face-to-face	• Riders use face-to-face to provide drivers with destination address and mode of payment for drivers to do trip setup before take-off • Drivers use face-to-face to collect cash payment of trip bill at the destination for riders to settle the fare before drop-off

Source: Author's construct

On the other hand, riders use the Dropping platform to get drivers' profile and car details after acceptance. The profile consists of photo, name, cellphone number, car model, and car

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registration number. Thus, riders use the platform to get cars at convenience for the trip from drivers' approval. The exchanged profiles provide users with means for interactions on the Dropping platform for locations update and associated remaining time until drivers' arrival for pick-up. Alternatively, users interact via different channels outside the Dropping platform for location and time updates, especially when the Internet is not stable for real-time updates on the platform. Drivers use SMS or WhatsApp to send the remaining arrival time for pick-up for riders to accept for waiting until arrival. In addition, drivers use voice or video calls to tell the remaining arrival time for pick-up at the source location for riders to justify the trip's readiness.

The Dropping platform enables drivers with directions and traffic flow information to riders' source location for pick-up. Riders have an option on the Dropping platform to cancel the booked ride after drivers' approval for pick-up without any penalty for payment in the next booking. In case a rider cancels the trip, the platform immediately prompts the driver of the trip cancellation to terminate the interactions between the users. This function enables drivers to stop the trip without going to the source location for pick-up. The platform, on the other hand, prevents drivers to cancel the trip after the profiles are exchanged.

Finally, *pick-up and drive* prompt riders of car arrival on the Dropping platform for pick-up at the unrestricted source location as justified by drivers. The users' interactions on the Dropping platform for location identifications deal with a digital address system via Google map and GPS. Unfortunately, Google map associated with the Dropping platform uses only popular places in Ghana. Drivers overcome this limitation associated with Google map for locating unpopular places by asking riders' locations via text messages and/or phone calls. This innovation enables drivers to find riders' locations with ease. Drivers then use the Dropping platform to provide car arrival for pick-up for the trip at the source location from riders'

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requests. Riders also use the platform to check for car arrival for pick-up and go provided by drivers. Alternatively, users interact outside the Dropping platform with different channels for arrival, identification, and pick-up. Drivers use WhatsApp, voice calls or video calls to inform arrival at the source location for riders to agree on for pick-up and go. Arrival at the source address for pick-up is where drivers notify their readiness at the exact location that they have parked for riders to come over to start the trip.

Identification, pick-up, and drive occur outside the Dropping platform, which enable riders to find the assigned car at the source location. Riders sit in the car and provide drivers with destination address and mode of payment for trip setup. Drivers then identify riders for pick-up at the source and drive to the destination address as agreed. Riders, on the other hand, identify drivers' arrival then pick up with destination address and go. The pick-up involves riders physically opening the car doors and then siting in. After pick-up, users interact via face-to-face for trip details and setup before take-off. The physical activities involving face-to-face interactions and open car doors, however, create fear and panic for the users of spreading or getting COVID-19. This is because COVID-19 spreads via physical contact. This disease started from overseas and most riders who use the Dropping platform in Ghana are tourists from abroad.

The face-to-face interactions enable drivers to provide trip setup. The trip setup involves arrival time and pick-up time, destination address, best route for traffic flow, and mode of payment (cash, credit card or mobile money). Drivers then use the Dropping platform to provide trip setup with destination address, mode of payment, and route selection, then drive as provided by riders. Drivers take off and continue the interactions on the Dropping platform to provide updates on directions, locations, arrival time, and automatic billing for riders' notifications.

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The platform also enables riders to get trip updates on arrival time and fare. The Dropping IT Administrator via the administration panel continues to monitor and manage the entire trip activities in real-time until arrival for drop-off.

At the destination for drop-off, drivers use the Dropping platform to provide end trip with a summary of distance covered, time spent, and affordable fare for riders to acknowledge. Riders, on the other hand, use the Dropping platform to get the trip summary according to the distance covered, time spent, and affordable fare from drivers' justification. The end trip is where drivers stop the activity when they arrive at the required destination address for drop-off without any restriction. Thus, the boundary object enables drivers to activate the end trip, then collect payment with invoice and drop-off at the preferred destination of riders.

Riders, on the other hand, make fare payments with invoices and drop-off at the preferred location for drivers' approval. Riders who wish to make e-payment for the fare interact across boundaries with their credit card accounts associated with banks or mobile money with telcos for drivers' acknowledgement. E-payments via credit card and mobile money go directly into the company's account for invoice confirmation. Riders with e-payment options use the Dropping platform to settle the trip fare with a credit card or mobile money for drivers to acknowledge with a receipt before drop-off. Cash payment and drop-off occur outside the Dropping platform. The cash payment enables riders to settle the trip fare with physical money directly with drivers as an alternative before drop-off. Thus, drivers use face-to-face to collect cash payment of the trip bill from riders before drop-off.

Rate is optional for users, and this enables them to assess each other's performance. Drivers use the Dropping platform to rate the trip performance based on the riders' behaviour. The

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platform also enables riders to rate the trip performance based on the drivers' attitude. Thus, users' interactions across boundaries provide means of rating each other for future reference before drop-off. After drop-off, riders sometimes continue the interactions outside the Dropping platform via voice call for post-trip activities relating to friendship and retrieval of item which may be left in the car.

User-boundary transactions are the users' agreement to exchange services and funds for trip activities across boundaries. The transactions are based on the Dropping platform component and the associated features. The transactions across boundaries are in two groups, namely, on and outside the Dropping platform. The two transactions run through the entire trip process between the users. Ride booking transaction occurs on the Dropping platform and it involves connecting riders' requests to available free drivers in close proximity for acceptance. It is real-time that connects users to exchange their information for trip activities irrespective of their social worlds and locations while being managed by the Dropping staff as intermediaries. Table 6.14 below shows users' transactions across boundaries.

Table 6.14: Users' Transactions across Dropping Platform as a Boundary Object

	Driver-rider transactions	Rider-driver transactions
On platform	• Trip setup & management transaction • Billing transaction • Acknowledgement of successful transaction and e-payment	• Ride booking transaction • E-payment transaction
Outside platform		• Cash payment transaction

Source: Author's construct

Trip setup and management transaction occurs on the Dropping platform where drivers set up the trip details provided by riders after pick-up and then drive. The provided details enable the

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Dropping IT Administrator to control and manage the trip activities via the administration panel until drop-off. Billing transaction occurs on the Dropping platform, and this provides drivers with payment details for the trip provided for riders to pay for the service. The payment details include rate per minute, time elapsed, distance covered, and fare. The transaction enables riders to pay drivers for the trip provided before getting out of the car. This transaction is real-time on the Dropping platform and controlled by the IT Administrator, irrespective of Internet outages. This limitation can create discrepancies in the fare between the users after the end trip.

Payment transaction consists of two types, namely, e-payment and cash. E-payment transaction occurs on the Dropping platform where riders pay for the trip provided by drivers via credit card or mobile money directly into the company's account. The e-payment via credit card or mobile money associated with banks or telcos, respectively, is based on standardisation for interoperability. It prevents users from getting or spreading COVID-19 and also mitigates taxi fraud. This function is due to the elimination of holding physical cash for the trip. Cash payment transaction supports riders to settle the trip provided by drivers outside the Dropping platform. This transaction involves physical cash where riders pay the trip fare directly to drivers before drop-off. Acknowledgement of successful transaction and payment occurs on the Dropping platform, where Dropping staff manage riders' e-payment via credit card or mobile money. After the successful service transaction, the Dropping platform provides riders with e-payment receipt and drivers with invoice before drop-off to end the process.

The use of Dropping platform as boundary object is attracting more users and new market due to innovations that are coming up from drivers. The standard of cars required has introduced a new market for vehicle dealers. This is because there is a need to use cars with a tracking system and camera for users' safety as some drivers have introduced. The tracking system is

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used to stop snatched cars remotely. These cars can later be retrieved. Thus, the vehicles also have become part of the boundary object. The camera is used to record users' activities inside the car during the trip. The platform has no complaint features for users to interact via phone and/or video call. These features can be introduced and linked directly to the police for users' safety in case of unprofessionalism.

6.3.4 Factors that Constrain use of Dropping Platform as a Boundary Object

The factors that constrain the use of the Dropping platform as a boundary object are what affect users' real-time 24/7 trip activities in achieving their goals (see Table 6.9 for contextual factors). These are Internet outages, poor digital address system, incompatible mobile phone and network standard, lack of public charging systems and services, and software bugs.

First, Internet outages affect drivers' actions, interactions, and transactions across boundaries for directions, traffic flow information, location updates, automatic billing, and invoice for riders' payments. This constraint also affects riders' actions, interactions, and transactions across boundaries for location identification, automatic billing for affordable fare, and e-payment. Due to the 24/7 real-time aspect of users' trip activities, the Internet outages make interaction between users to breakdown, and it creates stoppages in synchronising their profiles. This prevents the monitoring of profiles for reviews and reports.

Second, poor digital address system disables drivers to find riders' locations effectively as Google map and GPS navigation app associated with the Dropping platform operate with only landmarks or popular places in Ghana. This poor digital address system constraint affects the users when dealing with unpopular and new sites not captured on the Google map. On the other hand, drivers and riders interact via text message and/or phone call for location identifications.

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This strategy solves the problem of the limitation of digital address system associated with the boundary object for locating unmapped places in Ghana.

Third, incompatible mobile phone for housing drivers' and riders' apps as the setup requires a minimum of 4G network standard. This constraint prevents users with lower mobile phone standard from installing the two complementary components for getting access to the Dropping platform.

Fourth, the instances of battery running out without public phone charging systems in Ghana affects riders to get and stay connected. This is because the Dropping platform's real-time activities run with other associated programmes concurrently. These associated functions demand more battery power to run. The process consumes riders' battery strength without any solution when they are in public places to fill their mobile phone batteries for ride requests. However, drivers have phone charging system in their cars so the problem of battery running down does not really apply to them. Some riders, on the other hand, use a power bank to charge their battery when needed. The power bank is a phone charging system used for restoring mobile phone battery. This strategy enables them to stay connected on the boundary object.

Finally, the software bugs are due to programming errors in drivers' and riders' apps associated with the Dropping platform. The software bugs sometimes terminate or freeze the users' process from actions, interactions, and transactions across boundaries. An additional factor that influences users to use the Dropping ridesharing platform is the working condition. This condition such as COVID-19 pandemic affects drivers' process of working. It has increased their cost of operation. Drivers are required to use nose mask and also sanitise their car seats and doors after each trip. Furthermore, car model required for providing the trip affects some

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drivers to meet the standard. Some of them are optional such as tracking system and camera-enabled. However, they are needed for security purposes to track stolen cars remotely and outside the boundary object recordings. Some drivers have installed tracking system and cameras in their cars as additional security to stop and get their cars remotely when snatched by thieves.

6.4 Cross-Case Analysis

This section analyses the similarities and differences across the two ridesharing platforms and generalisations that can be drawn according to each case boundary object components with associated features and use. Based on the boundary object theory, a comparative analysis is undertaken based on components, common and local features, and use of each case platform.

6.4.1 Component and Feature of Ridesharing Platform as a Boundary Object

The findings show that Uber or Dropping platform represents a boundary object that connects the divergent group of users with different social worlds. Both Uber and Dropping platforms components consist of administration panel, drivers' app, and riders' app. The components also have features. The administration panel (Uber) or app-based mobility service (Dropping) is the core component, which deals with the common features for managing, monitoring, and controlling users' activities by Uber or Dropping IT Administrator. The common features of the administration panel component are users' management form, administrations management form, cars and booking management form, payment management form, and reviews management report. The drivers' and riders' apps are the complementary components, which also operate with the local features. The local features of the two platforms are used for meeting the divergent group of users' needs. The features are standard and show directions for using each platform effectively in line with the users' task breakdown. Drivers' app features are

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registration form, push notification button, trip setup form, end trip button, and rate rider option buttons. Riders' app features, on the other hand, are registration form, request ride form, trip cancellation button, payment methods form, and rate driver option buttons. The request ride form among Uber and Dropping is the only feature with different labels but the same function and use. The labels are request Uber ride and request Dropping ride.

6.4.2 Reasons for using Ridesharing Platform as a Boundary Object

Uber or Dropping ridesharing platform as a boundary object provides the divergent group of users with special functions associated with trip activities. These functions are the reasons why users use ridesharing platforms to meet their needs. Both Uber and Dropping use their main components to manage, monitor, and control the functions in real-time. The users' functions are the same among the two platforms as boundary objects. The driver user group goals for using the boundary objects are linkage, flexibility, traffic update, unrestrictedness, and security. The rider user group goals also are transportation, legitimacy, accountability, security, and convenience.

For instance, linkage connects the divergent group of users for trip activities where riders book rides for drivers to accept. The booking function associated with each case platform allows the rider user group to request cars at convenience 24/7. All the two platforms as boundary objects provide riders with car options for booking. The Uber platform has two options for riders, whiles Dropping has three car options. The driver user group, on the other hand, from the two cases uses the function of the accept ride to select a series of riders' requests in close proximity. This function has improved the drivers' activities because they can select a series of riders in close proximity to avoid wasting time and fuel roaming without getting a match.

