Exploring Factors Shaping Mobile Application Usage in Rural Uttarakhand: A Study in Selected Villages of Chamoli, Pauri, Rudraprayag, Tehri, and Uttarkashi Districts

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Abstract: This research aimed to investigate the impact of diverse factors on the usage behavior of mobile applications among users in the rural regions of Uttarakhand specifically in villages situated in Chamoli, Pauri Garhwal, Rudraprayag, Tehri Garhwal, and Uttarkashi districts. The primary objective was to ascertain whether factors such as the Ease of Use of applications, Privacy & Security considerations, Satisfaction levels, Digital Literacy levels, and Internet Accessibility collectively influence the usage behavior of mobile application users. To conduct the study, a descriptive research design was employed, and primary data was collected from rural areas in Uttarakhand. The influence of various factors was analyzed using the ANOVA test. The findings of the study indicate that all the aforementioned factors significantly impact the usage behavior of mobile applications in these rural areas. Additionally, the study suggests a widespread increase in the future adoption of mobile applications in these regions.

Introduction

In the digital era, all services are available online. Smartphones and feature mobile phones are widely used devices and have created public value for their users (Twizeyimana et al., 2019). Increasing adoption of mobile phones has led to the use of banking and non-banking applications (Aydin & Burnaz, 2016). Mobile apps are used widely to get government and general information, do shopping, perform banking transactions, social networking, etc. Nowadays, a wide variety of apps are available on app store platforms and can be accessed easily by consumers on their mobiles. As per prior surveys, 25% of the installed apps are never used by users while 26% of installed apps are uninstalled after a single use. Mobile app use has been increasing in the Indian market and citizens are using the technology mainly for shopping, networking, entertainment, banking and health purposes, etc.

India is the fastest mobile growth market in the world. Increasing mobile app users requires good research to find evidence for policy development. India is the most populated country in the world, having half billion wireless connections and now it is home to the second largest population of mobile phone users after China.

Mobile or cellular phones have been referred to as the underprivileged individual's "personal computer" in developing nations (Kumar et al., 2010). In rural India, Internet users are primarily mobile Internet users and the rural demographic make up nearly 50 percent of the country's online population with a major uptrend in smartphone Internet use after the launch of Reliance Jio's budget-

friendly 4G data plans in 2016 (Gupta et al., 2022). Smartphone media & entertainment applications have recorded unprecedented uptake in small towns and villages owing, in part, to the affordability of mobile Internet or data tariffs and the lowered retail price of smartphones in the country (Gupta et al., 2019).

A significant aspect of the mobile medium for the delivery of services to the public is that mobile devices are powered on continuously and it is possible to access services at any point of time around the clock (Kamal et al., 2016). However, access - as a measure or indicator - alone is insufficient to suggest utilization of such ICTs for governance and development (Prasad, 2012).

With the fast digitalizing and transforming experience of well-developed urban India, rural regions have special needs that can be addressed by ICTs in areas such as employment generation and livelihood development, agriculture, public health and financial inclusion (Svensson and Larsson, 2015). Recent evidence suggests that digital technologies have penetrated amongst rural communities but have varied patterns of use when it comes to adopting the technologies (Asrani, 2022). Among the key factors directly responsible for citizens' adoption of digital services, awareness of the services is most fundamental.

Uttarakhand is among the Indian states which includes the higher Himalayan regions characterised by relatively less infrastructure development due to the mountainous terrain, adverse climactic conditions for seasonal periods and the threat of natural disasters. However, over the recent decades, technological accessibility has greatly improved in these areas. As far as the village-level developmental indicators are concerned, these regions lag behind urban areas. A 'Digital Divide' is also evident when the rural areas are compared to urban areas.

Review of Literature

Substantial scholarship has been published in the last few decades in the areas of Information and Communication Technologies for Development (ICT-D or ICT4D), Mobile for Development (M4D or m4D), e-Governance and m-Governance, and Human-Computer Interaction (HCI) making the area of inquiry multidisciplinary and multi-theoretical. Among the disciplines that have contributed to the literature are Information Systems, Media and Communication Studies and Public Administration - to name a few. This research study followed a thematic review approach to survey the most important empirical works relevant to the area of inquiry and also referred to the key theories cited by the majority of authors in these fields (Gupta et al., 2019).

