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Exploring post-usage behaviour in app-based ride-sourcing services: Evidence from Egypt

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ABSTRACT

Despite numerous studies focusing on ride-sourcing services, most have concentrated on users' pre-usage behaviour. This study explores users' post-usage behaviour, aiming to identify significant factors affecting existing users' intentions to continue using app-based ride-sourcing services in Egypt. Integrating the Expectation-Confirmation Model (ECM), the Technology Acceptance Model (TAM), and the Technology Readiness Model (TRM), this research identifies key determinants influencing users' perceptions and continued usage intentions. An online questionnaire collected empirical data from 381 respondents, analysed using partial least squares structural equation modelling (PLS-SEM). The results highlight the essential roles of optimism, innovativeness, discomfort, and insecurity in shaping users' perceptions of ride-sourcing apps' usefulness. Additionally, perceived ease of use is determined by innovativeness and discomfort. Furthermore, users' continuance usage intention is significantly associated with satisfaction level, perceived usefulness, and perceived ease of use. This study's findings offer valuable insights for service providers, aiding their understanding of variables influencing users' decisions to continue using ride-sourcing apps and enabling them to retain and satisfy their current users effectively.

1. Introduction

Over the past decade, the sharing economy has been recognised as one of the most rapidly expanding business models, attracting global interest from academics, practitioners, decision-makers, and individuals alike (Li et al., 2024; Yuan et al., 2024). In contrast to traditional asset-owning business models, the sharing economy signifies a significant shift in how resources are accessed and utilised. It is based on the principle of temporary access or the right to use idle or surplus assets, promoting access over ownership (Alatawi et al., 2024; Idug et al., 2023).

Despite the expansion of the sharing economy, it remains a complex concept lacking a concrete definition (Alatawi et al., 2024; Elnadi and Gheith, 2022; Xingjun et al., 2024). According to Gerwe and Silva (2020), it can be defined as "a socioeconomic system that allows peers to grant temporary access to their underutilised physical and human assets through online platforms with both fee-based and non-fee-based transactions".

The total worldwide revenues from the sharing economy are predicted to increase from $15 billion in 2014 to reach $335 billion by 2025 (Alatawi et al., 2024; Li et al., 2024; Yuan et al., 2024). This rapid growth of sharing economy business models is expected to be particularly beneficial for emerging markets (Alatawi et al., 2024). The sharing economy model has become a global phenomenon, impacting and transforming how services are accessed in various industries including transportation, hospitality, and entertainment and more (Xingjun et al., 2024).

Shared mobility is a type of sharing economy that has gained significant importance and expanded around the world in the last few years. The popularity of shared mobility is due to the rapid advancement in information and communication technologies, as well as changes in individuals' lifestyles (Arora et al., 2021; Castellanos et al., 2021; da Silva et al., 2023; Li et al., 2023; Machado et al., 2018). While many researchers have been interested in the concept of shared mobility, it is worth noticing that there is no precise and commonly accepted definition for shared mobility (Castellanos et al., 2021). For example, shared mobility has been defined as "the shared use of a vehicle, bicycle, or other modes" (Shaheen et al., 2015). Additionally, it is considered "an

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innovative transportation strategy that enables users to have short-term access to a mode of transportation when required" (Machado et al., 2018).

Shared mobility is a broad concept that includes many forms such as "carsharing", "ridesharing", "carpooling", "vanpooling", "on-demand ride services", "ride-hailing", "transportation network companies (TNCs)", and "ride-splitting" (Chen et al., 2021; Jie et al., 2021; Machado et al., 2018; Nguyen-Phuoc et al., 2022; Xu et al., 2023). These concepts are sometimes used interchangeably and appear to overlap.

Table 1 categorises and defines various forms of shared mobility to provide a clear and comprehensive understanding of the different concepts within this domain. The table is organised into broader concept groups, including carsharing, ridesharing, on-demand ride services, and Transportation Network Companies (TNCs). Each group encompasses specific types, such as carpooling and vanpooling under ridesharing, and ride-hailing and ride-splitting under on-demand ride services. The focus of this study will be on ride-sourcing services, which are described as "services that use online-enabled platforms (web applications) to connect between passengers and local drivers who are using their vehicles for commercial purposes" (Su et al., 2021).

In recent years, ride-sourcing services have rapidly become a common means of transportation and have become increasingly prevalent in many nations worldwide (Li et al., 2023; Tu et al., 2019). Approximately 692.9 million people are anticipated to use ride-sourcing services by 2023, and the market for these services is expected to grow by $47 billion between 2020 and 2024 (da Silva et al., 2023; Elnadi and Gheith, 2022; Loa et al., 2023).

Ride-sourcing is an efficient, adaptable, trustworthy, and cost-effective transportation option. It offers a convenient door-to-door experience, providing riders with all the information they need for a specific journey. This includes the approximate waiting time, vehicle location, license plate number, fare estimate, and driver information (name and rating). All these information are accessible through a simple-to-use app (Acheampong et al., 2020; Elnadi and Gheith, 2022; Javid et al., 2022; Nguyen and Ha, 2022; Rangel et al., 2021; Shah and Hisashi, 2022). Furthermore, ride-sourcing services enable users to avoid automobile ownership and traffic issues, particularly in crowded urban areas, as well as to avoid "driving under the influence (DUI)" or "driving while intoxicated (DWI)" (Almunawar et al., 2021; Elnadi and Gheith, 2022; Li et al., 2022; Najjar and Dahabiyeh, 2021).

The number of Transportation Network Companies (TNCs)—companies that provide ride-sourcing services—has increased dramatically in several countries (Loa et al., 2023). These TNCs merely serve as an intermediary that uses applications or an electronic platform to match drivers and potential passengers, and they bill passengers for each journey (Elnadi and Gheith, 2022; Hu et al., 2022; Li et al., 2023, 2022; Loa et al., 2023; Shah and Hisashi, 2022). Uber is a well-known example of a TNC that offers ride-sourcing services in the United States and many countries around the world. Other examples include "Didi Kuaidi (China), Ola (India), Yandex (Russia), Grab (Southeast Asia), Line taxi (Japan), GO-JEK (Indonesia), and Careem (various nations)" (Elnadi and Gheith, 2022; Hu et al., 2022; Javid et al., 2022; Li et al., 2023; Nguyen and Ha, 2022).

In Egypt, Uber dominates the ride-sourcing business with 90,000 drivers working in eight governorates (Elnadi and Gheith, 2022; Uber, 2022). Egypt is also one of the world's top ten markets for Uber (Elnadi and Gheith, 2022; Gaber and Elsamadicy, 2021). The ride-sourcing business in Egypt, which has a population of "102.5 million" and only 4 million ride-sourcing users, is expected to reach "$2.99 billion" by 2028 (Elnadi and Gheith, 2022; Hassanein, 2021). According to Elnadi and Gheith (2022), due to the attractiveness of the Egyptian market, two international TNCs, namely "Didi Kuaidi and inDriver", as well as two domestic TNCs, namely "Dubci and Wngo" intend to penetrate the ride-hailing market in the future. This growth potential is likely driven by factors such as internet penetration and Egypt's public transportation system.

Table 1
Classifications of shared mobility.

Concept group	Concept	Definition	Reference
Carsharing	Carsharing	"Carsharing services provide individuals with access to a fleet of shared-use vehicles without the costs and responsibilities of private vehicle ownership. Members of these services typically pay for subscription-access plans and are charged through hourly rates"	Nourinejad and Roorda (2014)
Ridesharing	Ridesharing	"An emerging mobility mode in which several people, whose travel routes and travel times are similar or partially overlapping, travel in the same car to share their journey and travel expenses (e.g., fuel costs, parking expenses, and tolls)"	Wang et al. (2019)
	Carpooling	"Carpooling is an informal form of ad hoc ridesharing. It involves the formation of impromptu carpools of typically three or more commuters per vehicle: one driver and two or more passengers"	Chen et al. (2021)
	Vanpooling	"Vanpooling consists of 7–15 passengers who share the cost of the van and operating expenses and may share the responsibility of driving"	Chen et al. (2021)
On-demand ride services	On-demand ride services	"On-demand ride services are innovative means for people to access transportation options using their smartphones readily and when required"	Machado et al. (2018)
	Ride-hailing or ride sourcing	"Services that use online-enabled platforms (web applications) to connect between passengers and local drivers who are using their personal vehicles for commercial purposes"	Su et al. (2021)
	Ride-splitting	"Ride-splitting is a variation of the ride-sourcing model, in which passengers with similar or overlapping routes split a fare and ride in a ride-sourcing vehicle"	Machado et al. (2018)
TNCs	Transportation Network Companies (TNCs)	"Transportation Network Companies (TNCs) provide prearranged transportation services for compensation using an online-enabled application or platform (such as smart phone apps) to connect drivers using their personal vehicles with passengers"	CPUC (2022)

Egypt's digital landscape is experiencing rapid growth. Recent statistics about the state of digital in Egypt show that the country has 82.01 million internet users, with an internet penetration rate of 72.2 % (Data Reportal, 2024). According to this report, internet users in Egypt increased by 1.3 million between January 2023 and January 2024. Additionally, there were 110.5 million active cellular mobile connections in Egypt in January 2024 (Data Reportal, 2024). These statistics demonstrate the extensive use of the internet and mobile technology throughout the country. This widespread adoption of mobile internet has facilitated the rapid growth of app-based services like ride-sourcing.

In the context of transportation, Egypt's public transportation options "public buses, minibuses (microbuses), traditional taxis, underground, and auto-rickshaws locally called tuk-tuks" especially in major cities like Cairo, struggle with many challenges including overcrowding, reliability issues, a high rate of road accidents, poor conditions, inadequate safety and security standards, and the risk of harassment (Christensen and Osman, 2021; Elnadi and Gheith, 2022; Rizk et al., 2018). These challenges have contributed to the growing popularity of ride-sourcing services as a convenient and efficient alternative to traditional modes of transportation.

While extensive research explores factors influencing initial adoption of ride-sourcing services, a critical gap exists – the intention-behaviour gap for existing users (Boateng et al., 2019; Elnadi and Gheith, 2022; Ofori et al., 2022). Previous studies have primarily focused on new users' pre-usage behaviour, examining factors affecting their decisions to accept or reject these services. However, initial user intentions may not always convert into consistent use. Users may later re-evaluate their initial positive perception and stop using the service, exemplifying the intention-behaviour gap (Elnadi and Gheith, 2022; Weng et al., 2017).