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In terms of convenience, riders' options for getting cars at their preferred locations are the same from both Uber and Dropping platforms. Automatic billing associated with each case platform performs the same function for legitimacy and accountability. The convenience also includes riders' option to cancel the booked ride when not ready. In the case of the Uber platform, the automatic billing for final fare payment includes a penalty for trip cancellation, unlike the Dropping case which is free. Also, e-payment based on credit card and mobile money associated with each case platform has the same function. The e-payment supports riders who wish to settle their fare via credit card or mobile money from banks or telcos, respectively.

In terms of security purpose, the recording function that is used to track snatched cars and riders who refuse to pay associated with each platform is the same. The divergent group of users believe that the real-time 24/7 trip monitoring and management from each case can provide them with recordings to track and locate snatched cars and riders who refuse to pay before drop-of. This function shows that all the two ridesharing platforms track users' profiles and cars' movements for recordings. Both users from all the cases use their contacts stored for reference. Riders use this opportunity to retrieve their items left in the car. Thus, both users also believe that real-time managing, monitoring, and controlling via administration panel keep track of their records for post-trip activities and reviews relating to their complaints. Another users' perception for using the two platforms is that Uber is an international company while Dropping is a local firm.

On the other hand, the divergent group of users' untoward goals from the two cases are the same. Some drivers intend to accept riders outside each case platform and use the shared profile for post-trip business. Some riders also take advantage to refuse payment, even endanger the driver or commit a crime. Some riders, also use their details to book rides for use by others other than themselves.

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6.4.3 Use of Ridesharing Platform as a Boundary Object Component and Feature

Uber or Dropping ridesharing platform components with the associated features enable users' actions, interactions, and transactions across boundaries to achieve the same goal. Uber or Dropping platform features in action support the users to activate their functions and use them on and outside the platforms. The administration component of Uber or Dropping platform is used to manage, monitor, and control fare rate and currency format; drivers' commissions and working hours; riders' trip fare payment via credit card, mobile money, and cash; redirect riders' requests; drivers' activities; and update drivers on riders' decision. The staff from Uber or Dropping also use the components and the features to manage, monitor, and control users' profiles for reviews and reports. Riders' app registration processes among Uber and Dropping are the same; the registration can be done at any location with Internet connectivity as the local action. Drivers' app registration is done at Uber or Dropping office where those qualified are selected as trip providers in the context of local actions. The reason for drivers to register at each case office is that the required details are verified and supervised by the staff. In the Uber case, there is training for the driver user group before the screening, unlike the Dropping case. All the users' real-time and offline activities from the two cases depend on the Internet. The Internet is the backbone that links the divergent group of users for 24/7 trip activities.

Uber or Dropping ridesharing platform enables drivers and riders to perform actions, such as platform entry, platform utilisation, trip information, trip set-up and take-off, and rate trip after payment; interactions, such as request confirmation, profile exchange, update before pick-up, arrival for pick-up, and end trip; and transactions, such as ride booking transaction, trip transaction, and service transaction.

On the other hand, users' constraints from achieving their goals are the same from Uber or Dropping ridesharing platform, namely, registration, information and reversal, location, and

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complaint. For instance, registration constraint from both Uber and Dropping prevents users who are unable to meet the requirement from using each case platform. In the case of Uber, the apps have mobile phones requirement with a minimum of 3G network standard, unlike Dropping with a minimum of 4G for registration. Each case ridesharing platform also prevents riders to send a complaint to the company or security agencies for help in case drivers show unprofessional attitude.

6.4.4 Factors that Constrain Ridesharing Platform as a Boundary Object

The findings show that all the two platforms as boundary objects have the same contextual factors that influence their use, namely, Internet outages, poor digital address system, lack of public phone charging systems and services, and car model. For instance, Internet outages in Ghana disrupt the users' actions, interactions, and transactions across boundaries. This constraint affects all the two cases. Also, poor digital address system associated with the Google map and GPS operates with only landmarks in Ghana. This constraint disables drivers via the two platforms as boundary objects to locate riders effectively for pick-up, especially when dealing with unpopular and new sites not captured on the Google map. Lack of public phone charging systems and services in Ghana also affect users to stay connected for ride requests based on battery running out.

The contextual factors also include users' working conditions, which are different from each case. In the case of Uber drivers are allowed to work with a maximum of eight hours a day, unlike Dropping case without a limit. In addition, the users have software bugs constraint in their apps due to programming errors. This issue emerged with Dropping case, which sometimes terminates or freezes the apps for users' consistent real-time actions, interactions, and transactions across boundaries.

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Due to the contextual factors that influence each ridesharing platform use in Ghana, innovations are coming up from drivers and riders. The users' innovations are the same from the two cases. They interact outside the boundary objects via text message and/or phone call for location identification to overcome the limitation of Google map for ridesharing platforms use in Ghana. Other innovations include the use of a power bank by riders to charge their batteries to avoid power rundown and drivers have become multiple users across boundaries to avoid working conditions associated with each case. Further, some drivers from the two cases have installed tracking system and cameras in their cars as part of the boundary objects that can be stopped remotely when snatched by thieves.

6.5 Chapter Summary

This chapter provided the within-case analysis of Uber and Dropping ridesharing platforms. It also presented the cross-case analysis according to each platform components with the associated features and use to determine whether they agree with the placement of their core ideas into the given category. The chapter identified three essential components of each case boundary object, namely, administration panel, drivers' app, and riders' app. The administration panels are the core components whereby drivers' and riders' apps are the complementary components of each case platform as a boundary object. Each component also has features. The divergent group of users' view and use of the two platforms as boundary objects according to their common and local features were presented in line with their actions, interactions, and transactions across boundaries. The chapter also highlighted users' personal goals for using ridesharing platforms and contextual factors that prevent them from using the boundary objects. The next chapter presents the discussion of findings in line with the literature review in Chapter 2 and the researcher's reflection on the use of boundary object theory in Chapter 3.

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CHAPTER SEVEN

DISCUSSION OF FINDINGS

7.1 Chapter Overview

The previous chapter presented the case analysis of the two selected ridesharing platforms in a developing country context of Ghana. The current chapter discusses and interprets the findings of the study in line with the research questions and the literature review. It is structured as follows. The next section discusses the reasons for using ridesharing platforms as boundary objects. This is followed by the process of using ridesharing platforms as boundary objects. Contextual factors that prevent actors from using ridesharing platforms are discussed next. The final section presents the researcher's reflection on the use of boundary object theory in the study. The chapter concludes with a summary.

7.2 Reasons for using Ridesharing Platforms as Boundary Objects

This section discusses why do actors (drivers and riders) use ridesharing platforms. Many of the authors in the literature reviewed have discussed ridesharing platforms as crucial phenomena in IS research (e.g., Chen et al., 2020; Millara et al., 2018). Some of the findings of this study also indicate that ridesharing platforms phenomena are crucial in IS research. The findings of the study show that drivers use ridesharing platforms because of the following goals: linkage, flexibility, traffic update, unrestrictedness, and security.

Linkage is drivers' major goal for using the boundary objects to get riders from any location within the companies' geolocations to avoid roaming for hours without getting a match. Thus, ridesharing platforms save drivers from burning fuel and wasting time to search for riders. Drivers are car owners and their actions across boundaries enable them to provide riders with a quality trip. This strategy avoids traffic jams and time wasting for manual searching for passengers. More importantly, ridesharing platforms' primary goal is to match riders' demands

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to drivers in close proximity to avoid challenges for getting passengers as done with the traditional taxis. This supports extant literature on ridesharing platform concerning matching trip demands to suppliers (Cram & Wiener, 2020).

Flexibility involves the use of drivers' profile by the ridesharing platforms to match riders' requests accordingly. This function specifically uses drivers' residential address to match riders' demands when signing in and off. The platforms give priority to drivers according to their residential address to get riders' requests in that area when signing in. The ridesharing platforms also use riders' destination address to match drivers when signing off. In addition, drivers use the boundary objects because of the automatic billing without the need to negotiate the fare with riders. The automation billing assures drivers to make their business more flexible and friendly to meet riders' needs. This function demonstrates how the ridesharing platforms make trip activities easy for drivers. This finding is consistent with the extant literature on how ridesharing platforms eliminate drivers' loss of time (Lee et al., 2019; Wang et al., 2018).

Traffic update enables drivers with real-time information to facilitate their activities to provide riders with quality trip. This drivers' goal for using ridesharing platforms enables them to know the name of their locations for easily interactions with riders across boundaries. It also enables drivers to provide trip directions without the need to ask for support. Further, it enables drivers to avoid traffic jams based on real-time information. This traffic update works via Google map and GPS associated with ridesharing platforms. Some riders even use this function positively beyond the intended goals of the ridesharing platforms for security purpose, such as to update their families and/or friends on their locations during the trip. Drivers also use this function positively beyond the intended goals to control the city maps efficiently. Relatedly, this finding

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shows that ridesharing platforms provide drivers with traffic predictions for an effective trip (Chen et al., 2020; Tang et al., 2020; Wu et al., 2020).

Unrestrictedness, this drivers' goal for using ridesharing platforms enables them to pick and drop riders at locations where cars are allowed. Cars associated with ridesharing platforms in Ghana are allowed to operate at any location without a certain restriction. These cars have no commercial registration numbers and colours and they are viewed as normal private vehicles. Most places in Ghana prevent commercial vehicles such as the traditional taxis from entering their premises. These places have "taxis are not allowed" inscription which limit commercial cars from entering, unlike vehicles associated with ridesharing platforms. More importantly, this function widens drivers' areas of working for more income.

Security is an essential function of the ridesharing platforms for keeping track of drivers' movement in real-time for post-trip review. Drivers believe that the platforms' real-time monitoring can provide recordings to track snatched cars and riders who refuse to pay. This function is also a major concern as drivers can get their stolen cars and money from riders who fail to pay before drop-off. This function associated with the ridesharing platforms boosts drivers' confidence to work 24/7 because they believe that the trip activities are recorded in real-time to minimise taxi fraud. This major concern is also based on the real-time managing, monitoring, and controlling of users' trip activities, which can be reviewed for a certain decision. Security agencies can also use the recordings to track drivers' and riders' trip activities for any issue. This finding supports the extant literature on ridesharing platform concerning drivers' safety to minimise taxi fraud (Gupta et al., 2019a; Tan et al., 2017).

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These other goals beyond linkage are clear examples of welcome adaptations as drivers are positively using the boundary objects more than the platforms' goals. The new goals (flexibility, traffic update, and unrestrictedness) that ridesharing platforms as boundary objects, also facilitate are not in conflict with the platforms' goals. They rather reinforce the drivers' primary goal, linkage. These drivers' goals for using ridesharing platforms are also relevant because of the context of developing countries. The traditional taxi services in Ghana lack flexibility, traffic update, and unrestrictedness. Security also is non-existent. The features or functionalities within the boundary objects are now facilitating other goals for drivers.

Concerning the rider user group, the study's findings show that riders use ridesharing platforms because of the following goals: mobility, legitimacy, accountability, security, and convenience. The findings show that riders' primary goal for using ridesharing platforms is mobility. *Mobility* involves transportation or means of travel with ease. Ridesharing platforms enhance how riders travel, especially in the cities. The platforms have introduced quality of moving freely to suit riders' needs. This function associated with ridesharing platforms has significant impact on how riders travel. This finding is in line with extant literature concerning how ridesharing platforms influence the mobility of people and goods (Lokuge et al., 2019; Thao et al., 2021).

With regards to *legitimacy*, because of the ability of the boundary objects to provide verifiable evidence of travel and its related costs, some institutions have adopted ridesharing platforms as a formal transportation service for their employees. This function enables riders to show evidence of travel for claiming trip allowance. The evidence includes trip date and time, source and destination addresses, and fare. This function within the boundary objects also removes corruption associated with riders' trips. The corruption involves riders claiming for a trip

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allowance without travel. This legitimacy also ensures accountability. The accountability enables riders to provide genuine and proper evidence for requesting trip allowance. In addition, riders can share details of travel with familial relations for accountability. Relatedly, the finding supports the extant literature on ridesharing platform concerning opportunities available for riders (Tan et al., 2017; Wang et al., 2018; Wu et al., 2020).

Riders use ridesharing platforms to book rides at *convenience* and watch the progress until the car arrives for pick-up. Ridesharing platforms operate 24/7, and this enables riders to book rides at their convenient time and at preferred location within the coverage of the companies. This function associated with the boundary objects enables riders to get their preferred cars at convenience to avoid loss of time at the roadside or any other means in search of vehicles. Some riders also use this function positively beyond the intended goals of the boundary objects for time management, such as booking rides in advance and managing their time for other activities before the arrival for pick-up. This is because the platforms quickly link riders' requests to the available free drivers with associated time for pick-up. This finding is in line with extant literature on ridesharing platform on how the platforms solve riders' problems (Lanamäki et al., 2020; Wyman, 2017).

