Paper—Factors Affecting Consumers' Intention to Use Mobile Ride Hailing Services in Developing Countries

# Factors Affecting Consumers' Intention to Use Mobile Ride Hailing Services in Developing Countries

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Abstract-Sharing economy services are growing very quickly, including with successful implementations such as mobile ride hailing services, whereby consumers and drivers can coordinate to share rides. This research investigates factors that are affecting consumers' intention to use mobile ride hailing services in developing countries. The research data was collected in June 2021 from Jordanian consumers using an online questionnaire. The collected data was then analyzed to verify the research hypothesizes using Partial Least Squares Structural Equation Modeling (PLS-SEM). The empirical findings indicate that personalized benefits positively attract consumers to use mobile ride hailing applications. The findings also show that consumers' privacy concerns negatively affect consumers' intention to use mobile ride hailing applications. Moreover, the findings also show that the role of laws and regulations is significant in such contexts as it decreases the negative interaction between privacy concerns and consumers' intention to use ride hailing applications. Accordingly, this research suggests that ride hailing practitioners should focus on providing more convenient services and at the same time governments and policy makers should provide protective legislations to overcome user's privacy concerns.

Keywords-sharing economy, ride hailing, benefits, risks, regulations, Jordan

## 1 Introduction

Sharing economy describes an emerging phenomenon whereby technology is used as a mediator for sharing access to goods and services [1,2]. Advancements in ICT, especially in location-based mobile services, have enabled the move from traditional offline to online sharing [1,2]. The concept of sharing economy has evolved over the past decade, moving from sharing with family and friends to sharing with anyone, even with complete strangers [3]. Moreover, the business model of sharing economy platforms has also changed from non-profit to multibillion-dollar businesses, such as Uber and Airbnb [1,3,4]. The most recent and comprehensive definition of sharing economy is "a socioeconomic system that allows peers to grant temporary access to their underutilized physical and human assets through online platforms" [3]. Sharing economy services attract consumers, governments and service providers and create value for them by facilitating offline transactions to be carried online [1,2] Sharing economy services provide participants with peer-to-peer, rapid, temporary and dynamic access to services [3]. Participants are brought together based on their needs and their underutilized assets either physical assets (rooms or cars) or human assets (time and skills) [3,4].

One of the most successful implementations of sharing economy is mobile ride hailing services [3,5]. These prolifically utilized mobile applications provide a platform for both drivers and consumers to share rides [3]. Recently, mobile ride hailing services have usurped the role of traditional taxi services in the transportation sector [3,6]. Worldwide, the most popular ride hailing mobile application is Uber, while the most popular variant in the Middle East is Careem, which was recently bought by Uber [11]. From a consumer perspective, mobile ride hailing services are making their lives more convenient and efficient [5,7]. Consumers are attracted to these services as they offer better accessibility, flexibility, transparency, and relatively lower transaction fees [6,7,8]. However, consumers also have many concerns about the risks of using these services. As an emerging technology, ride hailing mobile application usage may involve safety, privacy, performance, and legal risks [2,7].

In Jordan, the public transportation sector is facing many challenges, the sector seems to be not a priority to governments, not receiving a significant fund and in general is not organized as it is managed by several authorities whereas no coordination is existed [9]. Transportation services are inefficient and ineffective, transaction costs are high, no information is available, and the services are not covering nor connecting all the country areas. Accordingly, citizens are becoming more reluctant to use public transportation services unless there are no other alternatives. These institutional voids are globally filled by the ride hailing services [10] and Jordan is not an exception, whereby several providers enter the market and start improving the transportation services in the country. Uber and its newly acquired Careem are the main ride hailing service providers in Jordan, providing convenient and high-quality transportation services [11]. However, there are still many concerns such as legal and social issues are facing ride hailing services in such a conservative community [12]. Although that consumers around the world are increasingly adopting these new technologies for their transportation needs, very few studies have examined the factors affecting the adoption of mobile ride hailing services in the developing countries [2,3]. The current research attempts to fill this knowledge gap by examining the factors affecting consumers' adoption of mobile ride hailing services in Jordan, a case study of a developing country. Privacy calculus theory was used in order to examine customers' motivating and inhibiting factors to adopt mobile ride hailing services. The research also examines the differences between females and males in their usage intentions and investigates the role of regulations on the consumers' intentions and interaction effects on privacy concerns.