The intention-behaviour gap refers to the discrepancy between a person's stated intention to perform an action and their actual behaviour (Ajzen, 1991). In the context of ride-sourcing, this gap manifests when existing users, despite expressing satisfaction, do not translate that intention into frequent rides. This represents a gap between the user's overall positive perception of the service and their actual usage patterns (Nguyen and Ha, 2022; Ofori et al., 2022; Tumaku et al., 2023). Several factors can contribute to this gap, such as unmet expectations, negative experiences, technological barriers, service quality inconsistencies, safety and security concerns, economic factors, and habit formation (Akram et al., 2024; Boateng et al., 2019; Elnadi and Gheith, 2022; Gaber and Elsamadicy, 2021; Jing et al., 2021; Ma et al., 2019; Malik and Rao, 2019; Nguyen and Ha, 2022; Ofori et al., 2022; Sedighi et al., 2021; Siyal et al., 2021; Tumaku et al., 2023; Weng et al., 2017). These factors can negatively impact user satisfaction, leading to a disconnect between their initial positive intention and their actual reduced usage. Therefore, it is critical to investigate why an existing user's positive intention to continue using a ride-sourcing service might not always translate into consistent usage.

Furthermore, previous studies that have investigated users' intention to continue using ride-sourcing services have applied various models and theories such as "Technology Acceptance Model (TAM)", "Theory of Planned Behaviour (TPB)", "Theory of Reasoned Action (TRA)", "Unified Theory of Acceptance and Use of Technology (UTAUT)", and "Innovation diffusion theory (IDT)" or combinations of these models. While these models offer valuable insights, they may have limitations in fully explaining users' continued usage intention (Alsadoon, 2022; Bhattacherjee and Barfar, 2011; Chiu et al., 2020; Franque et al., 2021; Loh et al., 2022; Park, 2020; Prakash et al., 2021; Selim et al., 2022). In light of these limitations, the Expectation-Confirmation Model (ECM) introduced by Bhattacherjee (2001) has more explanatory power than other models in predicting the continued usage intention of IT products/services.

Additionally, most of the recent studies that have investigated ride-sourcing services' reuse intention were conducted in Asia, including Malaysia, Indonesia, China, Korea, India, Vietnam, and Pakistan. However, studies conducted in the Middle East, particularly in Egypt are few (Elnadi and Gheith, 2022).

Thus, the primary research aim of this study is to contribute to closing these gaps, by investigating the factors influencing Egyptian users' satisfaction with ride-sourcing apps and their intentions to reuse these apps. To achieve this, the study proposes an integrated model that incorporates constructs from the ECM (Bhattacherjee, 2001), the TAM (Davis, 1989), and the TRM (Parasuraman, 2000). This framework examines how perceived usefulness, perceived ease of use, and confirmation of expectations influence reuse intention, mediated by satisfaction. Additionally, the model explores how personality dimensions such as optimism, innovativeness, discomfort, and insecurity can impact perceived usefulness and ease of use in the context of ride-sourcing.

In this way, this study attempts to contribute to the existing ride-sourcing existing literature in the following ways. First, the study provides a review of previous ride-sourcing studies by analysing and identifying the significant determinants of continued use intention. Second, while most previous studies have explored factors influencing the initial adoption of ride-sourcing services, there remains a gap in understanding users' post-usage behaviour and reuse intentions. This gap is particularly evident in developing countries like Egypt, where the ride-sourcing market presents unique dynamics with significant growth potential. This study addresses this research gap by investigating factors influencing Egyptian users' satisfaction with ride-sourcing apps and their intentions to continue using them. Understanding these factors is crucial for Transportation Network Companies (TNCs) to enhance user retention, promote continued usage, and achieve long-term success. TNCs can implement targeted strategies to bridge existing users' intention-behaviour gap, including continuous improvement in service quality, building trust, enhancing user experience, improving usability, responding to changing user needs and preferences, and employing data-driven marketing efforts. Third, by integrating the ECM, TAM, and TRM, this research contributes to the advancement of theoretical frameworks in the ride-sourcing domain. it provides a comprehensive framework for understanding the factors influencing users' post-usage behaviour in the context of ride-sourcing services. Fourth, previous studies have not employed the TRM to examine how personality dimensions may affect users' intentions to continue using ride-sourcing services. Therefore, this study sheds light on the role of personality dimensions such as optimism, innovativeness, discomfort, and insecurity in the adoption of ride-sourcing apps. Finally, conducting the study in Egypt, a region with minimal research on continued use intention for ride-sourcing apps, provides valuable insights into user behaviour in a geographically under-investigated context. This expands the generalisability of existing knowledge about ride-sourcing services usage.

In summary, this study aims to contribute to the existing literature by providing insights into post-usage behaviour, integrating theoretical models (ECM, TAM, and TRM), exploring the Egyptian context, and considering the influence of personality dimensions (optimism, innovativeness, discomfort, and insecurity) on users' intentions to continue using ride-sourcing services. The remaining sections of the article are structured as follows. Following the introduction, Section 2 presents the literature review and the theoretical background. The development of the research model and hypotheses is covered in Section 3. After that, Section 4 presents the research methodology. Section 5 presents the data analysis. The research findings are then discussed in Section 6, followed by the study implications in Section 7. Finally, the conclusion and research limitations are included in Section 8.

2. Literature review and theoretical background

2.1. Ride-sourcing services

Ride-sourcing service can be considered as "a service that takes advantage of digital technologies (smartphone applications, web applications, Global Positioning System (GPS), network techniques, cashless

payment system, dynamic routing algorithm, and data analytics) to connect and match dedicated drivers (that use their private cars for commercial purposes in exchange for money) with riders requesting a ride in real-time" (Elnadi and Gheith, 2022). Several terminologies, including "ride-sourcing, app-based ride services, e-hailing apps, ride-booking, on-demand ride services, call-a-taxi applications, and taxi-hailing" (Elnadi and Gheith, 2022; Li et al., 2023, 2022; Nguyen-Phuoc et al., 2022; Nguyen and Ha, 2022), have been used to characterise these services in past studies.

In light of the continued widespread use of ride-sourcing services around the world, numerous researchers have attempted to examine factors affecting users' behaviour towards ride-sourcing services using a variety of theories and models (Elnadi and Gheith, 2022; Inan et al., 2022).

A literature review revealed that previous studies conducted to explore users' behaviour towards ride-sourcing services can be categorised into two groups. The first group focused on investigating potential users' pre-adoption behaviour. These studies examined the initial intention of prospective users to accept or reject these services (e.g., Acheampong et al., 2020; Almunawar et al., 2021; Arumugam et al., 2020; Goel and Haldar, 2020; Hu et al., 2022; Huynh et al., 2020; Inan et al., 2022; Javid et al., 2022; Lee and Wong, 2021; Lee and Chan, 2018; Min et al., 2019; Soares et al., 2020; Suhud et al., 2019). Although investigating potential users' intentions regarding ride-sourcing services is important, another group of researchers has shifted their focus to exploring existing users' post-adoption behaviour. They are interested in understanding the factors motivating existing users to continue using ride-sourcing services, rather than focusing solely on initial intentions.

According to this second group of researchers, exploring the continuance intention towards ride-sourcing services is critical. Some individuals who initially accept ride-sourcing services may not translate their intentions into actual behaviour and use the services, or they may discontinue using these services at a later stage if they do not experience the expected benefits (Elnadi and Gheith, 2022; Fauzi and Sheng, 2021; Nguyen and Ha, 2022; Weng et al., 2017). Additionally, these researchers argue that examining motivational factors that encourage the prolonged usage of ride-sourcing services is vital for service providers to enhance and improve their services and retain their existing users. To establish a comprehensive understanding of factors influencing continued use of ride-sourcing services, it is crucial to examine the existing research landscape. Numerous studies have explored this topic, employing different theoretical models. Table 2 systematically organises the literature, categorising studies by theoretical models, determinants, and contexts, thereby offering a comprehensive overview of existing research.

The literature review reveals the following. First, while most previous ride-sourcing studies have focused on potential users' pre-usage behaviour, research on post-usage behaviour, particularly users' continued intention to keep using these services, remains scarce (Boateng et al., 2019; Elnadi and Gheith, 2022; Malik and Rao, 2019; Nguyen and Ha, 2022; Ofori et al., 2022). Second, While robust theories and models like TAM, TPB, TRA, UTAUT, and DIT, along with other theories, have been widely applied to examine users' continued usage intention of ride-sourcing services (e.g., Gaber and Elsamadicy, 2021; Jing et al., 2021; Joia and Altieri, 2018; Ofori et al., 2022; Sedighi et al., 2021; Siyal et al., 2021), some researchers argue these models have limitations (e.g., Bhattacherjee and Barfar, 2011; Chiu et al., 2020; Franque et al., 2021; Khan et al., 2023; Park, 2020; Prakash et al., 2021; Rekha et al., 2023; Selim et al., 2022). Given these limitations, the ECM offers distinct advantages in the context of this research on ride-sourcing continuance intention.

Unlike TAM, TPB, TRA and UTAUT, which primarily focus on users' initial acceptance and use of ride-sourcing services (pre-adoption decision), the ECM goes beyond that by capturing users' post-usage experiences and their impact on continuance intention (Lee et al., 2023). This makes the ECM a well-suited framework for investigating factors

Table 2
Summary of previous studies on users' continued usage intentions towards ride-sourcing services.