Riders use ridesharing platforms based on record keeping for *security* purpose. The ridesharing platforms' real-time managing, monitoring, and controlling keep track of users' activities for post-trip review. This function enables riders to interact with drivers after the trip for retrieval of items left in the cars. The record keeping function also provides security agencies with information about riders' complaints after the trip. This function is also riders' major concern for using ridesharing platforms because they believe that the trip records can assist security agencies to provide safety when needed. The record keeping for security purpose encourages

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riders to travel at anytime irrespective of the location without fear. The finding supports the existing literature on ridesharing platform concerning minimising risks associated with travelling (Davlembayeva et al., 2020; Gupta et al., 2019a). These other riders' goals beyond mobility are also clear examples of positive or welcome adaptations. These additional goals show how riders are positively using the boundary object beyond the goals of the platforms. These new goals (legitimacy, accountability, and security) are not in conflict with the platforms' goals. They rather reinforce the riders' primary goal, mobility. These goals are also relevant because of the context of developing countries. The traditional taxi services in Ghana lack legitimacy, accountability, and security. Even convenience is also almost non-existent. Here, we do realise that specific functionalities within the boundary objects are facilitating other goals for riders to suit their needs.

The study's findings also show that drivers and riders have untoward goals for using ridesharing platforms. Some drivers tend to occasionally pursue personal goals to maximise revenue illegally by booking riders outside the platforms and using their shared profile for post-trip business. These untoward goals by some drivers are only known through the experiences of riders. These goals by drivers, on the other hand, are clear examples of conflicts and appropriations. Drivers are negatively using the boundary objects beyond the intended goals of the platforms. Arguably, these conflicts tend to happen because drivers are independent contractors of ridesharing platform companies without any legal form to control their off-platforms activities. For instance, drivers can accept requests outside the platforms. This strategy is possible because vehicles associated with ridesharing platforms can be easily identified by riders. The burden or problem is always placed on the ridesharing platform companies rather than the drivers. This study shows that ridesharing platform companies do not have control over drivers' cars (Watanabe et al., 2016; Cram & Wiener, 2020). The

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companies, therefore, must put in place policies and practices that can restrict drivers to accept riders outside the boundary objects. This can ensure proper monitoring based on the trip recordings. Some riders take advantage of this untoward goal to rob drivers without recordings or enough information to assist security agencies.

Some drivers also use the shared profile to interact with riders for other business such as friendship after the trip. Such weaknesses in the structural processes of the ridesharing platforms also enable or facilitate conflicts. These goals are also in line with the boundary object concept (Star & Griesemer, 1989; Star, 2010) that enables and constrains actors' (drivers') movement across boundaries and retain its identity. Drivers, therefore, take the opportunities of ridesharing platforms as boundary objects to facilitate untoward goals. If riders are accepted only via the ridesharing platforms, drivers' opportunities for such untoward goal can be eliminated. This function can also be used to curb unidentified riders who rob drivers due to insufficient information, such as rider's photo and name.

Also, some riders have untoward goals which intend to abscond payment, even endanger the driver or commit a crime. These goals are largely overt only known through the experiences of drivers. These other goals beyond mobility are clear examples of conflicts and appropriations. Riders are negatively using the boundary object beyond the goals of the platforms. Arguably, these conflicts tend to happen because the riders register on the platforms without any legal form of identification, 'just a mobile number'. A mobile number is not or directly linked to a legal form of identification in many developing countries. Such weaknesses in the structural processes of the ridesharing platforms enable or facilitate conflicts. As stated in Chapter 3, the boundary object concept refers to an object with both enablers and constraints (Star & Griesemer, 1989; Star, 2010) that can be adjusted to the standard of various actors' (riders)

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movement across borders and retain its identity. Hence, we witness riders leveraging the constraints of the ridesharing platforms as boundary objects to facilitate untoward goals. Ghana is now undergoing a re-registration of mobile numbers linking them with the national ID, Ghana Card. If this is completed, opportunities for untoward goals are likely to reduce since riders can be legally identified by their mobile numbers. Riders are also able to use their details to book rides for use by others other than themselves. Thus, some riders pursue personal goals by absconding payments, endangering drivers, committing crime (stealing the vehicle), and lending or sharing their accounts. The findings support the extant literature on ridesharing platform concerning crimes committed by drivers or riders against each other for using the platforms (Calo & Rosenblat, 2017; Mousavi et al., 2020).

Comparably the personal goals of riders tend to be more undesirable since drivers are endangered and violent crime is sometimes committed. Previous studies have been silent on these undesirable goals (of which are criminal in nature) in the use of ridesharing platforms. Addressing these are critical especially in the context of developing countries where public transportation still remains a challenge and thus, ridesharing platforms are a necessary for both employment and public mobility. This may require a combined effort of law enforcement agencies (e.g., the Ghana Police), ridesharing platform managers, driver unions, and the labour department of the Ministry of Employment and Labour Relations.

7.3 Use of Ridesharing Platforms as Boundary Objects

This section discusses how ridesharing platforms enable or constrain the realisation of actors' goals. The findings of the study show that ridesharing platforms as boundary objects enable drivers and riders to perform: 1) user-boundary actions, namely, platform entry, platform utilisation, user identification, user set-up, and user rating; 2) user-boundary interactions,

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namely, platform connection, users' update, pick-up interactions, and end trip interactions; and 3) user-boundary transactions, namely, booking transaction, trip transaction, and service transaction. The platforms, on the other hand, constrain drivers and riders from achieving their goals, namely, registration, information and reversal, location, and complaint constraints.

First, the user-boundary actions involve platform entry, platform utilisation, user identification, user set-up, and user rating. *Platform entry* involves user registration and access to the boundary objects. Users' actions across boundaries enable them to register with their details for authentication and identification. The registration enables them to establish proof of identity before access is granted. After the successful registration, both users automatically get a link on their mobile phones with their entry name and password. The link is the app according to each user group used as a gateway for accessing the ridesharing platforms without going through the process again. This process enables the users to secure access to the boundary objects, thus, platforms entry with an approved username and password.

Platform utilisation involves the various actions applied by the users to meet their needs. Riders, for instance, use the ridesharing platforms to book rides 24/7 at their convenience, cancel the trip when not ready, and check for drivers' arrival. Drivers, on the other hand, use the platforms to accept riders' requests, cancel the requests when not ready, and prompt for arrival at the agreed location for pick-up. All these users' functions are part of the platforms' goals. Figure 7.1 below with supporting evidence in Table 6.3 shows what enables drivers' and riders' actions across ridesharing platforms, user-boundary actions.

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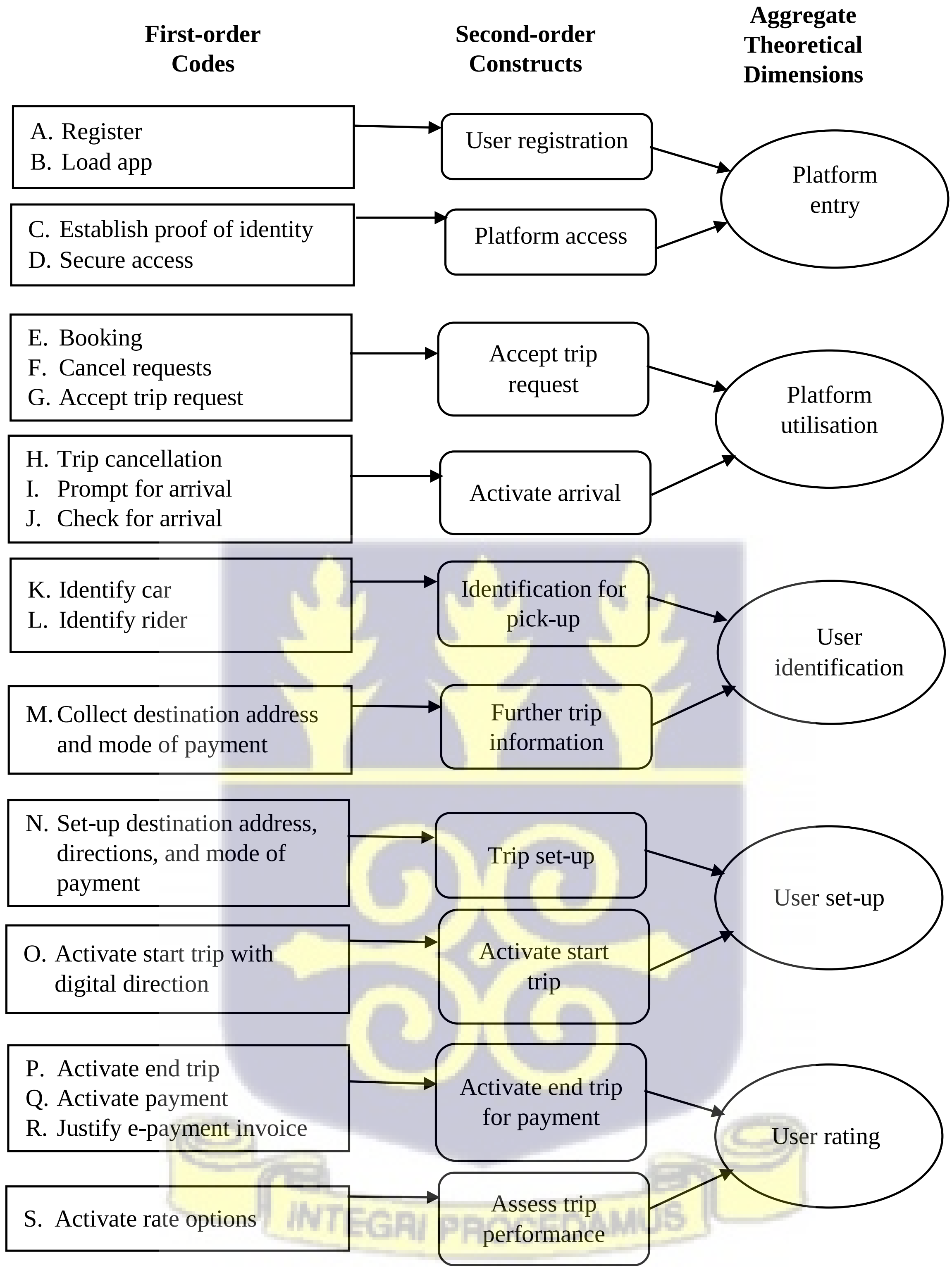
Figure 7.1: Structure of data related to Users' Actions across Ridesharing Platforms - Enablements



Source: Author's construct

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User identification is the users' actions across ridesharing platforms. This function enables users to identify each other for pick-up. The available details on the boundary objects enable users to know each other by photo and car type for easy identification and pick-up. After the users' actions across the boundaries for pick-up, they are also able to get further trip information. These further details include destination address and mode of payment, which enable the users with their necessary actions. Users' actions across boundaries enable drivers to feed the platforms with additional information before take-off.

User set-up involves feeding the ridesharing platforms by drivers with additional information before take-off. The ridesharing platforms enable drivers to set up a trip with a destination address and direction. The platforms also enable drivers to set mode of payment based on the riders' further trip information before take-off. Thus, the ridesharing platforms enable users' actions across boundaries to get additional information to meet their needs. Another goal of the ridesharing platforms is to enable *users to rate* their trip performance. These users' actions across boundaries involve activating end trip for payment and assessing performance. Riders' actions, for instance, across boundaries enable them to assess drivers' performance for the trip. The platforms also enable drivers to assess riders' performance during the trip for review. This study gives insight into how users activate the various functions on ridesharing platforms to meet their needs. More specifically, users' actions across boundaries enable them to activate the platforms' functions. This finding is in line with the extant literature on digital objects for users' real-time activities across platforms (Faulkner & Runde, 2019).