This research is structured as follows. First, the next section describes the theoretical background and research model. Next, the research methodology is presented, along

with the results analysis. Finally, the results are discussed and used to derive the implications and conclusions of the study.

# 2 Literature review

Previous empirical research have largely focused on the factors affecting consumers' intention to participate in sharing economy activities. It has been found that factors like usefulness, ease of use, and social influence are attracting consumers to use mobile ride hailing services [5]. Other important factors that affect consumers' participation value in the ride hailing context are self-efficacy, functional value, and emotional value [6]. More motivations to participate in a peer-to-peer sharing were identified as economic interest, quality of life, and sustainability [7]. However, other research findings indicate that consumers' perceived risks negatively influence their intention to use mobile ride hailing services [7]. Privacy, performance, security, and conflict risks were all found to shape consumers' concerns about the use of mobile ride hailing services, which conditions their subsequent behavior and purchase intention [7]. The factors of risk and cost were found to be insignificant by some studies [6]. Moreover, unlike many e-services, ride hailing privacy concerns extend beyond information privacy to include physical, 'real-world' threats consumers may face, including physical attacks, harassment, and stalking [13,14,15,16,17].

Therefore, in order to understand the behavioral intention to use mobile ride hailing services in Jordan, privacy calculus theory has been adopted to study such phenomena. Given that using sharing economy platforms such as mobile ride hailing services often entails disclosing personal information [4,18], a key concern associated with information disclosure is privacy, which is defined as the ability to control personal information [19]. The privacy calculus theory is often used to explain consumer comparison of the benefits and risks of disclosing their sensitive information to service providers [20]. Privacy calculus theory has been widely used in information systems research contexts, such as e-commerce, marketing, and location-based services [21,22,23,24,25]. However, few empirical studies have employed privacy calculus theory specifically to analyze sharing economy phenomena, particularly in developing countries [2,55]. In the ride hailing context, location information is considered the main and the most critical privacy concern [56]. Accordingly, this research proposes that consumers' decisions to adopt mobile ride hailing services are determined by their trade-offs between perceived personalized services and their perceived privacy risks. In addition, other antecedents such as legislative protection and perceived prestige are also proposed to directly affect behavioral intention or interact with the privacy calculus constructs. The proposed research model is shown in Figure 1.

Consumers look for personalized products or services and are willing to disclose their personal information for utilitarian benefits [23,57,44]. From a business perspective, personalized services can increase customer satisfaction and loyalty, as well as profitability [58]. However, consumers have many concerns about potential privacy loss when their data is collected and used by service providers [13,44]. Personalization is defined as the ability to provide tailored products and services to consumers based on their preferences and personal information [57]. Service providers build consumer profiles based on information that consumers provide or which is acquired from consumer

behavior [46,59]. This definition has its effect in almost all online activities, starting from electronic commerce, electronic business, online marketing and location-based services [46,47,59,60,66]. In the context of mobile ride hailing services, personalization is closely tied to the quality (e.g., the accuracy, timeliness, and richness) of the offered service [47,54]. Mobile ride hailing services should provide services to consumers based on their situational context in terms of location, speed, and efficiency [47,54]. When this service is highly accurate, timely, and efficient, consumers are expected to be more inclined to use it [47,54,57].



Fig. 1. Research model

*Note:* UI: Usage intention, PR: Perceived risks, PS: Personalized services, LP: legislative protection, PP: Perceived prestige.

Based on that, the following research hypothesizes are proposed and discussed in depth in the subsequent paragraphs:

- H1: Perceived privacy risks negatively affect users' intention to use mobile ride hailing services.
- **H2:** Personalized services positively affect users' intention to use mobile ride hailing services.
- **H3:** Privacy legislations positively affect users' intention to use mobile ride hailing services.
- **H4:** Social prestige positively affects users' intention to use mobile ride hailing services.