Author(s)	Theoretical model(s)	Determinants	Context of the study
Akram et al. (2024)	MTAM	Mobile usefulness, mobile ease of use, utilitarian value, hedonic value, and attitude	India
Aw et al. (2019)	Means-end chain theory	Perceived innovativeness, perceived personalisation, perceived usefulness of rating system, service personal values, perceived value, trust	Malaysia
Bhatt et al. (2024)	TRA	Utilitarian value, hedonic value, and attitude	India
Boateng et al. (2019)	Social exchange theory	Consumer need for prestige, trust, social connection, consumer return on investment, search convenience	Ghana
Elnadi and Gheith (2022)	TAM and IDT	Perceived usefulness, perceived ease of use, social influence, perceived risk, perceived enjoyment, compatibility, observability, interactivity, personal innovativeness, and environmental awareness.	Egypt
Fauzi and Sheng (2021)	Information technology Continuance intention model	Personal innovativeness, perceived utilitarian value, perceived hedonic value.	Indonesia
Gaber and Elsamadicy (2021)	UTAUT	Performance expectancy, effort expectancy, social influence, facilitating conditions, economic benefits, perceived infectability, fear of COVID-19.	Egypt
Jing et al. (2021)	TAM and TPB	Attitude, perceived usefulness, perceived ease of use, trust, security risk, perceived security, subjective norms, perceived behaviour control, perceived knowledge, government credibility	China
Joia and Altieri (2018)	TAM, IDT, TRA and TPB	Subjective norms, perceived usefulness, perceived ease of use, complexity, compatibility, relative advantage, trust, user satisfaction	Brazil
Lee et al. (2019)	Value theory	Perceived informativeness, monetary value, relative attractiveness, reassurance, interactivity	Korea
Ma et al. (2019)	Risk to Trust Unidirectional Model	Functional risk, time risk, physical risk, financial risk, psychological risk, trust in drivers, trust in platform, attitude towards platform	China
Malik and Rao (2019)	TAM and ECM	Perceived usefulness, perceived ease of use, confirmation, perceived value, self-efficacy, satisfaction	India
Nguyen and Ha (2022)	TPB and Technology continuance theory	Perceived compatibility, self-efficacy, subjective norm, behavioural adaption, and satisfaction	Vietnam
Ofori et al. (2022)	Value theory	Hedonic value, economic value, satisfaction	Ghana

(continued on next page)

Table 2 (*continued*)

Author(s)	Theoretical model(s)	Determinants	Context of the study
Sedighi et al. (2021)	TAM, IDT	Relative advantage, compatibility, complexity, observability, perceived usefulness, perceived ease of use, social norms, trust	Iran
Shao et al. (2022)	Justice theory	Perceived distributive justice, perceived procedural justice, perceived interactional justice, trust, perceived risk, and perceived benefit	China
Siyal et al. (2021)	UTAUT	Performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation	Pakistan
Tumaku et al. (2023)	Value theory and trust model	Hedonic value, utilitarian value, trust in platform, trust in driver, and satisfaction	China
Weng et al. (2017)	Technology continuance theory	Perceived usefulness, perceived ease of use, perceived risk, subjective norms, confirmation, satisfaction, attitude	Malaysia

influencing users' decisions to continue using ride-sourcing services.

One of the ECM's main advantages is its ability to analyse post-adoption behaviour more dynamically. While TAM, TPB, and UTAUT focus on pre-adoption decisions, the ECM emphasises that users' perceptions and expectations may change over time (Ashfaq et al., 2023; Cheng, 2023). This allows for a more detailed understanding of how users' experiences after initial adoption (confirmation/disconfirmation of expectations) influence their decision to continue using ride-sourcing services. Deviations from expectations can significantly impact user behaviour, highlighting the importance of considering post-usage experiences. Furthermore, the ECM integrates users' satisfaction level, a critical factor in ride-sourcing continuance intention, alongside perceived usefulness and ease of use. By considering these factors, the ECM provides a more holistic view of users' post-usage behaviour.

Previous studies (Alsadoon, 2022; Ashfaq et al., 2023; Bhattacherjee and Barfar, 2011; Cheng, 2023; Chiu et al., 2020; Franque et al., 2021; Loh et al., 2022; Park, 2020; Prakash et al., 2021; Selim et al., 2022) have demonstrated that the ECM can offer greater explanatory power than other models in predicting continuance usage intention for IT products/services. This makes it a particularly desirable choice for this research.

Finally, the ECM is a well-established framework with a broad application across various domains, including mobile and online shopping (Maduku and Thusi, 2023; Tam et al., 2022; Wu et al., 2020; Yu et al., 2023), e-learning (Al Amin et al., 2023b; Alsadoon, 2022; Cheng, 2021a; Chibisa and Mutambara, 2022; Dai et al., 2020; Huang, 2019; Rafique et al., 2021; Rekha et al., 2023; Youssef and Issam, 2022), mobile payment (Al-Sharafi et al., 2022; Jaiswal et al., 2022; Loh et al., 2022), internet banking (Rahi et al., 2021), *E*-health (Chiu et al., 2020; Shen et al., 2022; Wu et al., 2022), smart wearable devices (Pal et al., 2020; Park, 2020; Rabaa'i et al., 2022; Shen et al., 2018), travel and tourist (Liu et al., 2023; Tiwari and Mishra, 2023), and ride-hailing and ride-sharing (Arteaga-Sánchez et al., 2020; Jia et al., 2020; Malik and Rao, 2019; Nguyen and Ha, 2022; Si et al., 2022; Weng et al., 2017).

Third, most recent research investigating the continuance usage intention of ride-sourcing has been conducted in Asia, including Malaysia (Aw et al., 2019; Weng et al., 2017), Indonesia (Fauzi and Sheng, 2021), China (Jing et al., 2021; Ma et al., 2019), Korea (Lee et al., 2019), India (Malik and Rao, 2019), Vietnam (Nguyen-Phuoc et al., 2020; Nguyen and Ha, 2022), and Pakistan (Siyal et al., 2021). However, few studies have explored users' continuance intentions towards ride-sourcing services in Africa and the Middle East, particularly in Egypt. For instance, Boateng et al. (2019) and Ofori et al. (2022) investigated users' continued intention to use ride-sourcing services in Ghana, while Sedighi et al. (2021) explored continuance usage intention in Iran. Only two studies were conducted in Egypt by Gaber and Elsamadicy (2021) and Elnadi and Gheith (2022) to examine the continuance usage intention of ride-sourcing services.

Finally, no prior research has applied the TRM to examine how personality dimensions may affect consumers' intentions to continue using ride-sourcing services. Thus, the present study aims to determine the significant factors influencing existing users' continuance intentions to reuse ride-sourcing apps in Egypt by integrating three robust models: ECM, TAM, and TRM, as the theoretical foundation of this study.

2.2. Theoretical background

2.2.1. The Expectation-Confirmation Model (ECM)

The ECM is one of the generally acknowledged frameworks that has been implemented in IS research to investigate consumers' satisfaction and continued usage intention of IT products/services. The ECM accurately captures the process that IT products/services users go through to decide whether to continue to use IT products/services or not (Franque et al., 2021; Hsu and Chen, 2021; Jumaan et al., 2020; Pal et al., 2020; Selim et al., 2022). The ECM, developed by Bhattacherjee (2001), integrates the PU construct from the TAM (Davis et al., 1989) into the expectation-confirmation theory (ECT) (Oliver, 1980). According to the ECM, before using new technology, individuals form initial expectations about the performance of that technology. Individuals develop post-expectations about a technology's performance (perceived performance) after accepting it and using it for a while, based on their usage experience. Then, they compare their post-expectations (perceived performance) against their initial expectations to assess whether their initial expectations are confirmed or not. If their initial expectations are confirmed, then they will be satisfied with the new technology, leading to the continued usage of this technology and vice versa (Jumaan et al., 2020; Loh et al., 2022; Pal et al., 2020).

The four fundamental constructs of the ECM are the continuance use intention, users' satisfaction level, PU, and users' confirmation of expectations level. According to Bhattacherjee (2001), users' continuous intention to use IT products/services is determined by their satisfaction levels, followed by their PU of using IT products/services. Furthermore, users' satisfaction level is connected with their PU of IT products/services and their confirmation of expectations level. Finally, users' confirmation of expectations level is a key determinant of their perception of the usefulness of IT products/services (Al-Sharafi et al., 2022; Chiu et al., 2020; Prakash et al., 2021; Tam et al., 2020; Yousaf et al., 2021).

2.2.2. Technology Readiness Model (TRM)

Technology readiness (TR) reflects "people's propensity to embrace and use new technologies to accomplish goals in home life and at work" (Parasuraman, 2000). TR indicates the set of beliefs and the state of mind that individuals hold about technology. TR determines how inclined individuals are to accept and employ new technologies (Chen and Lin, 2018; Jin, 2020). Individuals' TR can be evaluated using the Technology Readiness Index (TRI), based on four main personality traits, namely optimism (a positive belief about technology), innovativeness (a propensity to experiment with new technology), discomfort (a feeling of not having control over technology), and insecurity (a belief in the possibility of negative outcomes from technology) (Parasuraman, 2000; Parasuraman and Colby, 2015).

Optimism and innovativeness, which are the driving forces behind technological readiness, inspire individuals to accept new technologies.

Conversely, discomfort and insecurity act as the barriers that prevent people from accepting new technologies.

Each of the TR personality dimensions is distinct and independent. Individuals have varying levels of each personality trait (Chen and Lin, 2018; Mishra et al., 2018). Additionally, TRI does not reflect an individual's capability in using technology but indicates an individual's beliefs and mental state towards technology (Parasuraman and Colby, 2015). The TR varies among individuals according to the varying combination of the four dimensions. In general, an individual with high scores of "optimism and innovativeness", and low scores of "discomfort and insecurity" will have a high overall TR and be more receptive to new technologies and willing to employ these technologies (Parasuraman, 2000). However, individuals with high TR scores do not necessarily embrace new technology (Jin, 2020; Parasuraman, 2000). Therefore, to explore how individuals' personality traits correlate with their technology acceptance, the "Technology Readiness and Acceptance Model (TRAM)" was introduced by Lin et al. (2007) by combining TR's four dimensions with TAM's PU and PEOU.

Previous research suggests that combining TR and TAM enhances the predictive power of both models. This integrated approach (TR and TAM) has been applied in various research domains, including mobile payment and digital banking (Balakrishnan and Shuib, 2021; Humbani and Wiese, 2019; Musyaffi et al., 2022; Rafdinal and Senalasari, 2021), education and m-learning (Alhasan et al., 2023; Amron et al., 2022; Kampa, 2023), health, fitness apps, and wearable devices (Aboelmaged et al., 2022; Chen and Lin, 2018; Chiu and Cho, 2021; Dash and Mohanty, 2023; Raman and Aashish, 2022), self-service technologies (Huy et al., 2019), virtual reality (Jeong and Kim, 2023; Seong and Hong, 2022; Wibisono et al., 2023), brand apps (Jin, 2020), and smart/e-shops (Chang and Chen, 2021; Mukerjee et al., 2019).

3. Research model and hypotheses development

3.1. Research model

This study aims to explore the factors influencing the continuous usage intention of app-based ride-sourcing services. To accomplish this aim, three well-known models—ECM, TAM, and TRM—have been used in this study, as presented in Fig. 1.