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Second, the user-boundary interactions involve platform connection, users' update, pick-up interactions, and end trip interactions. Figure 7.2 below with supporting evidence in Table 6.12

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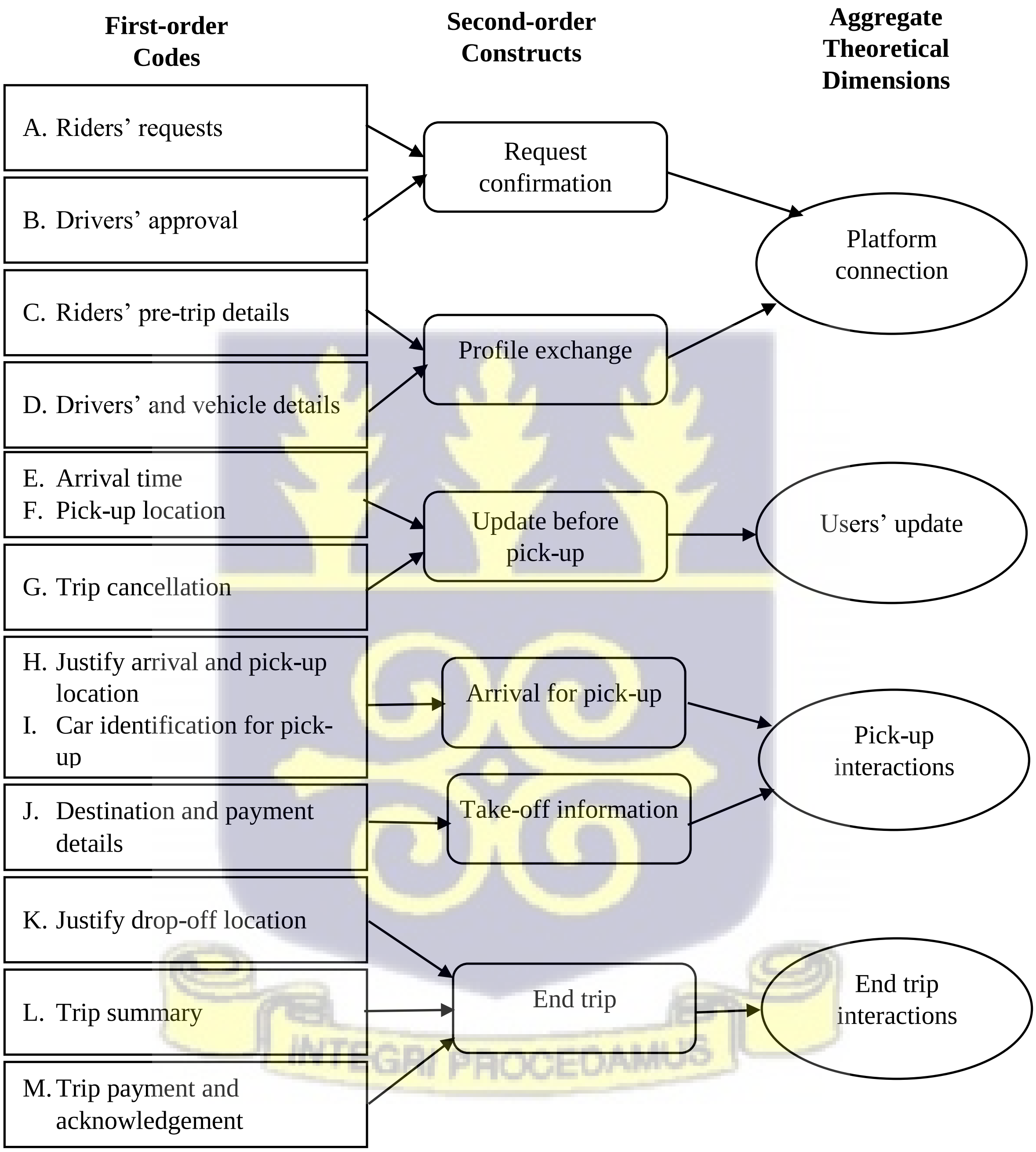
shows what enables drivers' and riders' interactions across ridesharing platforms, user-boundary interactions.

Figure 7.2: Structure of data related to Users' Interactions across Ridesharing Platforms - Enablements



Source: Author's construct

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The boundary objects enable riders' requests to connect to drivers for approval, thus, *platform connection*. This function associated with the ridesharing platforms saves both users considerable time for trip activities. Riders' interactions across the boundaries enable them to get cars at their preferred location. Drivers' interactions across boundaries also enable them to get riders in close proximity. This platform connection enables both users to get their match to meet their needs. These request matching and response via boundary objects address the problem for drivers and riders trying to locate each other for trip activities as done in the traditional taxi services. This function is the platforms' major concern for meeting users' needs. This finding is consistent with the extant literature on ridesharing platform broadcasts trip requests (Cram & Wiener, 2020; Tan et al., 2017; Wang et al., 2018). The platform connection also enables users to exchange profiles for trip activities. Thus, users' interactions across boundaries enable them to get their details accordingly for easy identification. Riders get drivers' details via the boundary objects such as name, photo, and vehicle type and licence number for identification and pick-up. The profile exchange via boundary objects also enables drivers to get riders' pre-trip details for interactions and identification for pick-up. The pre-trip details involve riders' name, photo, phone number, and source address.

Although drivers and riders may be unfamiliar to each for the first time, the exchanged profiles, especially the photos and car licence number provide the users with access for verification, identification, and pick-up at the source location. Relatedly, this finding shows that ridesharing platform provides users with authentication as one of its advantages (Cheng et al., 2018; Gupta et al., 2019b). Users' interactions across boundaries enable them to get trip updates in real-time. This *users' update* enables them to take the necessary decision relating to the trip. This function associated with ridesharing platforms enables users to know the arrival time and exact

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location for pick-up. It also enables drivers to avoid going to riders' location for pick-up in case of trip cancellation.

Pick-up interactions occur outside the boundary objects, which involve arrival for pick-up and take-off information. Users' interactions across boundaries enable them to get information on car arrival at the agreed pick-up location. The boundary objects enable drivers to justify their arrival at the pick-up location. Riders' interactions across boundaries also enable them to identify the assigned car for pick-up. After pick-up, both users interact via face-to-face for destination and mode of payment details. This take-off information enables drivers to interact across boundaries until arrival at the required destination. *End trip interactions* across boundaries support users to justify destination location before drop-off. Drivers' interactions across boundaries enable them to end the trip at the riders' preferred location. The boundary objects enable drivers with a trip summary. The trip summary provides both users with the details for payment such as rate per minute, time elapsed, and distance covered without the need for negotiation of the fare. The boundary objects enable both users to interact for successful payment and acknowledgement before drop-off.

Finally, the user-boundary transactions involve booking transaction, trip transaction, and service transaction. *Booking transaction* involves exchanging riders' requests with drivers for approval. Ridesharing platforms enable drivers and riders to exchange their profiles for trip activities. The platforms enable drivers to accept riders' trip requests irrespective of their locations. This transaction saves both users a considerable amount of time because they can get their match in real-time. It also addresses the problem in the traditional taxi services for drivers and riders trying to locate each other. Thus, ridesharing platforms enable riders to book rides for drivers to agree on the requests accordingly. This finding is consistent with the extant

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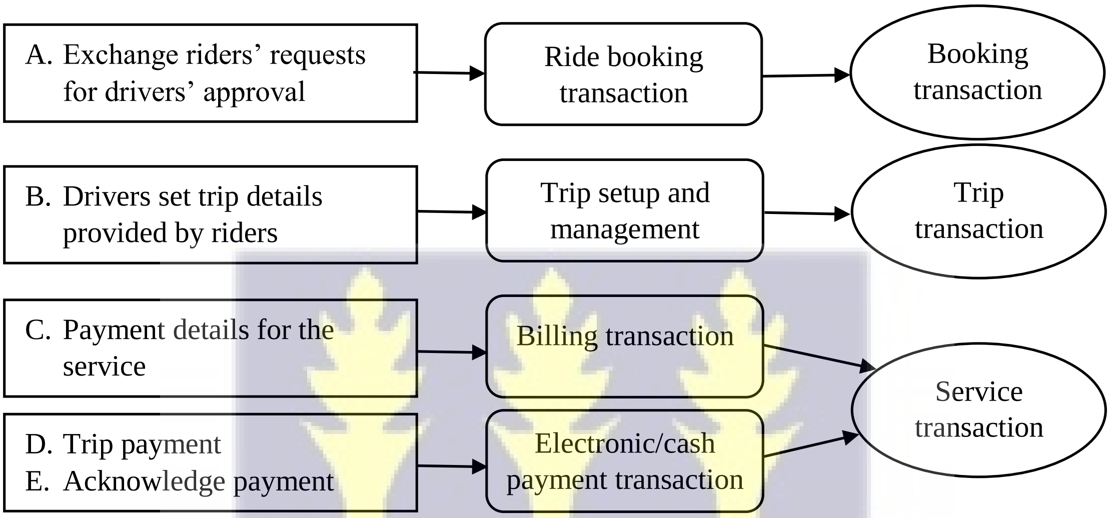
literature on ridesharing platform broadcasts trip requests (Cram & Wiener, 2020; Tan et al., 2017; Wang et al., 2018). Figure 7.3 below with supporting evidence in Table 6.3 shows what enables drivers' and riders' transactions across ridesharing platforms, user-boundary transactions.

Figure 7.3: Structure of data related to Users' Transactions across Ridesharing Platforms-Enablements



Source: Author's construct

Trip transaction involves setup and management of riders' details by drivers via ridesharing platforms. Ridesharing platforms enable drivers to set trip details according to what has been provided by riders before take-off. This transaction enables drivers to manage the trip according to riders' destination address and mode of payment across boundaries. It also shows that drivers and riders exchange additional information outside the boundaries for trip setup. More importantly, ridesharing platforms enable riders to get bills according to information provided for drivers' trip setup.

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Service transaction enables riders to settle drivers with money according to the trip provided. This users' transaction across boundaries involves billing and electronic/cash payment. The boundary objects enable the two user groups with transparency for trip billing and payment without any dispute. Thus, riders exchange money via physical cash or electronic such as credit card with the service provided by drivers accordingly. The physical cash is where drivers collect payment directly from riders via face-to-face based on the trip provided before drop-off. Alternatively, riders with e-payment options pay via credit card or mobile money from banks or telcos, respectively, in real-time directly into the ridesharing platform companies' accounts before drop-off. The banks and telcos are the external digital platforms or organisations that support users' information exchange across boundaries. The ridesharing platforms enable drivers to acknowledge receipt of payment from riders according to the service provided before drop-off. This finding supports extant literature on how ridesharing platforms influence trust between drivers and riders to exchange information (Cheng et al., 2020). The finding also provides insight into how ridesharing platforms enable users to share information across different boundaries.

The study's findings also show that the boundary objects have constraints that affect users to achieve their goals for using the platforms. The users' constraints are registration, information and reversal, location, and complaint. First, *registration constraint* involves how users are restricted to use a certain minimum of mobile phone network standard for apps installation. The apps installation is the process of users' registration. This requirement restricts some drivers and riders to register for the boundary objects access. This is because not all mobile phones are compatible with various ridesharing apps. Some of the apps even require higher network standard than others. This issue is based on a particular ridesharing platform's structural process. The study's finding supports Lee et al.'s claim (2019) that network standard

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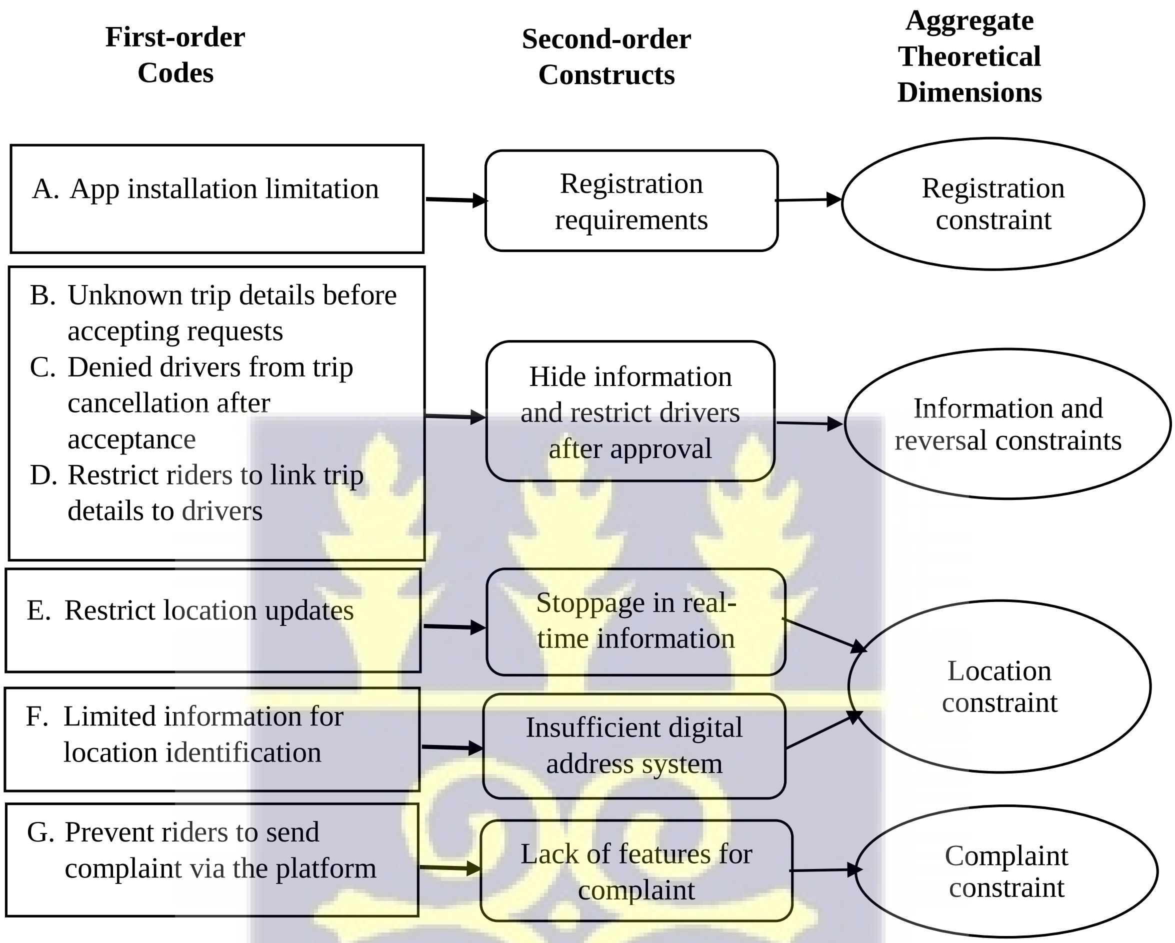
specifies system compatibility. Figure 7.4 below with evidence in Table 6.4 shows what constrains drivers and riders from using ridesharing platforms.

