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Student Name:

ARYAN AHMAD
(FA22-BSE-003)

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Human Computer Interaction
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Teacher Name:

Ma’am Sidra Tariq

PACT Analysis of a Ride-Hailing Application

Introduction

In today's fast-paced digital era, ride-hailing applications such as Uber, Careem, and Bykea have revolutionized the way people commute. These platforms provide an interactive, human-centered solution that connects passengers with drivers through a mobile interface. To evaluate such a system from an HCI perspective, the PACT framework (People, Activities, Context, and Technologies) provides a structured approach to understand interaction and usability challenges.

This report presents a detailed PACT analysis of a ride-hailing app, focusing on how different human, social, technological, and contextual factors influence the design and user experience of the system.

1. People

Ride-hailing apps cater to a wide variety of users, each with different needs, skills, and expectations. The user demographic includes young adults (18–35) who are tech-savvy and frequent users, middle-aged individuals (35–55) who are more occasional users, and elderly users (55+) who are less familiar with mobile interfaces and may struggle with app navigation. Experienced smartphone users usually adapt to the app quickly, while first-time or less tech-savvy users often require on-boarding tutorials and a simple interface.

Accessibility is also a critical factor. Users with visual impairments need screen reader support, large text, and high-contrast themes, while those with hearing impairments benefit from visual alerts instead of sound-only notifications. For individuals with physical disabilities, voice commands and simplified navigation can greatly improve usability. Additionally, cultural differences shape how people interact with the app. For example, in some regions, women may prefer female drivers due to safety concerns, while multilingual support ensures accessibility for users from diverse language backgrounds.

From a goals perspective, passengers primarily want quick booking, safe and cost-effective rides, real-time tracking, and easy payment methods. Drivers, on the other hand, expect stable income, transparent pricing, fair ride distribution, and efficient in-app navigation. However, physical and cognitive abilities also influence interaction. For instance, users with hand tremors may find it difficult to tap small buttons, while elderly users may find it confusing to differentiate between ride categories such as Economy, Business, or Premium. To address these challenges, ride-hailing apps should use large, clearly labeled buttons, recognizable icons, and straightforward workflows that cater to a wide range of users.

Aspect / Category	Findings	Design Implications
Young Adults (18–35)	Tech-savvy, frequent users	Smooth workflows, digital wallets
Middle-aged (35–55)	Occasional users, less experimental	Clear navigation, visible options
Elderly (55+)	Less familiar, struggle with small buttons/categories	Large buttons, onboarding help
Accessibility (disabled users)	Visual/hearing/physical challenges	Screen reader, voice commands, high contrast
Cultural Factors	Gender preferences, language barriers	Female-only rides, multilingual support
Drivers	Need income, transparency, navigation	Fair algorithm, efficient maps

2. Activities

The primary activities within a ride-hailing app revolve around booking and managing rides. Passengers book rides by entering pickup and drop-off locations, tracking drivers in real time, making or canceling payments, and leaving ratings and feedback. Drivers perform activities such as accepting rides, navigating using GPS, and managing their income and performance ratings.

These activities vary in frequency. Daily commuters may use the app multiple times a day, while occasional users rely on it weekly or monthly. The complexity also differs: for passengers, the process is relatively simple, involving just a few steps (booking, confirming, and tracking). For drivers, however, the activities are moderately complex, as they involve multitasking—accepting rides, following navigation, managing customer interactions, and handling payments.

Urgency is another important factor. In emergencies, such as being late for work or catching a flight, passengers expect the app to load quickly and function reliably. Collaboration is also central, as effective communication between passengers and drivers (via chat or calls) ensures smooth coordination. In ride-sharing services, multiple passengers may need to coordinate trips, which adds a layer of complexity.

Despite its benefits, usability challenges remain. Network issues can delay bookings or disrupt tracking, map misinterpretation can lead to pickup errors, and cluttered or overloaded interfaces may confuse elderly or inexperienced users.