The ECM has been validated in previous studies in various IT contexts as a robust model to examine IT products/services users' post-adoption behaviour of IT products/services. It is applied to predict users' continued usage intentions based on their perceptions, including satisfaction, PU, and expectation of confirmation, developed after prolonged use of IT products/services. However, as the ECM is based only on three constructs, it may not consider other critical factors influencing users' continued usage intentions. Therefore, some researchers (e.g., Chibisa and Mutambara, 2022; Hong et al., 2006; Jumaan et al., 2020; Lee, 2010; Lin and Bhattacherjee, 2010; Tam et al., 2020; Wu et al., 2022) have suggested integrating other models into the ECM to develop a more comprehensive framework that can better predict continuance usage intention.

Accordingly, the current study integrates the PEOU construct derived from TAM into the original ECM. Some researchers (e.g., Chibisa and Mutambara, 2022; Chong, 2013; Hong et al., 2006; Malik and Rao, 2019; Park, 2020; Rafique et al., 2021; Tseng et al., 2022; Youssef and Issam, 2022) have integrated PEOU into the ECM to improve its explanatory power.

Although merging ECM and TAM provides a better understanding of users' post-adoption behaviour, users' personality dimensions are not addressed in both models. Therefore, besides integrating TAM into ECM, some researchers (e.g., de Melo Pereira et al., 2015; Hariguna et al., 2023; Humbani and Wiese, 2019; Tsai et al., 2020) have suggested integrating TRM into ECM. Hence, in this study, TRM is integrated with ECM and TAM to explain the continuous usage intention of ride-sourcing apps. It is expected that users with higher scores in "optimism and innovativeness" traits and lower scores in "discomfort and insecurity" traits will consider ride-sourcing apps more beneficial and easier to use, they will be more inclined to keep using ride-sourcing services.

3.2. Hypotheses development

3.2.1. Technology Readiness Model (TRM) constructs

3.2.1.1. Optimism. Optimism is one of the motivators in the TR model that drives individuals to accept new technology, reflecting positive beliefs towards technology. It is described as "a positive view of technology and a belief that it [technology] offers people increased control, flexibility, and efficiency in their lives" (Parasuraman and Colby, 2001). Optimistic individuals consider the positive aspects of new technology rather than the negative aspects and are more ready to employ new technology (Aboelmaged et al., 2022; Chen and Lin, 2018; Rafdinal and Senalasari, 2021; Seong and Hong, 2022).

Prior studies have demonstrated the significance of optimism on individuals' PU and PEOU of new technology in different domains. For example, Aboelmaged et al. (2022) and Chen and Lin (2018) revealed the significant positive effect of optimism on how individuals perceive the usefulness and ease of use of fitness apps. Similarly, Raman and Aashish (2022) confirmed these results in the domain of sports and fitness wearable devices, along with Seong and Hong (2022), who found that optimism had a strong effect on how the usefulness and ease of use of virtual reality sports games were assessed.

Additionally, similar findings were reported by Park et al. (2021), Van Huy et al. (2019), and Kim et al. (2019a). They demonstrated the positive impact of optimism on individuals' PU and PEOU of self-service technologies in fashion retail stores, hotels, and airports, respectively.

Moreover, individuals' perceptions of mobile payment apps' usefulness and ease of use were significantly predicted by their levels of

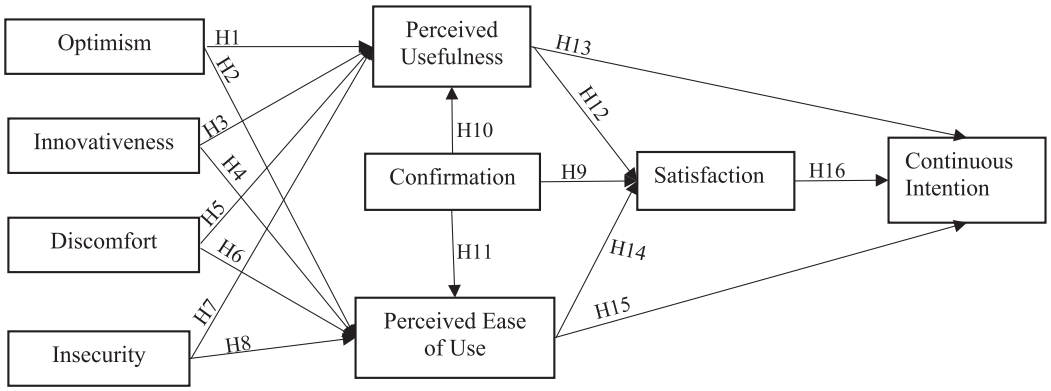

Fig. 1. Research model

optimism (Musyaffi et al., 2022; Rafdinal and Senalasari, 2021). Finally, a significant positive association between optimism and the perceived usefulness and ease of use has been documented by Alhasan et al. (2023), Amron et al. (2022), Kampa (2023), Wibisono et al. (2023), and Dash and Mohanty (2023). It could be argued that optimistic users will perceive ride-sourcing apps as more efficient and simpler to use. Thus, the following hypotheses were postulated:

H1. Optimism has a positive impact on users' perceived usefulness of ride-sourcing apps.

H2. Optimism has a positive impact on users' perceived ease of use of ride-sourcing apps.

3.2.1.2. Innovativeness. The second motivator in the TR model is innovativeness, reflecting individuals' tendency to embrace new technology and take a risk. Innovativeness is defined as "a tendency to be a technology pioneer and thought leader" (Parasuraman and Colby, 2001). Individuals with an innovative mindset are inclined to have favourable impressions of new technology and are more motivated to accept it than individuals with lower levels of personal innovativeness (Aboelmaged et al., 2022; Elnadi and Gheith, 2022; Leong et al., 2021; Rafdinal and Senalasari, 2021; Seong and Hong, 2022).

The importance of innovativeness in determining individuals' PU and PEOU of new technology has been reported in various research settings. For example, the positive effect of innovativeness on individuals' perceptions of the usefulness and ease of use of new technology has been documented by several researchers (e.g., Aboelmaged et al., 2022; Amron et al., 2022; Dash and Mohanty, 2023; Van Huy et al., 2019; Rafdinal and Senalasari, 2021; Raman and Aashish, 2022; Sun et al., 2020; Wibisono et al., 2023). They have shown that a high level of personal innovativeness is directly related to a high level of PU and PEOU.

Accordingly, it is expected that users with a high level of innovativeness are more likely to perceive ride-sourcing apps as more efficient and easier to use. Hence, this study posits the following hypotheses:

H3. Innovativeness has a positive impact on users' perceived usefulness of ride-sourcing apps.

H4. Innovativeness has a positive impact on users' perceived ease of use of ride-sourcing apps.

3.2.1.3. Discomfort. Discomfort refers to "a perceived lack of control over technology and a feeling of being overwhelmed by it" (Parasuraman and Colby, 2001). In the TR model, discomfort is one of the inhibitors restraining technology acceptance. It reflects an individual's inability to achieve a complete mastery of technology and manage technology-related functions (Aboelmaged et al., 2022; Balakrishnan and Shuib, 2021). High discomfort scores indicate that individuals may find new technology not beneficial for them and difficult to use (Chen and Lin, 2018; Kamble et al., 2019; Raman and Aashish, 2022).

Research findings (Aboelmaged et al., 2022; Alhasan et al., 2023; Buyle et al., 2018; Van Huy et al., 2019; Jeong and Kim, 2023; Martens et al., 2017; Musyaffi et al., 2022; Raman and Aashish, 2022; Walczuch et al., 2007) have confirmed the negative impact of discomfort on PU. Similarly, several former studies have suggested the negative association between discomfort and PEOU (e.g., Alhasan et al., 2023; Amron et al., 2022; Chen and Lin, 2018; Dash and Mohanty, 2023; Jeong and Kim, 2023; Kampa, 2023; Martens et al., 2017; Park et al., 2021; Rafdinal and Senalasari, 2021; Raman and Aashish, 2022; Walczuch et al., 2007).

In this study, it can be expected that users of ride-sourcing apps who experience a high level of discomfort will perceive these apps as less efficient and more difficult to use. Consequently, the following hypotheses were postulated:

H5. Discomfort has a negative impact on users' perceived usefulness of ride-sourcing apps.

H6. Discomfort has a negative impact on users' perceived ease of use of ride-sourcing apps.

3.2.1.4. Insecurity. Insecurity is one of the crucial inhibitors of technology adoption (Balakrishnan and Shuib, 2021). A person's level of insecurity reflects their mistrust of new technology and uncertainty about its intended functions and potential risks (Balakrishnan and Shuib, 2021; Chang and Chen, 2021).

Parasuraman and Colby (2001) defined insecurity as "a distrust of technology and skepticism about its ability to work properly." Therefore, individuals with higher insecurity scores tend to find technology complex and not beneficial for them. The negative influence of insecurity on individuals' PU and PEOU has been documented by several researchers (e.g., Aboelmaged et al., 2022; Dash and Mohanty, 2023; Jeong and Kim, 2023; Martens et al., 2017; Musyaffi et al., 2022; Rafdinal and Senalasari, 2021; Raman and Aashish, 2022; Walczuch et al., 2007; Wibisono et al., 2023).

In this study, it is suggested that users' feeling of insecurity while using ride-sourcing apps will lead to lower degrees of PU and PEOU, leading to the following two hypotheses:

H7. Insecurity has a negative impact on users' perceived usefulness of ride-sourcing apps.

H8. Insecurity has a negative impact on users' perceived ease of use of ride-sourcing apps.

3.2.2. Expectation-Confirmation Model (ECM) constructs

3.2.2.1. Confirmation. In the ECM, users' perception of the degree of consistency between the predicted performance of an IT product or service and the actual performance is referred to as confirmation (Bhattacherjee, 2001; Chiu et al., 2020; Loh et al., 2022). After using an IT product/service, users compare their initial expectations of its performance with the actual experience they have. The result of this comparison may be positive (confirmation of expectations) or negative (disconfirmation of expectations). Positive confirmation occurs when the actual performance of an IT product/service exceeds the expected performance. On the contrary, when the actual performance fails to meet to the expected performance, negative confirmation takes place (Franque et al., 2021; Hsu and Chen, 2021; Loh et al., 2022; Pal et al., 2020). Therefore, if an IT product/service meets users' pre-usage expectations, it creates a positive post-adoption belief about this IT product/service, and vice versa. In this study, confirmation indicates the extent to which users' initial expectations have been met after using ride-sourcing apps.