Figure 7.4: Structure of data related to Ridesharing Platforms' Constraints



Source: Author's construct

Second, *information and reversal constraints* involve how drivers are restricted on the ridesharing platforms for other information. They are restricted to know riders' destination address and mode of payment when accepting the trip requests. The ridesharing platforms show riders' source address when broadcasting the requests for acceptance without the destination location for drivers' decisions. Drivers are also constrained on the boundary objects to reverse

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or cancel riders' requests after the approval. Thus, the ridesharing platforms have no option for drivers to cancel the approved trip after a change of mind. This issue is unlike riders who have the option to cancel the trip when not ready or interested in the assigned car. Riders are also restricted on the boundary objects to request for a specific driver.

Third, *location constraint* involves how drivers are limited to information available on ridesharing platforms for location identifications. The platforms use the Google map and GPS for popular places in developing countries. Most places such as new and without street address are not captured by the digital address system associated with the boundary objects for location identification. The approach provides drivers with an insufficient digital address system. Thus, drivers on the boundary objects are limited with the digital address system for location identification without any alternative on the platforms for unknown places. This constraint affects drivers to locate those places via the boundary objects when searching for riders. This finding is consistent with Zhou et al.'s claim (2018) that digital technologies' challenges can constrain users' ability to achieve their goals.

Finally, ridesharing platforms restrict riders to send complaints about help relating to drivers' behaviour during the trip. The boundary objects have no safety complaint features for riders to activate in order to seek help from security agencies and/or the ridesharing platform companies in case of drivers' attitude. This function can be linked directly to the police for users' safety in case of unprofessionalism. The issue affects riders to call for help in real-time during the trip when a rider suspects something strange from a driver.

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7.4 Contextual Factors influence use of Ridesharing Platforms

In response to the final research question concerning contextual factors that influence actors' use of ridesharing platforms and the achievement of their goals. The study's findings show the contextual factors that prevent drivers and riders from using ridesharing platforms in developing countries. The factors are Internet outages, poor digital address system, lack of public phone charging systems and services, working condition, and car model. The findings also show that innovations are coming up from drivers and riders due to contextual factors. The innovations are drivers' and riders' interactions outside the boundary objects via text message and/or phone call for location identification, use of power bank to charge mobile phone battery, multiple users across different ridesharing platforms, and cars with tracking system and camera that can be stopped remotely when snatched by thieves. The study's findings in line with the contextual factors and related users' innovations are discussed next.

First, *Internet outages* in developing countries interrupt ridesharing platform companies' real-time managing, monitoring, and controlling of drivers' and riders' trip activities; thus, they breakdown information access. The consequences involve interaction breakdown between drivers and riders; stoppages in synchronising drivers' traffic information flow and location updates; and stoppages in keeping track of drivers' and riders' profiles in real-time, automatic billing, and e-payment. The e-payment, for instance, supports riders to settle their trip fares online via credit card and mobile money directly into ridesharing platform companies' accounts and the Internet outages affect such transactions. In the case of automatic billing, the Internet outages create discrepancies in the fare between users after the end trip. Internet outages also disrupt real-time activities such as loading users' apps. Thus, users are unable to get and stay connected to the boundary objects in case of Internet outages. This study gives new insight into how Internet outages in developing countries interrupt ridesharing platforms' use, such as

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users' actions, interactions, and transactions across boundaries. The finding supports the extant literature on digital platform concerning technology failure in a particular context (Amoako et al., 2021) and contextual factors that disrupt virtual platforms adoption (Ali et al., 2021). With respect to the IS research, this finding supports the view that environmental context can constrain the use of ICT artefacts for a particular purpose (Eze et al., 2021).

Second, *poor digital address system* associated with ridesharing platforms use in developing countries disables drivers to find riders' directions and locations effectively for pick-up and drop-off. This is because the Google map and GPS navigation app associated with ridesharing platforms operate with only landmarks. This issue indicates that not every street or location in Ghana is captured on the Google map, especially the unpopular places and new sites. The issue, for instance, disables drivers' navigation systems on ridesharing platforms from locating new and/or unmapped areas. The finding supports the view that content and ownership rights are independent, and this can create consequences for using digital platforms (Zhou et al., 2018). Drivers and riders, on the other hand, interact for further information on identification outside the boundary objects via text message and/or phone call. This innovation is due to the limitation of Google map associated with ridesharing platforms use in developing countries. The innovation enables drivers to overcome the limitation of Google map for locating riders at unpopular places and new sites in developing countries. This study gives new insight into innovations that are coming up from the users because of the limitation of digital address system for location identifications in a developing country context. Figure 7.5 below with supporting evidence in Table 6.8 shows contextual factors that prevent drivers and riders from using ridesharing platforms.

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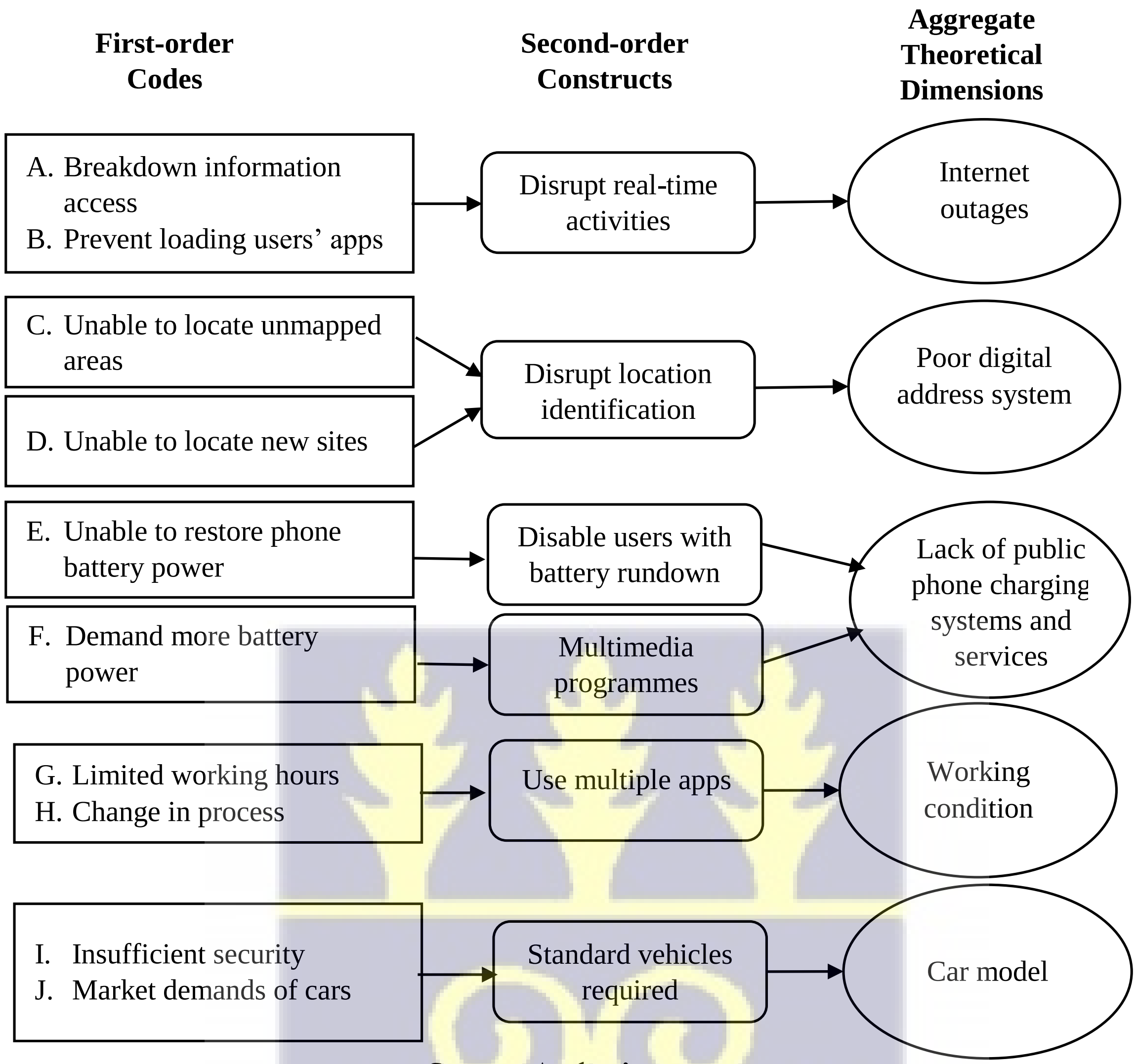
Figure 7.5: Structure of data related to Contextual Factors influence use of Ridesharing Platforms and their achievement



Source: Author's construct

Third, *lack of public phone charging systems and services* in developing countries at places such as malls and churches affect users when their batteries rundown. This issue prevents them from staying connected to ridesharing platforms. The users' actions, interactions, and transactions across boundaries are real-time and involve multimedia programmes that run simultaneously. The running programmes drain more mobile phones' batteries power. This issue causes riders' mobile phone batteries easily to run out of power. For instance, riders find it difficult to book rides when their mobile phone batteries run out of power outside their homes and offices. More specifically, the issue affects riders to stay connected on the boundary objects

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because they are unable to restore their mobile phone battery power when they are at public places such as malls and hospitals. It prevents them from making ride requests in public places. Drivers have a system in their cars that supports periodic charging of mobile phones to retain their battery power for information sharing. Riders, however, do not have such an option to charge their batteries for ride requests and information sharing. Batteries quickly run out of power due to multimedia programmes associated with the boundary objects that run concurrently. These functions demand more battery power; they continue to consume riders' mobile phones power till they run out. The finding supports the extant research concerning challenges, which constrain the use of technology to handle information systems (Hedström, 2016). Riders, on the other hand, travel with a power bank. The power bank is a mobile phone charging system that supports riders to charge their batteries. This innovation enables riders to charge their batteries and get or stay connected to the boundary objects. This is because the power bank serves as a backup for mobile phone battery power.

Fourth, *working condition* associated with the use of ridesharing platforms influences drivers to use multiples apps to avoid issues such as limited working hours and change in process. Drivers are independent contractors of ridesharing platform companies and each organisation also has conditions that influence its boundary object use. The limited working hours limit drivers to enjoy their maximum period for providing riders with trip activities a day. This contextual factor influences drivers to work beyond the limited hours a day associated with a specific organisation. Change in process is also another working condition associated with ridesharing platform companies that influences use of the boundary objects. For instance, COVID-19 pandemic has changed how drivers use ridesharing platforms. The process for verifying drivers before access is granted for using the platforms has included real-time checking of nose masks via selfie. This check ensures that drivers wear their nose masks

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properly to meet the requirement before accessing the boundary objects. The change in process also includes extra cost and work due to the COVID-19. The additional cost is where drivers need to buy nose masks and sanitisers. The extra work also is where drivers sanitise their doors and seats after each trip. This finding from the study also shows that there is an innovation due to the limited working hours associated with ridesharing platforms. The innovation is that drivers have become multiple users across boundaries with different apps. Drivers with multiple apps can work for more hours without a limit from a specific ridesharing platform. This innovation also enables drivers as multiple users to get more riders' requests from different ridesharing platforms.

Finally, *car model* influences the contextual factors for using ridesharing platforms. This contextual factor is due to the standard vehicles required for drivers' registration by ridesharing platform companies. The standard vehicles involve specific features such as security and type. The security helps to monitor drivers' activities in real-time but is insufficient. Insufficient security means that the boundary objects are unable to record activities in and around the cars for post-trip review. This issue is due to the type or model of vehicles used by drivers, which increases the market demand for cars. The requirements affect drivers who are unable to meet the standard to use ridesharing platforms. The study's findings also show that innovations are coming up because of the context as cars used by the drivers have/can also become part of the boundary object with tracking system and camera that can be stopped remotely when snatched by thieves. This study gives new insight into innovation by drivers with tracking system and camera features added to their cars due to insufficient security associated with vehicles required by the ridesharing platform companies. This innovation also shows an increase in market demand for cars that are used by drivers. The findings support extant research on how contextual factors integrate with other systems (Cheng et al., 2020; Thao et al., 2021). In

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addition, ridesharing has been introduced into a context which has a tradition of how cars are accessed and used from a public perspective and traditional riding is a social and physical infrastructure phenomenon. Furthermore, ridesharing is a digital-enabled service which needs physical infrastructure. However, in developing countries that physical and digital infrastructures are under-developed. Hence for it to work efficiently, adaptations are occurring on the perspective of digital, physical, and the social infrastructure.

7.5 Reflections on the use of Boundary Object Theory

This section presents the researcher's reflection on the use of boundary object theory as a tool by discussing how well the theory explains or fits the phenomenon understudy. The benefits and the limitations of applying boundary object theory are examined. The boundary object theory concepts and the principles (Stange et al., 2016) were found useful for first, investigating the use of ridesharing platforms as complex sociotechnical trip activities between the divergent group of users for information sharing across boundaries. The theory's usefulness enabled the researcher with interpretive flexibility to explain how users from different social worlds interact with common protocols across boundaries (Oever, 2019). In addition, the theory provides room for the researcher to gain a different understanding of users' viewpoints in terms of interests, rights, and constraints for using ICT artefacts (Hedström, 2016) for ridesharing platforms. Moreover, the theory enabled the researcher to understand the coordinative role of users and artefacts in practice across boundaries.