Innovations in the sharing economy, like ride hailing services, bring positive outcomes to communities, particularly enhancements in transportation services [6,7]. Moreover, consumers are also expecting social rewards such as reputation from participating in online services and innovations [33,61]. As such, earlier research findings proved that social value has a positive impact on consumer's intention to use mobile ride hailing services [5,6,14]. Social influence represents the degree to which members' behavior in a social context influences their mutual behavior [5,6,62,63]. Social influence has a strong impact on individual's behavior, as it forms the net value of prestige, social approval, and social pressure [5,62]. As an antecedent to social value, firms' social prestige or image is shaped by consumers' perceptions regarding the quality of the offered goods or services [64]. Accordingly, consumers who perceive—whether from advertising or direct experience—that a firm is providing good quality products, they will be positively predisposed to that firm in general and will more readily believe that the firm will protect their privacy [65]. Such prestige can be considered as an important factor affecting consumer's intention to use products or services.

Compared to offline transactions, online transactions may expose consumers to more potential risks [25,26]. Based on previous literature, the common risk dimensions in the e-commerce context are performance, financial, social, psychological, and privacy risks [27]. In the case of online transactions, one of the most significant risks is data privacy and the consequences of unauthorized use or disclosure of personal data [14,28]. Sharing personal data online makes consumers vulnerable to potential privacy violations [14,28]. These risks make consumers more hesitant about the use of online transactions. With the emergence of online location-based services, more sensitive information is collected about consumers, hence increasing potential risks associated with service use [29]. For instance, with ride hailing applications, the most significant risks are legal, financial, physical, and privacy risks [6,30,31,32]. The perceived risk of ride hailing is defined as the uncertainty and potential for loss that consumers perceive when using ride hailing applications [7]. Due to its unique and emerging risks nature, ride hailing applications combine privacy risks with a wide range of real-time, physical location risks [21]. In the ride hailing context, perceived privacy risks reflect consumer privacy concerns regarding disclosure, violation, misuse, and damage of personal information by ride hailing service providers or malicious attackers [13,23,33,66].

Recently, in the sharing economy era, technological innovations like mobile ride hailing services have disrupted the traditional regulatory systems of service economies worldwide [34,35]. Regulation is considered the most significant barrier facing sharing economy firms [34,36]. Rideshare mobile applications are still not fully recognized by the legal systems in the USA and Europe and are forbidden in many jurisdictions, especially in developing countries [36,37]. Issues like licensing, taxation; insurance, safety, and information privacy are all involved in the difficulties of the ride hailing industry. Concerning data, there is a genuine concern about the protection and privacy of consumers' personal information [35,38,39]. Privacy legislation provides a balancing force between service providers' usage of consumers' data and their privacy concerns [20,40,41]. Consumers expect that privacy legislations will manage the collection, storage, and usage of their usage data, hence protecting it from the misuse and abuse by service providers or malicious attackers [20,42,43]. Additionally, government regulations often guide service providers' privacy policy and compel them to adhere to certain required practices [43,44,45]. As a result, consumers can be comfortable disclosing their personal information with services where privacy regulations are implemented (with the proviso that they are aware of applicable legislation and regulation) [46,47,48].

# 3 Research methodology

This study adopted the method of an online survey to collect data with which test the proposed hypotheses. The survey consists of two sections: the first section is demographics and the second one is measurement items using a five-point Likert scale ranging from

("1, strongly disagree" to "5, strongly agree"). The survey measurements were developed based on existing literature, first designed in the English language and then translated into the Arabic language (the mother language in Jordan). The Arabic version was back translated by an independent translator to ensure the authenticity of the translated version.

To test the model's basic validity and reliability, 30 university students and 5 academics were invited to answer a pilot paper-based survey and to give their feedback about the design and the questions of the survey. After that, the survey was distributed online in Jordan using Google Forms and through social networks, to collect about 400 answers. Only 10 responses were discarded, due to being considered incomplete, unengaged, or containing outliers. Table 1 shows demographic data of the respondents, including gender, age, and ride hailing service usage. The data show that 54% of respondents are males and 46% are females and more than 55% of them have used ride-share mobile applications. Moreover, the data also show that respondents aged between 18–30 years old are 49%, and 35% are aged between 31–40 which means that the majority of the sample are potential users of mobile ride hailing services.