In the original ECM, users' PU and satisfaction level with IT products/services are determined by confirmation of expectations (Bhattacherjee, 2001). Confirmation of expectations has been demonstrated in numerous earlier studies to be an important factor in determining satisfaction and PU in various of contexts (e.g., Al-Sharafi et al., 2022; Al Amin et al., 2023b; Alsadoon, 2022; Chiu et al., 2020; Franque et al., 2021; Hariguna et al., 2023; Jumaan et al., 2020; Loh et al., 2022; Pal et al., 2020; Pereira and Tam, 2021; Prakash et al., 2021; Rafique et al., 2021; Rahi et al., 2021; Shen et al., 2022; Song, 2023; Tam et al., 2022; Wu et al., 2022; Youssef and Issam, 2022; Zhang et al., 2020). In previous studies on ride-hailing and ride-sharing services, the positive effect of confirmation of expectations on PU and satisfaction has also been demonstrated by Si et al. (2022), Malik and Rao (2019), and Weng et al. (2017).

Besides the crucial influence that confirmation has on predicting users' PU and satisfaction, another group of researchers (e.g., Chong, 2013; Hong et al., 2006; Lee, 2010; Park, 2020; Rafique et al., 2021; Timur et al., 2023), who have integrated PEOU into the ECM, emphasised the positive interrelationship between confirmation of expectations and PEOU. This significant relationship has also been demonstrated by Malik and Rao (2019) and Cheng (2021b) in the context of ride-sourcing services.

According to the preceding discussion, this study posits that if a ride-sourcing app meets users' expectations, this will create positive

confirmations that will directly boost users' PU and PEOU, as well as their satisfaction with the ride-sourcing app. Consequently, the subsequent hypotheses are put forth:

H9. Confirmation has a positive impact on users' satisfaction with ride-sourcing apps.

H10. Confirmation has a positive impact on users' perceived usefulness of ride-sourcing apps.

H11. Confirmation has a positive impact on users' perceived ease of use of ride-sourcing apps.

3.2.2.2. Perceived usefulness (PU). Another key construct in the ECM that has been adopted from TAM is PU. PU is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989). In the ECM, users' post-adoption expectations of IT products/services benefits are measured by PU (Prakash et al., 2021), and it is considered as "the baseline of reference against which the confirmation of the expectations is measured" (Pereira and Tam, 2021). PU is reported to have a direct impact on both users' satisfaction levels and continued usage intention (Bhattacherjee, 2001).

Former studies across different contexts have revealed the significant effect of PU on users' satisfaction and intention to continue using IT products/services (e.g., Al-Sharafi et al., 2022; Al Amin et al., 2023a; Alsadoon, 2022; Chibisa and Mutambara, 2022; Chiu et al., 2020; Jangir et al., 2023; Loh et al., 2022; Meng and Li, 2023; Pal et al., 2020; Park, 2020; Rahi et al., 2021; Shen et al., 2022; Tam et al., 2020; Zhang et al., 2020). Similarly, earlier ride-hailing and ride-sharing studies have supported the positive correlation between PU and users' satisfaction (e.g., Arumugam et al., 2020; Cheng, 2021b; Joia and Altieri, 2018; Malik and Rao, 2019; Nguyen-Phuoc et al., 2020; Si et al., 2022; Weng et al., 2017). Moreover, the significant impact of PU on users' continuous intention has been reported by many researchers (e.g., Cheng, 2021b; Gaber and Elsamadicy, 2021; Jing et al., 2021; Malik and Rao, 2019; Sedighi et al., 2021; Si et al., 2022; Weng et al., 2017).

PU, as used in this study, relates to how much users believe utilising ride-sourcing apps is favourable and fits their needs regarding trip quality, duration, and fees (Elnadi and Gheith, 2022). Users will be more satisfied and likely to continue using ride-sourcing apps if they can get additional benefits from doing so. As a result, the following hypotheses were developed:

H12. Users' perceived usefulness of ride-sourcing apps has a positive impact on their satisfaction.

H13. Users' perceived usefulness of ride-sourcing apps has a positive impact on their continuous usage intention.

3.2.2.3. Perceived ease of use (PEOU). PEOU is another TAM construct that cannot be ignored while investigating users' continuous intention to reuse IT products/services (Pereira and Tam, 2021). It is considered as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989).

In different research contexts, PEOU has been integrated into the ECM and shown to directly influence users' satisfaction and continued usage intention (e.g., Chibisa and Mutambara, 2022; Chong, 2013; Hong et al., 2006; Lee, 2010; Park, 2020; Rafique et al., 2021; Youssef and Issam, 2022).

In previous studies on ride-sourcing services (e.g., Arumugam et al., 2020; Cheng, 2021b; Malik and Rao, 2019), users' perceptions of ride-sourcing apps' ease of use positively affected their satisfaction with these apps. Additionally, the significant positive correlation between ride-sourcing apps' ease of use and users' continued usage intention has been confirmed by various researchers (e.g., Cheng, 2021b; Jing et al., 2021; Joia and Altieri, 2018; Malik and Rao, 2019; Sedighi et al., 2021).

In the current study, PEOU is defined as the degree to which a user thinks booking a ride using a ride-sourcing app is simple and convenient (Elnadi and Gheith, 2022). As a result, when users view a ride-sourcing app as simple to use and effortless, they are likely to be satisfied and intend to continue using it again. Therefore, this study hypothesises that:

H14. Users' perceived ease of use of ride-sourcing apps has a positive impact on their satisfaction.

H15. Users' perceived ease of use of ride-sourcing apps has a positive impact on their continuous usage intention.

3.2.2.4. Satisfaction. Satisfaction is the final variable in the ECM and the strongest indicator of users' continuance intention behaviour (Bhattacherjee, 2001). It reflects "a psychological or affective state related to and resulting from a cognitive appraisal of the expectation-performance discrepancy" (Cheng, 2021a).

According to the ECM, users who are satisfied with IT products/services are more inclined to continue using them. The significant effect of users' satisfaction on their intention to keep using IT products/services has been confirmed in a great number of earlier studies in various contexts (e.g., Al-Sharafi et al., 2022; Al Amin et al., 2023a; Alsadoon, 2022; Cheng, 2021a; Chibisa and Mutambara, 2022; Franque et al., 2021; Hsu and Chen, 2021; Jaiswal et al., 2022; Jangir et al., 2023; Loh et al., 2022; Meng and Li, 2023; Pal et al., 2020; Park, 2020; Pereira and Tam, 2021; Prakash et al., 2021; Rafique et al., 2021; Rahi et al., 2021; Selim et al., 2022; Shen et al., 2022; Tam et al., 2022, 2020; Wu et al., 2022). This positive correlation between satisfaction and continued use intention has also been documented in numerous studies on ride-sourcing services (e.g., Cheng, 2021b; Joia and Altieri, 2018; Malik and Rao, 2019; Nguyen-Phuoc et al., 2020; Nguyen and Ha, 2022; Ofori et al., 2022; Si et al., 2022; Weng et al., 2017). Ride-sourcing users need to be satisfied with the services to keep using ride-sourcing apps. Therefore, this study hypothesises that:

H16. Users' satisfaction with ride-sourcing apps has a positive impact on their continuous usage intention.

4. Research methodology

4.1. Data collection

To gather the necessary data for this study, the convenience sampling technique was employed. This technique is widely used by many researchers (e.g., Almunawar et al., 2021; Elnadi and Gheith, 2022; Goel and Haldar, 2020; Lee and Wong, 2021; Siyal et al., 2021; Su et al., 2021) in ride-sourcing previous studies. According to Lee and Wong (2021), convenience sampling is an affordable and less time-consuming technique that requires fewer rules to collect data. Additionally, the convenience sample technique is utilised because it is challenging to compile an inclusive list that accurately represents the total number of ride-sourcing services users in Egypt (Elnadi and Gheith, 2022; Gaber and Elsamadicy, 2021).

To gather the required data and test the assumptions, an online survey software, namely "QuestionPro", was used to create and launch the survey. Before collecting the main data, a pre-test of the initial questionnaire was conducted in two consecutive stages. The first stage includes evaluating the content and the clarity of the questionnaire via the feedback collected from three research professionals in the area of IS. In the second stage, the questionnaire was pilot-tested on 25 ride-sourcing app users to verify its validity, reliability, and wording.

Following these stages, the authors published the final survey link to their social media accounts, including "Facebook, LinkedIn, WhatsApp, and Telegram". Additionally, the survey link was shared with local Facebook groups in four main cities where Uber Egypt operates: "Cairo, Alexandria, Mansoura, and Zagazig". It is worth noting that Uber Egypt only operates in eight main cities and does not serve all of Egypt's cities (Elnadi and Gheith, 2022; Uber, 2022).

Before starting the survey, respondents were asked to answer a filter question to ensure their eligibility to participate in the study. Only current users with experience using ride-sourcing apps were allowed to

participate, and respondents without such experience were screened out. Eligible respondents were required to go through three primary sections in the survey.

A brief introduction regarding ride-sourcing services is included in the first section to ensure that each participant was aware of the aim of the study. The second section contained items related to the study constructs. Demographic information about respondents was gathered in the final section. A total of 483 responses were received; however, due to invalid or partial responses, only 381 of these responses were used in the final analysis, representing a 78.88 % response rate.

4.2. Respondents demographic profile

Table 3 summarises the demographic characteristics of the final sample. Females represent 58 % while males accounted for 42 % of the final sample. The majority of respondents are younger, representing 61.2 % of the sample. An associate degree or higher was acquired by the majority of respondents, representing around 81 % of the entire sample. More than half of the respondents were fully employed. The majority of the participants reside in Cairo (48 %), followed by Alexandria (29.7 %), while the rest reside in Mansoura (16 %), Zagazig (5.2 %), and other cities (1 %). A total of 166 respondents reported a monthly income of less than 4000 EGP. More than half of the respondents (61.2 %) have experience in using app-based ride-sourcing services for 1 to 3 years.