Applying the boundary object theory for the phenomenon understudy involved time-consuming, extensive reading, thorough understanding, and application of the concepts and principles (Boell & Cecez-Kecmanovic, 2014), especially during the coding and comparing data for the analysis. The implication of viewing ridesharing platforms as boundary objects draws attention to the users' actions, interactions, and transactions across boundaries that

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produced the phenomenon. In addition, the application of the theory draws attention to user-local actions associated with the use of ridesharing platforms. The study of the use of ridesharing platforms based on the components and features of the platforms as boundary objects to understand the divergent group of users' actions, interactions, and transactions give a general view of the phenomenon. By going through the original application of the theory that links with the use of ridesharing platforms, the researcher was able to identify the platforms as boundary objects components with the associated common and local features that make a difference and the implications in line with their functions and use. The researcher was also able to identify and define users' trip activities concerning local and boundary actions, boundary interactions, and boundary transactions. Thus, the researcher was able to contextualise the theory to suit the phenomenon understudy (e.g., Leidner, 2020; Walsham, 1995). Based on the researcher's experience from the boundary object theory's reflections, the idea is consistent with this study on the divergent group of users' actions, interactions, and transactions across ridesharing platforms. More importantly, the theory's characteristics enabled the researcher to structure the data with an interpretive style for user-local actions, user-boundary actions, user-boundary interactions, and user-boundary transactions.

7.6 Chapter Summary

This chapter discussed the study's findings in line with the literature on ridesharing platform. It identified patterns and trends of using ridesharing platforms in a developing country. It also provided the researcher's reflections on the use of boundary object theory which underpinned the study. The next chapter presents the overall summary and conclusion for the study.

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CHAPTER EIGHT

SUMMARY AND CONCLUSION

8.1 Chapter Overview

The previous chapter addressed the research questions by discussing the findings in line with the literature. The researcher's reflection on the use of boundary object theory was also presented. The current chapter summarises the study as follows. First, the chapter begins by reviewing the research purpose and questions outlined in Chapter 1 and how they were addressed in this study. Second, the chapter presents the study's contributions to knowledge in line with theory, research, practice, and policy as well as implications of the study. Third, the chapter evaluates the thesis based on the set of criteria for conducting and assessing IS interpretive case studies outlined in Chapter 4. Fourth, it evaluates the study based on ethical considerations. Finally, the chapter presents the study's limitations and recommendations for further research.

8.2 Review of Research Purpose and Questions

In line with the research purpose and questions stated in the chapter one, the purpose of the study has been to understand the use of ridesharing platforms in a developing country. The study addressed the research gaps identified in the literature in terms of the research purpose and questions, knowledge, and theory as follows:

First, extant studies on ridesharing platform focus more on various research questions such as why ridesharing platforms have gained market, impacts on society, and governments concern to regulate their service. Others also focus on how travel times are calculated and drivers' profile is generated. These studies, while necessary, overlook explaining the goals of actors on ridesharing platforms.

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Second, previous research on ridesharing platform also overlooks explaining the platform's contribution to users' pursuit and achievement of their goals. More importantly, research needs to direct attention to explaining how the ridesharing platforms enable or constrain the realisation of actors' goals. This research effort may be achieved through a theoretical lens that exclusively accommodates both the social and technical aspects of ridesharing platforms.

Finally, the focus of existing ridesharing platform research assumes that platforms and actors work in relative isolation from any contextual influence. Such a view overlooks how contextual factors such as business climate and even government regulations potentially influence the operations and outcomes of ridesharing platforms.

By addressing the study's gaps identified in the literature, this research makes contributions to IS body of knowledge using qualitative interpretive case study methodology (e.g., Klein & Myers, 1999; Myers, 2019; Walsham, 2006) and boundary object theory (Stange et al., 2016) to understand the use of ridesharing platforms from the developing country perspective.

The study was guided by the following research questions:

i) Why do actors use ridesharing platforms?

ii) How do ridesharing platforms enable or constrain the realisation of actors' goals?

iii) What contextual factors influence actors' use of ridesharing platforms and the achievement of their goals?

INTEGRI PROCEDAMUS

The following chapters show how the research questions were addressed:

i. Chapter 2 reviewed the extant literature on ridesharing platform. The review highlighted ridesharing platforms in general. The areas covered are sharing economy;

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ridesharing platform – ridesharing platform infrastructure, setup of ridesharing platform, use of ridesharing platform, ridesharing platforms in developed and developing countries, and benefits and challenges of ridesharing platforms; and digital objects. It also presented conceptual and theoretical approaches used in studying ridesharing platform. This provided gaps in the literature the study seeks to fill.

ii. Chapter 3 discussed boundary object theory as the study's theoretical foundation. The chapter's discussion covered the theory's background, concepts and principles, applications of the theory in IS and this thesis, cross-boundary object, and limitations. It also presented the theory gaps in the literature.

iii. Chapter 4 discussed the research methodologies and justified the choice of the interpretive paradigm and case study approach for this thesis. The chapter explained the research process including interpretive case study, fieldwork and case selection from the developing country context of Ghana, data sources and techniques for data collection, and data analysis. The chapter also discussed the evaluation principles of interpretive studies and ethical considerations.

iv. Chapter 5 presented the case description, which encompassed two ridesharing platform companies in Ghana, namely, Uber and Dropping. All the cases were constructed according to their historical background information, components, planning and setup, process, reasons, use, and challenges.

v. Chapter 6 analysed the two ridesharing platforms and their cross-case analyses based on the reported data in Chapter 5. Within-case was analysed using the concepts and principles of boundary object theory. The cross-case analysis provided comparisons with each case in terms of similarities and differences.

vi. Chapter 7 addressed the research questions stated in the introduction chapter by discussing and interpreting the findings in line with the literature on ridesharing

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platform presented in Chapter 2. The chapter also discussed a reflection on the application of the boundary object theory presented in Chapter 3.

vii. Chapter 8 summarised and concluded the study based on contributions to knowledge in terms of theory, research, practice, and policy; recommendations and implications; evaluation of the study based on IS interpretive study principles and ethical considerations; limitations of the study; and recommendations for further studies. Appendix A, B, and C present publications from the study, a summary of the research questions and findings, and the contributions to knowledge, respectively.

8.3 Contribution to Knowledge

The primary knowledge contribution of a study is always in one category to identify the particular focus of the interpretive researcher's work (Myers & Klein, 2001). The researcher is responsible for demonstrating a contribution to knowledge that makes this thesis worthwhile to read (Leidner, 2020). As noted in IS interpretive studies, knowledge contribution allows readers to understand the phenomenon understudy in the context of developing new concepts, generating a theory, providing specific research implications, and offering rich and deep insight (Walsham, 1995a). More specifically, contribution to knowledge in terms of theory involves applying it first in a particular domain to explain a phenomenon, closing a gap, contextualising it to suit the phenomenon, adding a new concept, and developing a new one (Leidner, 2020). This study contributes to theory, research, practice, and policy are discussed below.

8.3.1 Contribution to Theory

INTEGRI PROCEDAMUS

This thesis contributes to boundary object theory. The application of the boundary object theory is the first to understand the use of ridesharing platforms. The study contextualises the theory to suit the use of ridesharing platforms. The study also adds one concept to the theory, called user-boundary transactions. The concepts of boundary object have been used in IS research to

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theorise interactions across boundaries (Oever, 2019; Spante, 2019; Stange et al., 2016) for a single organisation process (Chen et al., 2019; Hussenot, 2010; Khoo & Hall, 2013). Some authors consider every artefact as a boundary object (Uppström & Lönn, 2017) for users' interactions without considering what can unite them. There is less research attention on the users' transactions for exchange information applied to the boundary. Some authors also focus more on boundary actions (Hedström, 2016; Oever, 2019; Spante, 2019). This study addresses the following limitations of boundary object theory in IS research: i) it extends the concepts to include user-boundary transactions and also introduces ridesharing platforms as boundary objects for sharing of information, ii) it provides insight into technological standard for interoperability that connects users irrespective of their background and artefacts, and iii) it provides insight into how users share information across boundaries with multiple organisations (ridesharing platforms, banks, and telcos).

In all, the study contributes to theory in three ways. First, it advances knowledge on the use of boundary object theory by providing a better understanding of users' actions, interactions, and transactions across ridesharing platforms. Thus, this study extends the definition of boundary object to address organisational context. The theory provides understanding of how the boundary concept applies across ridesharing platforms from individuals and organisations as a whole for user-boundary actions, interactions, and transactions within the information ecology. To the best of the researcher's knowledge, this study is the first to apply the boundary object theory to understand the divergent group of users' actions, interactions, and transactions across ridesharing platforms. As a result, it shows how process for sharing of information across boundaries by organisations has become more open (Faik et al., 2019).

Second, the study extends the theory's scope of use in IS research (Leidner, 2020) by adding one construct (Presthus & Munkvold, 2016) due to the limitation of the existing concepts. The

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new construct is “user-boundary transactions”. This construct extends users’ activities across boundaries and not just boundary actions and interactions. The concept adds to the original four constructs, namely, boundary object, actors, actions, and interactions. The introduction of “user-boundary transactions” is the fifth concept. This concept is what the study adds to the original four (boundary object, actors, actions, and interactions) constructs. The fifth “user-boundary transactions” concept shows a commercial agreement between users in an exchange of exchangeable services, rights or funds. The introduction of the new concept, therefore, shows that when users are connected by ridesharing platforms, user-boundary transactions also occur in order to achieve their goals. This is different from the original claim of boundary object theory that indicates that actions and interactions emerge when users are connected by the boundary object (Stange et al., 2016).

Furthermore, this study contextualises the original “actors” and “interactions” concepts to suit the use of ridesharing platforms in IS research (e.g., Ellway & Walsham, 2015) as “users” and “user-boundary interactions”, respectively. In addition, the study contextualises the original “actions” as user-local actions and user-boundary actions. The user-local actions show what users activate individually on ridesharing platforms without affecting each other group. The user-boundary actions also show what users invoke on ridesharing platforms, which affect each other. This study also introduces ridesharing platform as a boundary object concept. This concept applies to understand the ridesharing platforms' components and features that connect a divergent group of users for information sharing. The common features are associated with the administration panel. Thus, the core component of ridesharing platform is used to manage users’ rights. The local features are associated with the drivers’ and riders’ apps. Thus, the complementary components of ridesharing platform are used by the divergent group of users.

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Finally, the application of the boundary object theory is the first to understand users' actions, interactions, and transactions across ridesharing platforms, banks, and telcos and not only in a single organisation. Thus, the study provides understanding of how drivers and riders use ridesharing platforms to share information across multiple organisations. This study, therefore, extends the scope for user-boundary actions, interactions, and transactions beyond one organisation.

8.3.2 Contribution to Research

This study contributes to ridesharing platform research in two ways, namely, 1) closing the research gaps and 2) providing some implications. The first contribution is in line with less research attention on actors' goals for using ridesharing platforms. While the extant research focuses more on why ridesharing platforms have gained market (Wu et al., 2020), impact on the platforms (Guo et al., 2019), and governments wish to regulate their service (Li & Hou, 2019). Others also focus on how travel times are calculated (Gurumurthy & Kockelman, 2018; Yan et al., 2020) and drivers' profile is generated (Basili & Alessandra, 2020; Gupta et al., 2019b). This study contributes to ridesharing platform research in IS by providing insight into users' goals for using ridesharing platforms. The study's findings show that drivers use ridesharing platforms because of the following goals: linkage, flexibility, traffic update, unrestrictedness, and security. Concerning the rider user group, the findings show that riders use ridesharing platforms because of the following goals: mobility, legitimacy, accountability, security, and convenience. The findings also show that drivers and riders have personal goals for using ridesharing platforms. Some drivers pursue personal goals to maximise revenue illegally such as accepting riders outside the platform. Some riders also pursue personal goals such as committing crime (stealing the vehicle). Comparably the personal goals of riders tend to be more undesirable since drivers are endangered and violent crime is sometimes committed.

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Previous research has been silent on these undesirable goals in the use of ridesharing platforms. Addressing these are critical especially in the context of developing countries where public transportation still remains a challenge and thus, ridesharing platforms are a necessary for both employment and public mobility. This may require a combined effort of law enforcement agencies, ridesharing platform managers, driver unions, and the labour department of the Ministry of Employment and Labour Relations.

Concerning the need to explain how ridesharing platforms enable or constrain the realisation of actors' goals. In line with a socio-technical perspective, the role of IT artefact cannot be ignored when explaining its use and impact (Orlikowski & Iacono, 2001). This study contributes to ridesharing platform research in IS by providing insight into how the platforms enable or constrain drivers and riders to achieve their goals. The study's findings show that ridesharing platforms enable drivers and riders to perform user-boundary actions, user-boundary interactions, and user-boundary transactions. First, user-boundary actions involve platform entry, platform utilisation, user identification, user set-up, and user rating. Second, user-boundary interactions involve platform connection, users' update, pick-up, and end trip. Finally, user-boundary transactions involve booking transaction, trip transaction, and service transaction. The ridesharing platforms, on the other hand, constrain drivers and riders from achieving their goals, namely, registration, information and reversal, location, and complaint constraints.