		Frequency	Percentage %
Gender	Female	181	46
	Male	209	54
Age	18-30	191	49
	31-40	138	35
	41-50	42	11
	>=51	19	5
Usage	Yes	219	56
	No	171	44

Table 1. Demographic data

#### 4 **Results**

To test the research model, partial least squares structural equation modeling (PLS-SEM) was used. PLS-SEM was selected because it can handle small sample size data that is not normally distributed [49]. The data analysis process involved examining the measurement model before adopting the structural model.

Before examining the research hypotheses, testing was conducted for the model reliability and validity. Reliability testing verifies construct items' internal consistency using Cronbach's Alpha and Composite Reliability values, with a (0.7) threshold value [49]. As shown in Table 2, both values for all the model constructs are above the threshold value ( $\geq 0.7$ ). Validity tests (Convergent and Discriminant) are used to verify if the measurement items are effectively reflected in each corresponding construct [49]. Convergent validity is tested by Average Variance Extracted (AVE), with a (0.5) threshold value [49]. As shown in Table 2, all AVE values are above (0.5). Discriminant validity is tested using two metrics: Fornell-Larcker (FL) and HeteroTrait-MonoTrait ratio (HTMT) [49,50]. Firstly, Fornell and Larcker suggest that each construct's AVE value should be greater than its correlation with other constructs [49,68]. As shown in Table 3a, all diagonal correlation values are higher than other values for each column.

In addition, Henseler et al. proposed HeteroTrait-MonoTrait ratio (HTMT) of correlations with threshold a (0.85) value [50]. As shown in Table 3b, all HTMT values are below the threshold value.

Construct	Loadings	Cronbach's Alpha	Composite Reliability	(AVE)
Privacy Risks		0.872	0.873	0.696
PR1	0.754			
PR2	0.852			
PR3	0.857			
Legislative Protection		0.872	0.873	0.696
LP1	0.875			
LP2	0.845			
LP3	0.779			
Perceived Prestige		0.892	0.892	0.734
PP1	0.794			
PP2	0.861			
PP3	0.911			
Personalized Services		0.879	0.879	0.707
PS1	0.829			
PS2	0.836			
PS3	0.857			
Usage Intention		0.844	0.847	0.648
UI1	0.828			
UI2	0.748			
UI3	0.837			

Table 2. Reliability and convergent validity of constructs

#### Table 3. Discriminant validity

a. Cross-loadings						
	LP	PP	PR	PS	UI	
LP	0.834					
PP	0.318	0.857				
PR	-0.279	-0.08	0.822			
PS	0.457	0.629	-0.19	0.841		
UI	0.502	0.591	-0.417	0.792	0.805	
		b. HTM	AT values			
	LP	РР	PR	PS	UI	
PP	0.319					
PR	0.279	0.078				
PS	0.459	0.628	0.19			
UI	0.504	0.591	0.426	0.79		

Having established a reliable and valid model, the next step is to test the model against multicollinearity issues among the constructs, prior to testing the model's statistical power and the research model hypotheses. Collinearity issues occur with Variance Inflation (VIF) values above 5 [51]. As shown in Table 4, VIF values for all constructs' items are less than 5, indicating that no multicollinearity issues were found. After that, the coefficient of determination (R2) is used to assess the model's explanatory power. The analysis shows that R2 value for the endogenous construct is (0.7). This indicates that the model can be considered to have moderate explanatory power. Consequently, to test the research model hypotheses, a consistent and complete bootstrapping procedure was employed with 5000 samples. The results of the path coefficients are shown in Table 5. All path coefficients were significant, and their corresponding hypotheses were accepted. Accordingly, it can be notice that personalization benefits have a significant positive impact on usage intention ( $\beta = 0.588$ ; p < 0.05), thus H1 is supported. However, privacy risks have a significant negative impact on usage intention ( $\beta = -0.261$ ; p < 0.05), thus H2 is supported. Moreover, both legislative protection and prestige perceptions have significant positive impacts on usage intention ( $\beta = 0.108$ ; p < 0.05)  $(\beta = 0.166; p < 0.05)$ , therefore H3.1 and H4 are supported.