4.3. Measurement items

The measurement items used in this study were taken from previously validated studies to ensure content validity. As presented in Appendix A, the questionnaire contains nine constructs measured by 30 items in total. All the items were assessed using a "five-point Likert scale" ranging from "1 = *strongly disagree* to 5 = *strongly agree*". Items used for continuance intention, satisfaction, and confirmation of expectations were derived from Weng et al. (2017) and Malik and Rao (2019), originally developed by Bhattacherjee (2001). PU and PEOU were assessed with items modified from Lee and Wong (2021), originally developed by Davis (1989). Scales from Chiu and Cho (2021) and Ramírez-correa et al. (2019), originally developed by Parasuraman and Colby (2015), were used for assessing optimism, innovativeness, discomfort, and insecurity.

Table 3
Sample characteristics.

Variable		N	%
Gender	Male	160	*42 %*
	Female	221	*58 %*
Age – groups	18–25	131	*34.4*
	26–35	102	*26.8*
	36–45	103	*27.0*
	46–55	39	*10.2*
	56 or above	6	*1.6*
Education	No formal education	6	*1.6*
	High school	63	*16.5*
	Associate degree or certificate	208	*54.6*
	Bachelor's degree	50	*13.1*
	Master's degree or above	54	*14.2*
Employment Status	Employed	232	*60.9*
	Unemployed	34	*8.9*
	Student	113	*29.7*
	Retired	2	*0.5*
City	Cairo	183	*48*
	Alexandria	113	*29.7*
	Mansoura	61	*16*
	Zagazig	20	*5.2*
	Other cities	4	*1.0*
Monthly Income	Less than 4000 EGP	166	*43.6*
	4001–8000 EGP	54	*14.2*
	8001–12,000 EGP	46	*12.1*
	More than 12,000 EGP	55	*14.4*
	Prefer not to answer	60	*15.7*
Since when use of ride-sourcing apps	Less one year	38	*10*
	1–3 years	233	*61.2*
	More than 3 years	110	*28.9*
Frequency of using ride-sourcing apps	Occasionally used (multiple times a month)	31	*8.1*
	Often used (multiple times a week)	229	*60.1*
	Very frequently use (multiple times a day)	121	*31.8*

4.4. Common method bias

Two criteria have been used to assess the common method bias (CMB). Firstly, the single-factor test was used by applying the principal axis factoring without rotation (Harman, 1976). The results showed that the first factor accounts only for 20.57 % of the total variance, confirming that CMB will not affect data analysis. Secondly, the full collinearity approach (Kock, 2015) was employed, and no significant risk of CMB was found, as the highest VIF was 2.19 (below the 3.3 threshold), confirming the former result.

5. Data analysis

The study examined the proposed relationships by adopting the partial least squares structural equation modelling (PLS-SEM) approach as understanding the correlation between the research variables and their ability to predict outcomes is the objective of this study (Hair et al., 2016). Furthermore, PLS-SEM does not rely on the assumption of normal distribution and performs better with small sample sizes. Additionally, PLS-SEM has been commonly employed in IT acceptance and adoption in previous studies (e.g., Kim et al., 2018; Min et al., 2019). The following sections show the results of the measurement model and the structural model.

5.1. The measurement model

The statistical analysis began by assessing the reliability and convergent validity of the measurement model, as shown in Table 4. Following the recommendations of Hair et al. (2016) and Chin et al. (2008) that items with loadings above 0.6 should be retained in the model, it can be seen from the table that all indicators meet the recommended threshold except one item, INSC1, which has been deleted from the final model.

Regarding the constructs' reliability, all constructs have Cronbach's alpha values higher than 0.6 (Hair et al., 1998; Taber, 2018). Moreover, the composite reliability exceeds the suggested threshold of 0.7 for all the constructs. Finally, the AVE values of all indicators are above 0.5. Consequently, these results confirm the adequacy of the reliability and validity of the model.

Discriminant validity has been assessed using two criteria. First, as Forenell-Larcker suggests, the square root of Average Variance Extracted (AVE) should exceed the correlation of the construct with other constructs in the model. This requirement has been met, as shown in Table 5. Second, the Heterotrai-Monotrait Ratio (HTMT) was tested, which should be less than 0.85. As shown in Table 5, the values of HTMT range from 0.07 to 0.69 which is below the recommended threshold. Therefore, all the relevant criteria for testing the structural model have been fulfilled.

5.2. The structural model

The second step of the analysis involves the assessment of the structural model. First, the model fit was assessed using the standard root mean square residual (SRMR). The results demonstrate that the created structural model has a good fit with the gathered data, as the value of SRMR (0.046) was below the threshold value (0.10) proposed by Henseler et al. (2016). Moreover, the determination coefficient (R^2)

Table 4
Reliability and convergent validity results.

Construct	*Items*	*Loading*	*CR**	*Alpha*	*AVE*
Optimism (OPT)	OPT1	0.741	0.832	0.702	0.624
	OPT2	0.846			
	OPT3	0.779			
Innovation (INN)	INN1	0.773	0.828	0.694	0.617
	INN2	0.735			
	INN3	0.846			
Discomfort (DIS)	DIS1	0.861	0.903	0.838	0.757
	DIS2	0.923			
	DIS3	0.822			
Insecurity (INSC)	INSC2	0.724	0.836	0.665	0.722
	INSC3	0.959			
Perceived Ease of Use (PEOU)	PEOU1	0.782	0.847	0.759	0.582
	PEOU2	0.768			
	PEOU3	0.830			
	PEOU4	0.662			
Perceived Usefulness (PU)	PU1	0.827	0.856	0.774	0.600
	PU2	0.829			
	PU3	0.650			
	PU4	0.780			
Confirmation (CON)	CON1	0.923	0.805	0.710	0.587
	CON2	0.738			
	CON3	0.603			
Satisfaction (SAT)	SAT1	0.810	0.934	0.905	0.780
	SAT2	0.900			
	SAT3	0.912			
	SAT4	0.907			
Continuous Intention (CI)	CI1	0.918	0.925	0.878	0.804
	CI2	0.872			
	CI3	0.901			

* CR and other values have been computed after deleting items with low loadings.

was examined to determine the prediction strength of the suggested model, following the guidelines of Chin (1998), who proposed that values ranging from 0.19 to 0.67 are considered weak and substantial, respectively. As shown in Table 6, the values of R^2 exceed the minimum threshold, and the reuse intention is moderately explained and predicted by the proposed model (55.8 %), confirming that the predictive power of the model is satisfactory. These results are further supported by calculating the Q^2 of the dependent variables, which are greater than 0, as depicted in Table 6.

To test the proposed hypotheses, the bootstrapping method with 5000 resampling was applied. As shown in Table 6 and Fig. 2, the results showed that 13 of 16 hypotheses are supported. Optimism is significantly connected with PU, whereas it has an insignificant influence on PEOU. Therefore, H1 is supported, while H2 is rejected. Furthermore, the results confirmed that innovativeness has a significant positive impact on both PU and PEOU, supporting H3 and H4. Regarding the direct impact of discomfort on both PU and PEOU, the results confirm that discomfort negatively impacts both of them, supporting H5 and H6. Furthermore, insecurity was found to be inversely related to PU; however, the same was not significant concerning PEOU, leading to accepting H7 and rejecting H8. The findings also validate that confirmation is significantly related to PU, as well as PEOU, thereby supporting H10 and H11, respectively. However, confirmation has no significant effect on satisfaction, leading to rejecting H9. Moreover, satisfaction is significantly related to both PU and PEOU, which supports H12 and H14. Finally, the results confirm that continuance intention is significantly associated with PU, PEOU, and satisfaction, supporting H13, H14, and H15, respectively.

6. Discussion

This study aims to explore the factors influencing users' continuance intention to reuse app-based ride-sourcing services by developing a conceptual framework that integrates the ECM, TAM, and TRM. The findings of this study show that most of the hypothesised relationships were confirmed Out of a total of 16 tested hypotheses, 13 hypotheses were supported, and 3 were not.

Regarding the effect of the TRM constructs on PU, the study's results demonstrate that optimism and innovativeness have a significant positive influence on PU. Optimism, as a personal trait, reflects an individual's positive outlook and expectations regarding the outcomes of using new technologies. Optimistic users are more likely to perceive ride-sourcing apps as a valuable transportation option with several favourable outcomes compared to other available transportation options. They may consider these apps as convenient, cost-effective, and time saving mode of travel.

Similarly, innovativeness, characterised by a propensity to adopt new technologies and take risks, also contributes to users' perceived usefulness of ride-sourcing apps. Users with high levels of innovativeness are likely to appreciate the innovative features and functionalities of ride-sourcing apps (real-time tracking, fare estimates, and payment options) compared to traditional transportation options. These findings are in line with prior studies (e.g., Aboelmaged et al., 2022; Huy et al., 2019; Jarrar et al., 2020; Rafdinal and Senalasari, 2021; Sun et al., 2020), all of which demonstrate a positive association between PU and both optimism and innovativeness. Therefore, the results indicate that optimistic and innovative users are more inclined to perceive ride-sourcing apps as useful tools for their transportation needs.

The study also identified discomfort and insecurity as significant negative influences on PU. Discomfort, characterised by a perceived lack of control over technology and feelings of being overwhelmed by it, leads users to believe that ride-sourcing apps are not beneficial. This feeling could be derived from unfamiliarity with the technology or a lack of technical knowledge and confidence in using the app's features effectively, leading to users' perception of apps as useless.

Insecurity, reflecting users' mistrust and uncertainty about the proper functioning of technology, can negatively impact users' perception of ride-sourcing apps' usefulness. Users with high levels of insecurity may have concerns regarding data privacy, payment security, and proper functioning of technology, which may reduce their perceptions of ride-sourcing apps' usefulness. These results are consistent with prior findings by Aboelmaged et al. (2022), Van Huy et al. (2019), Walczuch et al. (2007), and Martens et al. (2017). Users' perception of ride-

Table 5
Discriminant validity (Fornell-Larcker and HTMT Criteria).