Research studies can be classified into three broad areas for the purpose of classification (Adnan et al., 2022):

1. Acceptance or adoption studies (which investigate why people adopt or begin to use ICTs or electronic services by studying the factors responsible for people's intention to adopt and use the technologies, their real or actual use of the technologies, and the various information-searching and utilization behaviours of the technology users as well as their attitude)

2. User-Technology Interaction or Engagement studies (which study the factors that make technological interfaces like websites and applications accessible for users, whether the sites and apps are usable and what factors govern their usability, the design features determining interactivity within the portals, sites and apps, the characteristics of an individual's experience of using these technologies, and the factors responsible for the satisfaction of a user and the user's intention to continue using the technologies)

3. Participation studies (which study the factors influencing users' electronic or e-participation in the deployment, spread and

use of such technologies, the participation or inclusion of beneficiary-citizens in the design and development of electronic services or information technologies, democratic participation in decision-making situations centered on the e-services, participatory digital platforms of governments, citizen participation in open government and smart city projects - to name a few distinct areas)

The Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Decomposed Theory of Planned Behaviour (DTPB), Technology Adoption Model (TAM), TAM 2, the Diffusion of Innovations theory (DOI), the Unified Theory of Acceptance and Use of Technology (UTAUT), UTAUT 2, Social Cognitive Theory, the Expectation-Confirmation Model, the Information Systems Continuance Model are some of the main theoretical models widely used in the literature of electronic governance (Dwivedi et al., 2017, Majeed et al., 2019).

Among research studies conducted in the Himalayan states of India, a study was carried out by Aggrawal and Kumar (2008) on the usage behaviour of mobile applications of students of Himachal Pradesh University. The study revealed that the government is the better service provider among the various mobile service providers. It revealed that mobile phone usage behaviour varies depending on time, geographical area and individual circumstances of the users.

As far as Uttarakhand is concerned, Kandpal & Bisht's (2013) study found that while the government has provisioned a wide portfolio of e-services for citizens including m-Governance applications, the hilly terrain leads to connectivity problems that limit citizen usage of the services and technological interfaces need to be better designed for user friendly interactions and awareness levels also need to be improved.

On the whole, there is a dearth of primary studies in Uttarakhand in the area of mobile applications and no study investigates specific factors governing usage in rural areas of the hilly districts. This indicates a research gap and an opportunity for scholarship in the area of citizen usage behaviour with respect to mobile applications.

Research Methodology

Objective: To study the influence of various factors on the usage behaviour of Mobile Applications.

Study Design: The primary investigation employed a descriptive research design, utilizing a non-probability convenience sampling approach and a snowballing method for respondent recruitment. The primary data collection involved a survey conducted through structured questionnaires distributed via Google Forms, disseminated through messaging applications. A total of 425 responses were obtained from rural areas in Uttarakhand. In addition to primary data, secondary data were sourced from articles, journals, magazines, newspapers, and published theses. The analysis of data was conducted using the ANOVA test, following the methodology outlined by Gupta (1997) and Kothari (1999) for a comprehensive examination.

Hypotheses

H_1: There is no significant influence of Ease of Use on the usage behaviour of mobile applications.

H_2: There is no significant influence Security and Privacy on the usage behaviour of mobile applications.

H_3: There is no significant influence of Satisfaction Level on the usage behaviour of mobile applications.

H_4: There is no significant influence of Digital Literacy Level on the usage behaviour of mobile applications.

H_5: There is no significant influence of Internet Accessibility on the usage behaviour of mobile applications.

Limitations:

1. Sample size is relatively small
2. Study area is limited to selected rural areas of the Garhwal region of Uttarakhand only.
3. Study period was limited to 4 weeks and it is not a longitudinal study.