Regarding less research attention on how contextual factors influence the use of ridesharing platforms, there is the need to explore their influences on ridesharing platforms (Eze et al., 2021). Prior IS research on ridesharing platform focuses more on what factors affect riders to adopt it (Min et al., 2018) and the challenges of managing it based on its big data governance

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and algorithmic (Basukie et al., 2020). Other IS research also focuses on contextual factors such as security concerns with respect to the adoption of cloud-based platforms (Ali et al., 2021). This study contributes to ridesharing platform research in IS by providing insight into factors that influence the platforms use in developing countries. The study's findings show contextual factors that prevent drivers and riders from using ridesharing platforms in developing countries. The factors are Internet outages, poor digital address system, lack of public phone charging systems and services, working condition, and car model. For instance, Internet outages interrupt real-time online communication between riders and drivers as well as location updates, automatic billing, and e-payments. Poor digital address system also prevents drivers' navigation systems from locating new and/or unmapped areas. Also, working condition affects drivers such as change in process due to COVID-19 pandemic. The process for verifying drivers before an access is granted for using the platforms has included real-time checking of nose mask via selfie. The findings also show that innovations are coming up from drivers and riders due to the contextual factors. The innovations are users interact outside the boundary objects via text message and/or phone call for location identification and use of power bank for riders in order to stay connected due to lack of public phone charging systems and services in developing countries. Drivers have also become multiple users across different ridesharing platforms. Also, cars used by drivers have become part of the boundary object with tracking system and cameras that can be stopped remotely when snatched by thieves.

The contributions to ridesharing platform research in IS also include providing insight into how standardisation for interoperability enables drivers' and riders' actions, interactions, and transactions across boundaries. The study also provides insight into how standardisation for interoperability enables ridesharing platforms to operate on open systems to increase drivers' and riders' scope of actions, interactions, and transactions with the external environment such

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as banks and telcos. In addition, ridesharing has been introduced into a context which has a tradition of how cars are accessed and used from a public perspective and traditional riding is a social and physical infrastructure phenomenon. Furthermore, ridesharing is a digital-enabled service which needs physical infrastructure. However, in developing countries that physical and digital infrastructures are under-developed. Hence for it to work efficiently, adaptations are occurring on the perspective of digital, physical, and social infrastructure.

In addressing the research gaps, this thesis uses a cross-case analysis from Uber and Dropping ridesharing platform companies in Ghana with a qualitative interpretive case study approach as a methodology (Myers, 2019; Sarker & Sahay, 2002; Walsham, 1995a).

8.3.3 Contribution to Practice

The study makes practical contributions to the use of ridesharing platforms concerning the findings as follows. First, this study contributes to practice by providing insight into how ridesharing platforms are used in developing countries as a valuable reference for companies. The findings show that drivers use ridesharing platforms because the platforms can enable them to provide riders with quality trip activities (see Section 8.3.2). In addition, it provides insight into how drivers' and riders' profiles are managed by ridesharing platform companies, which can assist security agencies in investigating post-trip activities in case of taxi fraud (Calo & Rosenblat, 2017; Mousavi et al., 2020).

Second, the study contributes to practice by providing insight into how digital management and monitoring of drivers' and riders' trip activities via ridesharing platforms can help authorities to manage traffic jams (Li & Hou, 2019; Wang et al., 2018) for smart cities (Liyanage et al., 2019; Willing et al., 2017). Also, it provides insight into how digital

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management and control can help authorities to manage drivers' and riders' personal goals for using ridesharing platforms. The findings show that riders use ridesharing platforms because the platforms can enable them to get quality trip activities and do their personal goals (see Section 8.3.2).

Third, the study provides insight into how communications between ridesharing platform companies and other digital platforms such as banks and telcos can be strengthened in terms of standardised data formats to improve the interface design. The study's findings show how drivers and riders use ridesharing platforms (see Section 8.3.2).

Fourth, the study contributes to practice by providing insight into the contextual factors that influence the use of ridesharing platforms. The study's findings show factors that prevent drivers and riders from using ridesharing platforms in developing countries (see Section 8.3.2).

Finally, the study contributes to practice by providing insight into how ridesharing platforms' activities can help traditional taxi drivers to improve their services. The findings show how ridesharing platforms enable drivers and riders to increase their scope of trip activities across boundaries with an external environment (see Section 8.3.2). This strategy allows drivers' and riders' interactions for information sharing (Faik et al., 2019) as well as actions and transactions across boundaries. Moreover, many researchers have raised concerns about the nature of ridesharing platforms in the sharing economy such as their competitive advantage over the traditional taxi services (Basukie et al., 2020; Thebault-spieker & Terveen, 2017).

8.3.4 Contribution to Policy

The findings provide lessons and guidelines for policy formulations in developing countries to guide ridesharing platforms in the sharing economy (see Section 8.3.5).

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8.3.5 Implications of the Study

Based on the research findings (see Section 8.3.2), this study offers implications for practice and policy. For practice, first, to address the poor digital address systems that prevent drivers and riders to identify themselves effectively at new and/or unmapped areas. The city authorities need to incorporate local systems, such as Ghana post digital address system in the ridesharing platform setup. This strategy can address the poor digital address system due to the limitation of Google map associated with ridesharing platforms for locating new and/or unmapped areas.

Second, concerning lack of public phone charging systems and services that affect riders with battery rundown to get and stay connected on ridesharing platforms. The authorities for urban development need to provide public phone charging systems and services at places such as malls and hospitals to avoid riders' batteries running out of power.

For policy, first, policymakers such as the Ministry of Transport, driver unions, DVLA, and the Ghana Police are advised to formulate general digital technology policies that companies can incorporate into the use of ridesharing platforms. Policymakers need to put in measures to enforce regular ICT usage in the taxi sector.

Second, policymakers are advised to revise existing laws to suit ridesharing platforms in the sharing economy, which supersede the traditional taxi services in competition. This policy can protect the traditional taxi services from disruptive digitally-enabled firms in developing countries. Thus, there is the need for laws for digital transformation.

Third, policymakers should enforce ridesharing platform companies to include all the transportation information in their systems such as car insurance, beyond banks and telcos.

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This policy will improve drivers' and riders' information exchange across ridesharing platforms.

Finally, policymakers must provide an adequate tag to identify ridesharing platforms' vehicles, which operate like private cars. This recommendation can help the security agencies to check ridesharing platforms' cars as they do to the traditional taxis. In addition, policymakers need to be ICT-oriented to understand activities across ridesharing platforms.

This study also has implications. This study provides insight into how standardisation for interoperability enables ridesharing platforms to operate on open systems with the external environment. For instance, e-payment associated with ridesharing platforms via credit card by banks or mobile money by telcos opens up research opportunities to understand riders' trip fare settlement. This outcome, therefore, suggests that researchers can draw on the experience of how digital network creates a relationship for using ridesharing platforms. More specifically, for those in developing countries where digital interoperability remains limited to understand a specific contextual issue. Moreover, this study provides insight into managerial implications of how the components and features of ridesharing platforms are strategically used to improve users' actions, interactions, and transactions for information sharing for trip activities. This study shows the requirements of infrastructure for using ridesharing platforms in developing countries, and this to some extent broadens the understanding in practice. This specific implication also opens up research opportunities in IS on why existing ICT infrastructure must be considered before using ridesharing platforms in developing countries.

8.4 Evaluation of the Research

This section presents the study's evaluation based on the widely adopted Klein and Myers' (1999) seven criteria for the conduct and evaluation of IS interpretive case studies. The

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evaluation criteria outlined in Chapter 4 are hermeneutic circle, contextualisation, interaction between the researcher and the participants, abstraction and generalisation, dialogical reasoning, multiple interpretations, and suspicion. The section also evaluates the study through the lens of ethical standard for IS interpretive studies outlined in Chapter 4. The seven set of principles are presented below in terse:

8.4.1 Hermeneutic Circle

The hermeneutic circle primarily concerned is to make meaning of textual data through an iterative process (Chughtai & Myers, 2017). It provides a set of concepts to help the researcher interprets and understands the meaning of a text or multiple texts about what people have done, said or written about an issue relating to the phenomenon understudy (Iivari, 2018). This principle of human understanding of a text is described as a "meta-principle" and it is the foundation for all interpretive studies as well as the other six principles (Klein & Myers, 1999). The principle emphasises that one needs to understand a text as a "whole" by interpreting its "parts" and associations (ibid).

The hermeneutic circle principle was applied in this study in two phases, namely, construction of case description and analysis of the case description. In the first phase of this thesis, the "whole" is the study of ridesharing platforms. The whole is formed by the "parts" that create ridesharing platforms. The "parts" in this study are the individual cases with the use that constitute the whole ridesharing platforms. Chapter 4 of this study provides details of how the cases were formed using the independent meaning of both "whole" and "parts". In the second phase of this study, the "parts" which interpret individual cases as a whole were derived from the concepts and principles of boundary object theory. The details of the "parts" are provided in Chapter 3 as a theoretical lens to understand the phenomenon from the divergent users' actions, interactions, and transactions across boundaries.

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8.4.2 Contextualisation

This principle is a central tenet. It helps the researcher to explain the study's social and technical contexts (Ellway & Walsham, 2015) in order to advance the rigour of qualitative interpretive research (O'hEocha et al., 2012). The principle was used to understand the research setting to reflect the ridesharing platforms' social and historical background (see Chapter 5). Contextualisation provides a better understating for intended readers to see the research phenomenon's trend from primary data collected based on interview participants, source documents, and artefact observations "parts". Details of the research setting as the context of the study were provided in the methodology chapter (see Chapter 4).

8.4.3 Interaction between the Researcher and the Subjects

This principle requires a critical reflection on how data are socially constructed through the researcher's interactions with interview participants (O'hEocha et al., 2012). The principle generates greater trust between the two parties for knowledge generation (Schwartz-shea & Yanow, 2012, p.80). The interactions principle involving face-to-face interviews; follow-ups with technology-enabled via e-mail, phone call, WhatsApp, and SMS; and feedback for checking the accuracy of transcripts of interviews by participants facilitated data collection for this study.

8.4.4 Abstraction and Generalisation

This principle requires that emerged details from the interpretation of data must be connected to the theoretical concepts to understand social action through the abstraction and generalisation of the research data (Ellway & Walsham, 2015). In this study, the interpretive case description, case analysis, and discussion of findings are situated in the specific context of the theoretical concerns about human understanding and social action generated from the research data rather than statistical data.

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8.4.5 Dialogical Reasoning

This principle requires the researcher's attention to possible contradictions with back and forth revision between theoretical preconceptions that guided the research and the actual findings that emerged from the study (Ellway & Walsham, 2015). The researcher, therefore, was sensitised through the lens of boundary object theory to entwine with field data, analysis of research text, and actual findings of the study through rereading from different viewpoints.

8.4.6 Multiple Interpretations

This principle requires the researcher to be sensitive to seek possible different stories telling among the interview participants (Ellway & Walsham, 2015). In this study, the researcher used document sources in addition to the interviews to gain multiple interpretations. The selection of the interview participants in line with this principle was based on their professional background through snowballing and purposive sampling. The researcher considered and revised the interpretations of potential differences from the participants' stories or narratives and source documents accordingly, as O'hEocha et al. (2012) suggest that the same structure of events can be interpreted in another way.

8.4.7 Suspicion

This principle requires the researcher to consider the possible "biases" and systematic "distortions" in the narratives collected from the participants (Ellway & Walsham, 2015). The researcher, therefore, was mindful of the interpretations of possible biases from the participants' narratives, official releases from each case, and media releases according to particular interests.

8.5 Ethical Considerations

The study's ethical procedures are meant for handling the data legally and ethically biddable to protect the researcher, participants, and the university's reputation (Watson, 2019). These

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values guided the researcher in practice with care, comprehensive, transparency, confidentiality, ethical responsibility (Porra et al., 2014); plagiarism (Gunnarsson et al., 2014); and permission to publish (Watson, 2019). A number of measures were employed to address this study's ethical issues. First, the interview guide provided the purpose of the research; the roles and responsibilities of the researcher, the participant, and the case organisations; and how the interview data would be treated, such as protecting the data from unauthorised access and use solely for the academic purpose.

Second, the University's ethical clearance, including a letter of support for approval by the Department head and an introductory letter provided by the lead supervisor, gave the researcher access to the study's case organisations. Third, participant consent to refuse, participate or withdraw from the interview process at any point as well as permission for audio-recording were also considered.

Fourth, the researcher has not disclosed any name of the interview participant in this study but rather occupational status in order to maintain privacy. Fifth, the transcribed interviews in the form of a draft were confirmed for accuracy by some of the participants who agreed to verify before publishing via technology-enabled means such as phone calls.

Finally, the researcher checked for the thesis's originality with a Grammarly premium application to avoid plagiarism. The plagiarism check is the key ethical requirement of the University's academic works. This ethical issue was disclosed to the case organisations.

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8.6 Limitations of the Research

The findings are limited in line with the research purpose, theoretical foundation, and methodology (Sarker & Sahay, 2002). There are a number of limitations of the study. First, the

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study is limited in terms of its use of two cases from a single developing country. However, from the interpretive case study perspective, the findings are only applicable to developing countries with similar settings.

Second, the findings are based on interpretive tradition without statistical data for generalisation. It is not the intention of Interpretive research to allow the findings to be generalised with figures rather than informing with similar settings on details that emerged from interpreting the data (Klein & Myers, 1999). The findings of the study, therefore, limit the ability to generalise across contexts because the researcher’s interpretative tradition does not discuss predictive power.