Aspect / Category	Findings	Design Implications
Ride Booking	Frequent, simple but GPS errors possible	Easy flow, error correction
Ride Acceptance	Drivers multitask, moderate complexity	Clear alerts, auto-navigation
Navigation	High frequency, GPS errors in cities	Offline maps, better routing
Payments	Simple but delays with network	Multiple payment options
Ratings & Feedback	Simple, low engagement	Quick, 1-tap feedback
Communication	Calls fail in noise	In-app text chat

3. Context

The context in which ride-hailing apps are used plays a major role in shaping the user experience. From a physical perspective, users book rides both indoors (at home or in offices with stable internet) and outdoors (in noisy or crowded areas where voice input may be ineffective).

The social context also affects usage. Some passengers travel alone, while others travel with family or friends. Safety concerns are particularly significant, as users expect emergency (SOS) features and trusted contact sharing options to ensure secure travel.

In terms of the organizational context, ride-hailing companies operate under strict transport regulations and fare policies. While drivers often work independently, their earnings and performance are closely tied to the company's algorithms and policies. The cultural context further shapes expectations. For example, in Pakistan, cash payments remain popular, while in the U.S. digital wallets and credit cards dominate. Gender-specific considerations, such as female-only ride options, are also influenced by cultural norms.

Environmental factors significantly impact usability. Poor lighting conditions at night make dark mode and high-contrast UI essential, while mobility demands that the interface be usable with one hand. Noisy environments reduce the effectiveness of in-app voice communication, making text-based chat necessary. Privacy is another critical issue, as users want assurance that their location data is secure and not misused.

Aspect / Category	Findings	Design Implications
Physical	Indoor stable, outdoor noisy	One-hand UI, text input
Social	Solo/group travel, safety concerns	SOS, trusted contacts
Organizational	Policies, regulations, driver earnings	Transparent pricing, compliance
Cultural	Cash (Pakistan), cards (US), gender norms	Local payment support, female-only rides
Environmental	Night, noisy, moving situations	Dark mode, haptic feedback
Privacy	Location/payment data sensitive	Encryption, privacy policies

4. Technologies

Ride-hailing apps are supported by a range of technologies. The primary platforms are mobile applications available on Android and iOS, although some services also provide web applications. Integration with smart devices such as smartwatches and voice assistants (Alexa, Google Assistant) offers added convenience.

The most common input method is the touchscreen, but voice input allows hands-free booking and GPS detects pickup locations automatically. On the output side, the system relies on visual maps, driver details, and estimated time of arrival, while audio notifications and haptic feedback (vibrations) provide additional cues.

Technological opportunities include AI-powered ride suggestions based on user history, **predictive pricing** that informs passengers of cheaper booking times, and integration with public transport for multi-modal travel. However, limitations persist. GPS inaccuracies in dense urban environments may misguide drivers, while battery and data consumption can be high. Additionally, voice assistants often struggle in noisy environments, misinterpreting commands and reducing usability.

Aspect / Category	Findings	Design Implications
Platforms	Android/iOS, some web	Expand to wearables, assistants
Input	Touch, voice	Smarter voice recognition
Output	Maps, ETA, alerts	AR navigation, precise GPS
AI Features	Ride suggestions, pricing	Fair algorithms, predictive booking
Resources	High battery & data use	Low-power mode, optimization

Conclusion

The PACT analysis of a ride-hailing application highlights the need for a human-centered design approach. Understanding user demographics, physical and cognitive abilities, and cultural backgrounds ensures that the system is inclusive and accessible. Activities such as booking and tracking rides should remain simple and efficient, even under urgent circumstances. Contextual factors—including social, cultural, and environmental settings—must be carefully considered to enhance usability and trust.

Technological innovations provide significant opportunities to improve ride-hailing apps, but limitations such as GPS errors and environmental challenges must also be addressed. Overall, a well-designed ride-hailing application balances usability, accessibility, and safety, ensuring a smooth experience for both passengers and drivers.