	1	2	3	4	5	6	7	8	9
1. Optimism	**0.79**	*0.56*	*0.40*	*0.31*	*0.25*	*0.58*	*0.20*	*0.31*	*0.29*
2. Innovation	0.41	**0.79**	*0.34*	*0.22*	*0.33*	*0.55*	*0.20*	*0.37*	*0.49*
3. Discomfort	−0.31	−0.27	**0.87**	*0.07*	*0.41*	*0.68*	*0.09*	*0.49*	*0.47*
4. Insecurity	−0.20	−0.11	0.04	**0.85**	*0.20*	*0.36*	*0.26*	*0.39*	*0.22*
5. Perceived Ease of Use	0.19	0.24	−0.33	−0.08	**0.74**	*0.56*	*0.35*	*0.43*	*0.50*
6. Perceived Usefulness	0.44	0.40	−0.55	−0.27	0.45	**0.77**	*0.16*	*0.61*	*0.59*
7. Confirmation	0.12	0.17	−0.08	0.10	0.32	0.15	**0.76**	*0.14*	*0.18*
8. Satisfaction	0.26	0.31	−0.43	−0.31	0.38	0.51	0.11	**0.88**	*0.81*
9. Continuous Intention	0.23	0.39	−0.40	−0.17	0.42	0.48	0.16	0.73	**0.90**

Note: The diagonal bold numbers are the square root of AVEs. Above diagonal italic numbers represent the HTMT values.

Table 6
Effect on endogenous constructs.

Endogenous Constructs		R^2		Q^2		
Perceived Usefulness		0.460		0.255		
Perceived Ease of use		0.216		0.103		
Satisfaction		0.284		0.204		
Continuous Intention		0.558		0.421		
Hypothesis & Relation		**Direct Effect**	***P*-value**	**t-value (bootstrap)**	**Percentile 95 % CI**	**Support**
H1	Optimism → Perceived Usefulness	0.177**	0.001	2.994	[0.08; 0.29]	Yes
H2	Optimism → Perceived Ease of Use	0.023	0.358	0.357	[−0.08; 0.13]	No
H3	Innovativeness → Perceived Usefulness	0.183***	0.000	3.510	[0.10; 0.27]	Yes
H4	Innovativeness → Perceived Ease of Use	0.100*	0.044	1.785	[0.001;0.21]	Yes
H5	Discomfort → Perceived Usefulness	−0.434***	0.000	8.593	[−0.52; −0.35]	Yes
H6	Discomfort → Perceived Ease of Use	−0.281***	0.000	4.084	[−0.38; −0.15]	Yes
H7	Insecurity → Perceived Usefulness	−0.206***	0.000	4.720	[−0.28; −0.13]	Yes
H8	Insecurity → Perceived Ease of Use	−0.110	0.052	1.615	[−0.20; 0.04]	No
H9	Confirmation → Satisfaction	-0.019	0.379	0.310	[−0.12; 0.09]	No
H10	Confirmation → Perceived Usefulness	0.081*	0.042	1.759	[0.003; 0.16]	Yes
H11	Confirmation → Perceived Ease of Use	0.286***	0.000	4.936	[0.19; 0.38]	Yes
H12	Perceived Usefulness → Satisfaction	0.404***	0.000	7.427	[0.34; 0.50]	Yes
H13	Perceived Usefulness → Continuous Intention	0.104*	0.022	2.040	[0.02; 0.19]	Yes
H14	Perceived Ease of Use → Satisfaction	0.194**	0.003	2.844	[0.09; 0.30]	Yes
H15	Perceived Ease of Use → Continuous Intention	0.119**	0.007	2.469	[0.06; 0.22]	Yes
H16	Satisfaction → Continuous Intention	0.629***	0.000	13.367	[0.54; 0.70]	Yes

Notes: ***$p < .001$; **$p < .01$; *$p < .05$ ns: not significant.

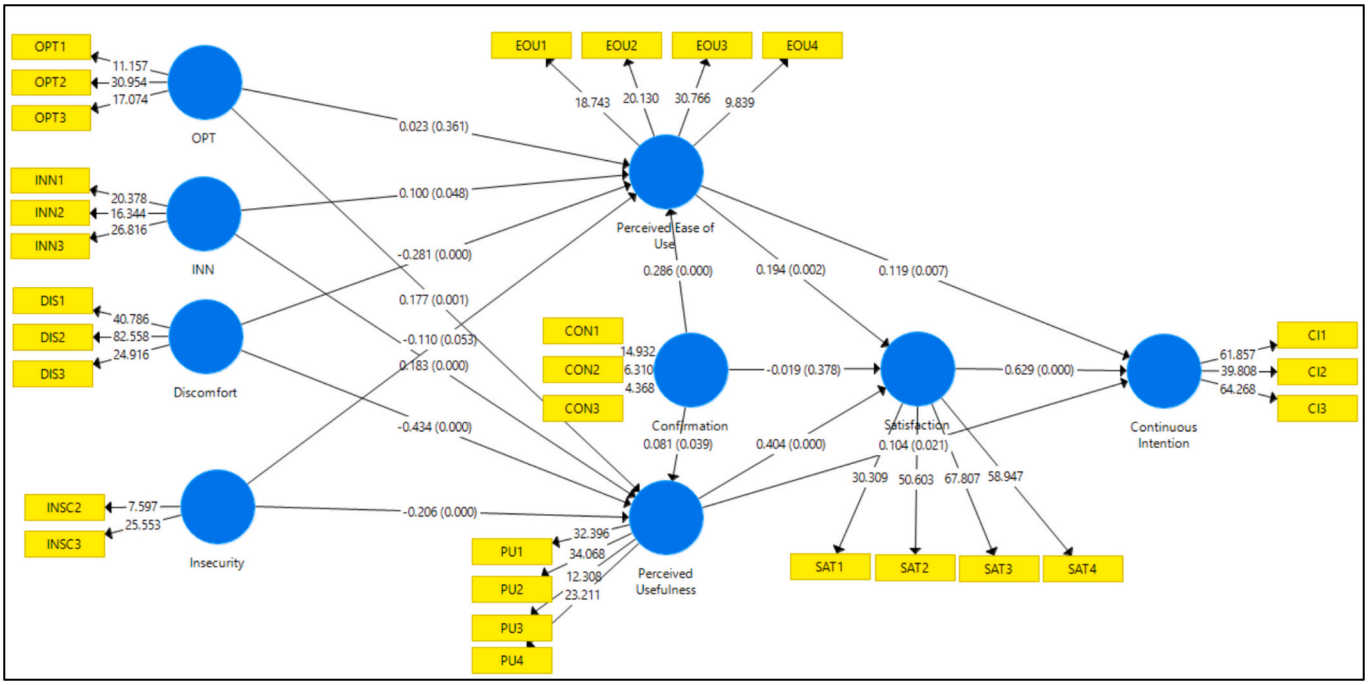

Fig. 2. Structural model with beta values and significance level.

sourcing apps' usefulness is negatively impacted by their feeling of risk and lack of control over the apps.

Furthermore, the results regarding the effect of the TRM constructs on PEOU reveal that only innovativeness and discomfort have a significant influence on PEOU. Innovativeness was found to positively influence PEOU. Users with high innovativeness levels tends to open to explore new technologies and appreciate their innovative features. Therefore, they are more likely to perceive ride-souring apps as easy to learn and user-friendly, leading to a positive perception of ease of use. This outcome is supported by previous results (e.g., Aboelmaged et al., 2022; Chen and Lin, 2018; Van Huy et al., 2019; Kim et al., 2019b; Martens et al., 2017; Park et al., 2021; Rafdinal and Senalasari, 2021; Sun et al., 2020; Walczuch et al., 2007). It is anticipated that users with an innovative attitude will find ride-sourcing apps easy to use.

Conversely, discomfort was found to negatively impact users' perceived ease of use of ride-sourcing apps. Users who experience discomfort with ride-sourcing apps lack confidence in using the apps' features effectively. As a result, they may find these apps complex and difficult to use. This finding is consistent with previous studies (e.g., Chen and Lin, 2018; Martens et al., 2017; Park et al., 2021; Rafdinal and Senalasari, 2021; Ullah et al., 2021; Walczuch et al., 2007). Hence, users who are unable to manage ride-sourcing apps' functions are more likely to perceive these apps as complex to use and requiring significant effort to operate.

Contrary to the developed hypotheses, the significant impact of optimism and insecurity on PEOU was not observed. These outcomes

deviate from previous studies that have suggested a positive correlation between optimism and PEOU. However, the insignificant impact of optimism on PEOU has been reported in previous findings by Buyle et al. (2018), Ullah et al. (2021), and Martens et al. (2017). Similarly, the result of the insignificant association between insecurity and PEOU is consistent with preceding studies (e.g., Buyle et al., 2018; Chen et al., 2009; Van Huy et al., 2019; Kamble et al., 2019; Park et al., 2021; Ullah et al., 2021).

One plausible explanation for the insignificant impact of optimism and insecurity on PEOU could attributed to the characteristics of the surveyed respondents. Since the participants in this study are existing users of ride-sourcing services, the impact of optimism and insecurity on how they perceive the complexity of these apps may shift and fade over time as they gain more experience with them. Optimism and insecurity may lose their significance as users become familiar with apps' features and using them becomes a routine.

Another plausible explanation may be related to the security mechanism implemented by TNCs. TNCs tend to design security systems that are user-friendly and straightforward, resulting in minimal challenges for users. Thus, insecurity may no longer critically influence users' perceptions of ride-sourcing apps' ease of use. Furthermore, since security is a fundamental requirement in ride-sourcing services, its existence may not significantly influence users' PEOU. However, its absence may have a detrimental impact on users' PEOU.

In line with the ECM, the results indicate that users' satisfaction with ride-sourcing apps is significantly determined by their perception of the apps' usefulness and ease of use. Users' perceptions of the benefits offered by ride-sourcing apps, such as convenience, time efficiency, cost-effectiveness, accessibility, time-saving, and real-time tracking functionalities, compared to traditional transportation options, play a critical role in determining their satisfaction levels. Consequently, users who perceive ride-sourcing apps as valuable are more likely to be satisfied due to the perceived benefits they offer. Similarly, users who find the apps easy to use, requiring less effort when interacting with them, are more satisfied.

These outcomes are consistent with previous research in the field of ride-sourcing services (e.g., Arumugam et al., 2020; Cheng, 2021b; Joia and Altieri, 2018; Malik and Rao, 2019; Nguyen-Phuoc et al., 2020; Weng et al., 2017), which has reported a positive association between PU and users' satisfaction. Additionally, these results are supported by the findings of Arumugam et al. (2020), Malik and Rao (2019), and Cheng (2021b), who have shown that users' perceptions of ride-sourcing apps' ease of use positively affect their satisfaction with these apps.

In contrast to earlier studies, the findings indicate that the direct impact of confirmation of expectations on satisfaction is insignificant. This finding is consistent with prior results of Park (2020), who revealed the insignificant influence of confirmation on users' satisfaction with smart wearable devices. This finding was also supported by Wu et al. (2020), who discovered that consumers' satisfaction with e-stores for online impulse buying did not associate with confirmation of expectations.