Item	VIF	Item	VIF
LP1	2.354	PR3	2.522
LP2	2.523	PS1	2.234
LP3	2.163	PS2	2.574
PP1	2.606	PS3	2.504
PP2	3.356	UI1	2.569
PP3	2.432	UI2	1.617
PR1	1.847	UI3	2.822
PR2	2.506		

Table 5. Measurement model

Hypothesis	Original Sample (β)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics ( O/STDEV )	P Values	
LP -> UI	0.108	0.108	0.049	2.215	0.027	Accepted
PP -> UI	0.166	0.166	0.065	2.541	0.011	Accepted
PR -> UI	-0.261	-0.261	0.046	5.615	0	Accepted
PSE -> UI	0.588	0.59	0.066	8.862	0	Accepted

Previous research results indicated that there is a moderating effect of users' legislative protection perceptions on the relationship between perceived risks and user intention [2]. Therefore, the product-indicator approach was used to test the interaction effects [51]. The results of this calculation process showed that the moderating effect of legislative protection is significant, therefore H3.2 is supported (t = 2.251, p < 0.05) (Table 6). This means that legislative protection perceptions help in damping the negative relation between privacy risks and usage intention (Figure 2).



Fig. 2. Moderation effect

The research sample comprised 181 females and 209 males. To compare between them upon the research model, multi-group analysis (PLS-MGA) was used. The results show that there are no significant differences between the two groups over all the paths except for the path between legislative protection and behavioral intention, as shown in Table 6. The results show that the path between legislative protection and behavioral intention is not significant for males (t = 1.044, p < 0.05) while it is significant for females (t = 3.828, p < 0.05), and this difference is found to be significant (t = 2.231, p < 0.05) (Table 7).

	Path Coefficients				STDEV	
	Original (F)	Original (M)	Mean (F)	Mean (M)	(F)	(M)
LP -> UI	0.228	0.054	0.227	0.057	0.06	0.051
PP -> UI	0.166	0.203	0.17	0.203	0.067	0.064
PR -> UI	-0.211	-0.241	-0.213	-0.242	0.057	0.05
PSE -> UI	0.457	0.511	0.453	0.511	0.071	0.066
		t-Valu	ie	•		
	(F)	(M)	(F)	(M)		
LP -> UI	3.828	1.044	0	0.297		
PP -> UI	2.463	3.173	0.014	0.002		
PR -> UI	3.71	4.871	0	0		
PSE -> UI	6.442	7.743	0	0		

Table 6. Parametric test MGA

Table 7. Bootstrapping MGA

	Path Coefficients-Diff	t-Value	p-Value
	(  F-M  )	(F vs M)	(F vs M)
LP -> UI	0.174	2.231	0.026

## 5 Discussion

Sharing economy services may help to tackle many development obstacles in the developing countries such as high unemployment rates, market informality and low female participation [52]. Yet, many challenges persist, like cultural concerns, weak regulatory systems, ICT literacy, limited access to technologies like the internet and smartphones [52]. This research studied the factors influencing consumers' intention to use mobile ride hailing services in the context of a developing country, specifically Jordan. Mobile ride hailing services bring many transportation benefits for passengers, traffic services, and society in general. However, there are still many challenges facing consumers, government, and service providers to optimize the services offered. This research mainly examines consumers' trade-offs between perceived privacy risks and perceived personalized services of using mobile ride hailing services. Moreover, it analyses the interactions involved in the personalization-privacy paradox, and other important factors like legislative protection and perceived social prestige.

The findings show that personalized benefits significantly and positively affected consumers' intention to use mobile ride hailing applications, while privacy concerns significantly and negatively affected their intention to use these applications. These findings indicate that, although consumers are having concerns about using ride hailing services, they prefer to use them due to their perceived benefits. Accordingly, consumers are willing to disclose their location information on ride hailing platforms for their personalization benefits, which outweighs their perceived privacy risks. One plausible explanation for this is that, despite mobile ride hailing services are extending online services with entirely new physical privacy risks, they still essentially offer what amounts to a traditional taxi service. In both online and traditional taxi services for their personalized services. Furthermore, no gender difference was found between females and males in terms of their perceptions toward the personalization-privacy paradox of mobile ride hailing services. These findings are consistent with prior literature findings on the sharing economy and location-based service acceptance [7,18,30,39].