Third, the use of the boundary object theory as the theoretical lens narrows the study's perspectives. The findings, therefore, are strictly confined to the boundary object theory. Its usefulness in a developing country like Ghana is limited because of poor digital address system and Internet outages for real-time users’ actions, interactions, and transactions across boundaries.

Fourth, the research limitation associated with access to interview participants. As explained in the methodology (Chapter 4), this issue affected the researcher from interviewing some sample participants and those who agreed but could not participate during the interview periods.

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Fifth, the limitation of interpreting the findings based on the empirical investigations from multiple informants and archival documents (O’hEocha et al., 2012), which might affect the interpretations. Also, this study is limited in terms of its use of a single developing country.

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This issue limits the study to do a comparative analysis of similar scenario in other African countries.

Finally, this study is limited to IS literature. While this is a limitation, the study focuses more on IS literature on ridesharing platform as it aims to contribute to that domain. Despite this focus, the researcher feels that the thesis has contributed to ridesharing platform literature in IS by integrating relevant literature from other disciplines.

8.7 Recommendations for Future Research

In future research, researchers should extend this study into other industries such as car rentals to examine the nature of digital competition and disruptive digitally-enabled service. There is a need to understand other actors' roles on ridesharing platforms from developing countries. In addition, future research can consider a comparative analysis of similar scenario in other African countries. Also, there is a need for future studies on other developing countries with different settings.

8.8 Chapter Summary

In summary, this study investigated how ridesharing platforms are used in Ghana, a developing country. In response to the research gaps in the literature, the thesis used the IS qualitative interpretive case study approach and the boundary object theory for the analysis to understand the use of ridesharing platforms in a developing country.

The contributions to theory, research, practice, and policy in this final chapter show the uniqueness of this study in the IS domain. For theory, the study extends the use of boundary object theory for studying a phenomenon involving a divergent group of users' actions, interactions, and transactions across boundaries. Despite the gaps identified in theory, its

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consideration for this study has made it possible to understand users' actions, interactions, and transactions across ridesharing platforms as well as user-local actions. For research, the study contributes to ridesharing platform literature. For practice, the study provides new insight into the use of ridesharing platforms, such as how drivers' and riders' profiles can assist security agencies to investigate post-trip activities or other businesses in case of taxi fraud. For policy, the study highlights lessons and guidelines for policymakers to streamline ridesharing platform companies. The thesis also provides implications of the study.

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INTEGRI PROCEDAMUS

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APPENDICES

Appendix A - Publications from the Study

Publication Type	Bibliographic Information
Scholarly Book Chapter	Simmons, R. O. (2020). Digital Innovation and Ridesharing in a Developing Country: The Case of Uru. In R. Boateng (Ed.), Handbook of Research on Managing Information Systems in Developing Economies (pp. 143–159). IGI Global.
Conference Papers	Simmons, R. O., Effah, J., & Boateng, R. (2019). Digital Innovation and Taxi Services: The Case of Uru in Ghana. *Proceedings of the 25th Americas Conference on Information Systems, 15-17 August 2019.* Simmons, R.O. (2018). Disruptive Digital Technology Services: The Case of Uber Car Ridesharing in Ghana. *Proceedings of the 24th Americas Conference on Information Systems, 16-18 August 2018.* Simmons, R. O. (2017). Disruptive Technologies: Car Ridesharing Services in Ghana. *International Science, Technology, Education, Arts, Management & Social Sciences (iSTEAMS), Cross-Border Multidisciplinary Conference Doctorial Consortium, 25-27 October 2017.*

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Appendix B - Summary of Research Questions and Findings

Questions	Findings	Implications
1)Why do actors use ridesharing platforms?	Drivers use ridesharing platforms because of the following goals: linkage, flexibility, traffic update, unrestrictedness, and security. Riders use ridesharing platforms because of the following goals: mobility, legitimacy, accountability, security, and convenience. Also, drivers and riders have personal goals for using ridesharing platforms. Some drivers occasionally pursue personal goals to maximise revenue illegally by accepting riders outside the platform and using their shared profile for post-trip business. Some riders pursue personal goals by absconding payments, endangering drivers, committing crime (stealing the vehicle), and lending or sharing their accounts. Comparably the personal goals of riders tend to be more undesirable since drivers are endangered and violent crime is sometimes committed.	The use of ridesharing platforms can provide real-time monitoring and controlling of drivers' and riders' information to mitigate taxi fraud. Ridesharing platforms can provide drivers with series of riders' requests to avoid roaming for passengers without a match. The platforms can provide service at preferred location and time and record for trip activities to attract more riders from competitors.
2) How do ridesharing platforms enable or constrain the realisation of actors' goals?	Ridesharing platforms enable drivers and riders to perform: 1) user-boundary actions – platform entry, platform utilisation, user identification, user set-up, and user rating; 2) user-boundary interactions – platform connection, users' update, pick-up interactions, and end trip interactions; and 3) user-boundary transactions – booking transaction, trip transaction, and service transaction. The platforms, on the other hand, constrain drivers and riders from achieving their goals, namely, registration, information and reversal, location, and complaint constraints.	The use of ridesharing platforms improves drivers' and riders' actions, interactions, and transactions for trip, which can affect the traditional taxi providers in competition. Ridesharing platforms components and features can strategically be used to improve drivers' and riders' trip activities.
3)What contextual factors influence actors' use of ridesharing platforms and the achievement of their goals?	Contextual factors that prevent drivers and riders from using ridesharing platforms in developing countries are internet outages, poor digital address system, lack of public phone charging systems and services, working condition, and car model. On other hand, innovations are coming up from drivers and riders due to the contextual factors. The innovations are drivers' and riders' interactions outside the boundary objects via text message and/or phone call for location identification, use of power bank to charge mobile phone battery rundown, multiple users across different ridesharing platforms, cars with tracking system and camera that can be stopped remotely when snatched by thieves.	In a developing country, there are Internet outages, poor digital address system, and lack of public phone charging systems and services. These constraints can affect the effectiveness of ridesharing platforms.

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Appendix C - Summary of Contributions to Knowledge

Research Gap/problem	Contribution	Existing Literature
	Contribution to Research	
The need to explain the goals of actors (drivers and riders) on ridesharing platforms.	This study contributes to ridesharing platform research in IS by providing insight into drivers' and riders' goals for using the platforms. In addition, the study provides insight into drivers' and riders' personal goals for using ridesharing platforms.	Extant studies on ridesharing platform overlook explaining the goals of actors on the platforms (see Basukie et al., 2020; Gupta et al., 2019b; Mäntymäki et al., 2019). These studies focus more on various research questions such as why ridesharing platforms have gained market (Stiglic et al., 2018; Wu et al., 2020), impacts on society (Guo et al., 2019; Mäntymäki et al., 2019), and governments concern to regulate their service (Li & Hou, 2019).
Previous ridesharing research also overlooks explaining the platform's contribution in drivers' and riders' pursuit and achievement of their goals.	This study contributes to ridesharing platform research in IS by providing insight into how the platforms enable or constrain drivers and riders in terms of actions, interactions, and transactions across boundaries to achieve their goals.	From a socio-technical perspective, the role of IT artefact cannot be ignored when explaining its use and impact (Orlikowski, 2001). Existing studies assume the platform's dormancy, suggesting an inactive role in platform activities. Meanwhile, actors converge on, and pursue their goals via the platform. The platform, thus exerts some influences which either enable or constrain the actors' operations. How the platforms enable or constrain actors' goals have been ignored by past research.
Extant research overlooks how contextual factors influence the use of ridesharing platforms.	The study contributes to ridesharing platform research in IS by providing insight into contextual factors that prevent drivers and riders from using the platforms in developing countries. The study also provides insight into innovation that are coming up from drivers and riders to overcome the contextual factors. The innovations are drivers' and riders' interactions outside the boundary objects for location identification, use of power bank, multiple users across different ridesharing platforms, and cars with tracking system and camera.	The focus of existing ridesharing platform research assumes that platforms and actors work in relative isolation from any contextual influences. For instance, Cheng et al. (2020) investigated how the sharing economy enabled ridesharing drivers' trust of passengers in China. Similarly, Thao et al. (2021) studied Switzerland preparations to integrate ridesharing with public transport in the rural areas. However, literature from developing economies in West Africa are yet to catch with studies addressing the contextual influences.

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Theory Gap/problem	Contribution	Existing Literature
Contribution to Theory		
Extant boundary object literature focuses more on the boundary actions and interactions with less attention on the user-boundary transactions.	The thesis extends the concepts of boundary object theory with "user-boundary transactions". This concept adds to the original four constructs, namely, boundary object, actors, actions, and interactions. The fifth "user-boundary transactions" concept shows a commercial agreement between users in an exchange of exchangeable services, rights or funds. The introduction of the concept, therefore, shows that when users are connected by ridesharing platforms, user-boundary transactions also occur in order to achieve their goals. The study also contextualises the original "actors" and "interactions" concepts to suit the use of ridesharing platforms in IS research as "users" and "user-boundary interactions", respectively. The contextualisation also includes original actions as user-local actions and user-boundary actions. This study also introduces ridesharing platform as a boundary object concept	The concepts of boundary object have been used in IS research to theorise users' interactions across boundaries (Oever, 2019; Spante, 2019; Stange et al., 2016) for a single organisation process (Chen et al., 2019; Hussenot, 2010; Khoo & Hall, 2013). Other IS research also focuses more on actions of the boundary object such as process involves electronic learning (Spante, 2019), human rights in Internet governance (Oever, 2019), and electronic identification card setting in a health-care (Hedström, 2016).
There is less research attention on the users' actions, interactions, transactions across boundaries for sharing of information with multiple organisations.	The study contributes to theory by providing insights into users' actions, interactions, and transactions across ridesharing platforms, banks, and telcos and not only on a single organisation. Thus, this study provides understanding on how users share information across multiple organisations. For the knowledge of the researcher, this study is the first to use the boundary object theory to understand users' actions, interactions, and transactions across multiple organisations while extant studies focus more on a single organisation.	Prior applications of boundary object theory focus more on users' interactions across boundaries for a single organisation process (Chen et al., 2019; Hussenot, 2010; Khoo & Hall, 2013).

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Contribution to Practice	
Literature Findings	**Contribution to Practice**
Drivers use ridesharing platforms because of the following goals: linkage, flexibility, traffic update, unrestrictedness, and security. Riders use ridesharing platforms because of the following goals: mobility, legitimacy, accountability, security, and convenience. Also, drivers and riders have personal goals for using ridesharing platforms. Some drivers pursue personal goals to maximise revenue illegally such as accepting riders outside the platform. Some of riders also pursue personal goals such as committing crime (stealing the vehicle). Comparably the personal goals of riders tend to be more undesirable since drivers are endangered and violent crime is sometimes committed.	The study contributes to practice by providing insight into how drivers' and riders' profiles can assist security agencies to investigate post-trip activities in case of taxi fraud taxi (Calo & Rosenblat, 2017; Mousavi et al., 2020). The study contributes to practice by providing insight into how digital management and control can help authorities to manage drivers' and riders' personal goals for using ridesharing platforms. Previous studies have been silent on these undesirable goals in the use of ridesharing platforms. Addressing these are critical especially in the context of developing countries where public transportation still remains a challenge and thus, ridesharing platforms are a necessary for both employment and public mobility. This may require a combined effort of law enforcement agencies (e.g., the Ghana Police) and other authorities (e.g., driver unions).
Ridesharing platforms enable drivers and riders to perform: 1) user-boundary actions – platform entry, platform utilisation, user identification, user set-up, and user rating; 2) user-boundary interactions – platform connection, users' update, pick-up interactions, and end trip interactions; and 3) user-boundary transactions – booking transaction, trip transaction, and service transaction. The platforms, on the other hand, constrain drivers and riders from achieving their goals, namely, registration, information and reversal, location, and complaint constraints.	The study provides insight into organisational openness via ICT-enabled, which allows drivers' and riders' actions, interactions, and transactions across ridesharing platforms. The study provides insight into e-payment of trip fare directly into ridesharing platform companies' account. Communications between ridesharing platform companies and other stakeholders such as banks and telcos can be strengthening in terms of standardised data formats to improve interface design.
Contextual factors that prevent drivers and riders from using ridesharing platforms in developing countries are internet outages, poor digital address system, lack of public phone charging systems and services, working condition, and car model. On other hand, innovations are coming up from drivers and riders due to the contextual factors. The innovations are drivers' and riders' interactions outside the boundary objects via text message and/or phone call for location identification, use of power bank to charge mobile phone battery rundown, multiple users across different ridesharing platforms, and cars with tracking system and camera that can be stopped remotely when snatched by thieves.	The study provides insight into contextual factors that prevent drivers and riders from using ridesharing platforms in developing countries. The negative consequences are Internet outages, poor digital address system, and lack of public phone charging system and services. The city authorities need to incorporate local system, such as Ghana post digital address system in the ridesharing platforms setup. This strategy can address the poor digital address system due to the limitation of Google map associated with ridesharing platforms. They also need to provide public phone charging systems and services to avoid riders' battery running out of strength and other measures to address the constraints.