One possible explanation for the insignificant relationship between confirmation of expectations and users' satisfaction with ride-sourcing apps could be related to the way users assess their exposure to ride-sourcing apps in the post-adoption stage. After the actual usage of ride-sourcing apps, users may recognise apps' ease of use and usefulness as more critical elements that derive their satisfaction than confirmation of expectations. Therefore, for existing users, ride-sourcing apps' PU and PEOU are essential requirements that lead to users' satisfaction. For frequent users, ride-sourcing apps might become integrated into their routine, and satisfaction may be driven by convenience and habitual use rather than a constant confirmation of expectations.

Additionally, it's possible that other factors not considered in this study may have a stronger influence on users' satisfaction with ride-sourcing apps, exceeding the impact of confirmation of expectations. While this study focused on the online aspects of the ride-sourcing experience, offline aspects such as driver behaviour, pricing, availability of drivers, and vehicle condition can also play a role in shaping user expectations and satisfaction. However, more empirical evidence needs to be conducted to explore these possibilities in more detail, potentially by employing a broader range of variables to capture the multifaceted nature of user satisfaction with ride-sourcing apps to support this argument.

Although the influence of confirmation on satisfaction was not reported, confirmation was found to have a positive impact on users' PU and PEOU. Hence, when a ride-sourcing app meets users' expectations, this creates positive confirmations that directly foster users' recognition of the usefulness and ease of use of the app. Previous studies in the field of ride-sourcing, conducted by Malik and Rao (2019) and Cheng (2021b), have confirmed the significant impact of confirmation on users' recognition of ride-sourcing apps' usefulness and ease of use.

Finally, the finding suggests that users' intention to continue using ride-sourcing apps is significantly determined by their PU and PEOU of these apps, as well as their level of satisfaction. These results are consistent with previous findings (e.g., Cheng, 2021b; Jing et al., 2021; Joia and Altieri, 2018; Malik and Rao, 2019; Sedighi et al., 2021; Weng et al., 2017), which have confirmed the significant effects of PU, PEOU, and satisfaction on users' continuous intention.

7. Implications

7.1. Theoretical implications

The theoretical implications of this study contribute to a better understanding of users' post-adoption behaviour towards app-based ride-sourcing services in the following ways. First, it is one of the first attempts that empirically tested the effect of the technology readiness dimensions on users' post-adoption behaviour in the ride-sourcing context. The outcomes of this study validate that most of these technology readiness dimensions are critical to predict users' perceptions about the usefulness and ease of use of ride-sourcing apps.

Second, this study advanced the ride-sourcing services literature by applying the ECM to investigate users' continued usage intention. Previous studies have applied various models and theories such as TAM, TPB, TRA, UTAUT, and DIT to investigate the continuous intention to reuse ride-sourcing services. According to numerous scholars, these theories and models have some limitations in predicting users' post-usage behaviour. However, only Malik and Rao (2019) and Weng et al. (2017) have applied the ECM in their studies to investigate the continuous intention to reuse ride-sourcing services. The results of this study reveal that the ECM constructs have a substantial impact on predicting users' continuous usage intention.

Third, based on the ECM, TAM, and TRM, this study developed an integrated model that no ride-sourcing previous studies have tested. For example, Malik and Rao (2019) have integrated the ECM with self-efficacy and perceived value. Weng et al. (2017) have integrated the ECM with subjective norms, perceived risk, and attitude. The results of this study show that the inclusion of TAM and TRM constructs complement the ECM and provide a clearer view about the continuance use intention of ride-sourcing apps. Finally, by analysing the use of ride-sourcing services in developing countries like Egypt, this research significantly contributes to the field. Despite their widespread use, little is known about how ride-sourcing services are being used in Egypt.

7.2. Managerial implications

This study examined the factors influencing users' satisfaction and continued adoption of ride-sourcing apps. The findings provide ride-sourcing service providers (TNCs) with valuable insights to enhance users' satisfaction and continued usage intention. The study's findings on user personality dimensions can be leveraged by TNCs to enhance users' experience when designing ride-sourcing apps. Tailoring the app

experience to accommodate users' personality traits can significantly enhance user satisfaction and intention to continue using the service. In their marketing and communication strategies, TNCS should emphasise the innovative features, positive aspects, cutting-edge functionalities of the ride-sourcing apps. They need to emphasise the benefits of ride-sourcing apps like convenience, cost-effectiveness, and real-time tracking functionalities compared to traditional transportation options.

Additionally, TNCs need to improve apps usability by designing apps that are simple and straight forward for users of all technical backgrounds. This can be achieved through creating clear and concise user guides, developing customer support option available with apps, and incorporating in-app tutorials or FAQs to guide users through app's features.

Furthermore, TNCs should focus on highlighting the security measures they use with their apps, including data privacy policies, users' verification processes, and payment security methods. TNCs should invest in robust security measures and transparent privacy practices to build trust with their customers. TNCs can gain valuable insights into user experiences and preferences by implementing a robust feedback mechanism combined with personality analysis.

While confirmation of expectations may not directly influence user satisfaction, it positively impacts users' PU and PEOU of ride-sourcing apps. Ensuring that the app meets users' expectations can lead to positive confirmations, enhancing users' perception of the app's usefulness and ease of use, regardless of their personality traits. Thus, TNCs should track users' post-usage experiences and try to regularly improve the performance of ride-sourcing apps, so that service providers can stimulate users to have a positive confirmation of expectations when they use the apps and compare their initial expectations with the actual performance. These practices can help TNCs improve their apps functionality, usability, and overall user experience, leading to greater user satisfaction and continued usage intention.

8. Conclusion

In conclusion, the main aim of this study is to determine what factors affect existing users' intention to keep using ride-sourcing apps in Egypt. To attain this aim, three robust models, namely ECM, TAM, and TRM were used as the theoretical foundation of this study. The results demonstrated the essential role that optimism, innovativeness, discomfort, and insecurity play in shaping users' perceptions about the usefulness of ride-sourcing apps. While users' perception of ride-sourcing apps' PEOU was determined only by innovativeness and discomfort. Additionally, the findings confirmed that the continuance use intention of ride-sourcing apps is significantly associated with users' satisfaction level, PU, and PEOU. The findings of this research will enrich service providers' understanding of users' post-usage behaviour.

8.1. Limitations and future research

This study has some limitations that should be addressed. First, the generalisability of the results may be limited by the use of a convenience sample. Future studies could employ alternative sampling techniques to obtain a more representative sample of ride-sourcing app users from the target population. Second, since this study only examines one type of shared mobility, caution should be used in extrapolating its findings to other shared mobility options. Future research could explore how user experience factors like PU, PEOU, and confirmation of expectations impact user satisfaction and continued usage intention across different types of shared mobility services.

Third, this research primarily focused on how users' expectations of the app's functionality and user experience (online component) influence their satisfaction and continued usage intention. This focus might not fully capture the impact of the entire ride-sourcing experience, which encompasses both online and offline components. Offline factors, such as driver behaviour, vehicle condition, and wait times, might play a significant role in shaping user satisfaction with the overall service. Therefore, future research should consider employing a more comprehensive approach that integrates both online and offline components of ride-sourcing services.

The context in which this investigation was conducted is a potential limitation. By focusing only on Egyptian users, the findings may not by universally applicable. Further research is necessary to compare the results of this study with those from other countries with diverse cultural backgrounds and transportation infrastructures. This can help in understanding how users' post-usage behaviour can vary across different countries. Finally, this study integrated TAM and TRM with ECM to explore users' satisfaction and continued usage intention. Future research can potentially strengthen the predictive power of the ECM by incorporating additional theoretical models.

CRediT authorship contribution statement

Moustafa Elnadi: Writing – review & editing, Writing – original draft, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Ciro Troise:** Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Paul Jones:** Writing – review & editing, Project administration. **Mohamed Hani Gheith:** Writing – review & editing, Writing – original draft, Visualization, Validation, Software, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization.

Data availability

The data that has been used is confidential.

Appendix A. Questionnaire Items

No.	Statement
Optimism	
OPT1	New technologies contribute to a better quality of life
OPT2	Technology gives people more control over their daily lives
OPT3	Technology makes me more productive in my personal life
Innovativeness	
INN1	Other people come to me for advice on new technologies
INN2	In general, I am among the first in my circle of friends to acquire new technology when it appears
INN3	I can usually figure out new high-tech products and services without help from others
Discomfort	
DIS1	When I get technical support from a provider of a high-tech product or service, I sometimes feel as if I am being taken advantage of by someone who knows more than I do
DIS2	Technical support lines are not helpful because they do not explain things in terms I understand
DIS3	Sometimes, I think that technology systems are not designed for use by ordinary people
Insecurity	

(*continued on next page*)

(*continued*)

INSC1*	People are too dependent on technology to do things for them
INSC2	Too much technology distracts people to a point that is harmful
INSC3	Technology lowers the quality of relationships by reducing personal interaction
Perceived Ease of Use	
PEOU1	Using ride-hailing apps is convenient
PEOU2	It is easy to understand how to use ride-hailing apps
PEOU3	Learning to use the ride- hailing apps is easy for me
PEOU4	Using ride-hailing apps does not require much mental effort
Perceived Usefulness	
PU1	Using ride-hailing apps would enable me to do what I need more efficiently
PU2	Using ride-hailing apps would enable me to do what need more quickly
PU3	Using ride-hailing apps makes it easier for me to request transportation
PU4	Overall, using ride-hailing apps is a useful option for getting transportation
Confirmation of Expectations (CON)	
CON1	My experience with using ride-hailing apps was better than what I expected
CON2	The service level provided by ride-hailing apps was better than what I expected
CON3	Overall, most of my expectations from using ride-hailing apps were confirmed
Satisfaction	
SAT1	I am very satisfied with using ride-hailing app
SAT2	I am very pleased with using ride-hailing app
SAT3	I am very content with using ride-hailing app
SAT4	I am very delighted with using ride-hailing app
Continuous Intention (CI)	
CI1	I intend to continue using ride-hailing apps rather than discontinue its use
CI2	I intend to continue using this ride-hailing app rather than use alternative means
CI3	I would like to continue using ride-hailing app on a regular basis in the future

* Items deleted from the final model due to low loadings.

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