The findings also show that the effectiveness of privacy legislations significantly and positively affected consumers' intention to use mobile ride hailing services. This indicates that the effectiveness of privacy legislations encouraged consumers to use ride hailing mobile application services and this also affirmed by previous research findings [2,48,53]. In addition, the findings also show that this effectiveness helps in damping the negative relationship between privacy risks and usage intention of mobile ride hailing services. Furthermore, these findings pertain only to females, and male responses were not significant in this regard. This can be explained as females being more concerned than males about their privacy in general, and particularly their location privacy.

Finally, it was found that social image and prestige significantly and positively affected consumers' intention to adopt mobile ride hailing services. These findings are supported by previous research findings [7,54]. This indicates that consumers look for social rewards and reputation from participating in mobile ride hailing services. Participating in such sharing services may foster collaboration and create value for the community making participants more self-satisfied [67]. Although it was expected that female respondents in Arab countries would be more concerned about their social image when using mobile ride hailing services, it was found that both females and males are socially positive toward using these services.

#### 6 Implications

The main theoretical implication of this study is the role of legislative protection as a moderator between users' perceived privacy risks and their intention to use mobile ride hailing services. Practically, this research has also several important implications for both mobile ride-sharing service providers and policy makers in the developing countries. Firstly, sharing economy practitioners should work together to provide high-quality ride hailing services to users in terms of technology awareness and literacy, internet speed, online payment and application usability. Moreover, service providers should provide more convenient services and promote their services to attract more customers. Secondly, practitioners should not neglect users concerns regarding their privacy, though, the relationship among them should be based on trust and transparency. Service providers are ought to invest more in data protection mechanisms, work more on their privacy policies and should design their services based on consumers' privacy preferences. Therefore, service providers should enhance their privacy protection mechanisms and policy makers should work on providing laws and regulations governing the different aspects of using mobile ride hailing services. At the same time, governments in developing countries can benefit from technological innovations to overcome their development obstacles mainly in the public transportation sector. Accordingly, many recommendations are suggested for governments and policy makers, they should invest more in building the appropriate technological infrastructure and the institutional framework governing public transportation should be restructured to suit mobile ride hailing technologies. Governments and service providers should also embed the best practices related legislation to convince consumers to use mobile ride hailing services. Moreover, workshops and campaigns should be held to understand consumers' privacy perceptions and to increase their awareness of legislation, particularly legislative protection of their data in e-services in general.

#### 7 Limitations and future research

This research has some limitations that could be used to guide future research. First, the study sample is from a single country, Jordan, therefore the results may not be generalizable to other countries or cultures. Second, the study focuses on the ride hailing sector, while other sharing platforms like those in the tourism sector remain to be tested.

Third, the study is exploratory and quantitative, addressing the personalization-privacy paradox. Therefore, more comprehensive studies are needed on users' actual behavior and continuous intention to use, as well as the different aspects of privacy like social concerns. Fourth, the most challenging concern is legislation; hence, further qualitative studies need to be carried out to understand the perspectives of governments and service providers and how their role affects consumers' intention and actual use and trust of ride hailing services. Finally, more research should focus on the impact of using ride hailing apps on the developing countries' economies.

#### 8 Conclusion

The aim of this research was to investigate the factors affecting Jordanian consumers' intention to use mobile ride hailing services. This research has adopted the privacy calculus theory as a base model and extended it with both social prestige and legislative protection factors. In order to test the research hypothesizes, an online questionnaire was distributed among Jordanian consumers and then the collected data were analyzed using partial least squares structural equation modeling (PLS-SEM). The research findings indicated that users are willing to use mobile ride hailing services for their tremendous benefits regardless of their potential risks. Moreover, the findings also indicated that privacy regulations are dampening the negative interaction between consumers' privacy concerns and their usage intention for ride hailing services as well as not neglecting privacy protection mechanisms. Furthermore, governments are recommended to get benefited from such innovations and to work with service providers on the laws and regulations that protect users' privacy.

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