Scope: The study will be useful to the research scholars and academicians for further research. It will be useful to know the barriers in usage of mobile apps. It would be useful to the government in formulation of different policies related to mobile apps.

Conceptual Framework

Figure 1. Proposed factors influencing usage behaviour
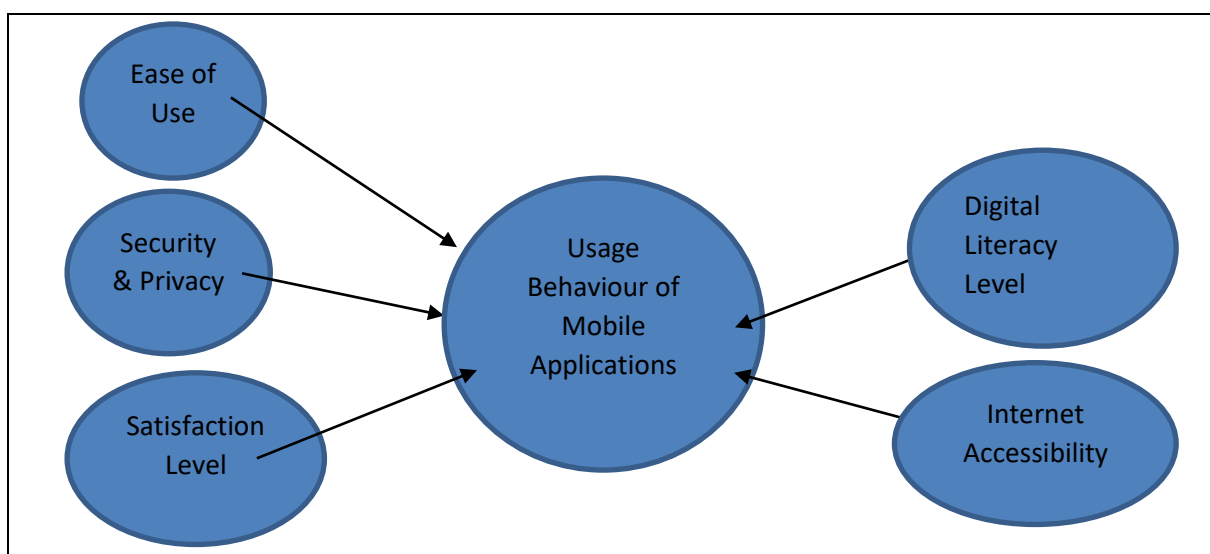
Data Analysis and Interpretation:

H_0: There is no significant influence of Ease of Use on the usage behaviour of mobile applications.

H_1: There is a significant influence of Ease of Use on the usage behaviour of mobile applications

Table 1. ANOVA Table: Usage Behaviour of Mobile Applications * Ease of Use

ANOVA Table						
		Sum of Squares	Df	Mean Square	F	Sig.
Usage Behaviour of Mobile Application * Ease of Usage	Between Groups	0.019	1	0.019	2.498	0.018
	Within Groups	10.66	425	0.02509		
	Total	10.679	425			

The above table shows that the p-value is 0.018 which is lower than the significant value of 0.05 so the null hypothesis 'There is no significant influence of Ease of Use on the usage behaviour of mobile applications' is rejected. Therefore, there is a significant influence of Ease of Use on the usage behaviour of mobile applications.

H_0: There is no significant influence of Security and Privacy on the usage behaviour of mobile applications.

H_2: There is a significant influence of Security and Privacy on the usage behaviour of mobile applications.

Table 2. ANOVA Table: Usage Behaviour of Mobile Applications * Security & Privacy

ANOVA Table						
		Sum of Squares	Df	Mean Square	F	Sig.
Usage Behaviour of Mobile Application * Security & Privacy	Between Groups	0.013	1	0.013	2.734	0.020
	Within Groups	12.05	424	0.0284		
	Total	12.063	425			

The above table shows that the p-value is 0.020 which is lower than the significant value of 0.05 so the null hypothesis 'There is no significant influence of Security and Privacy on the usage behaviour of mobile applications' is rejected. Therefore, there is a significant influence of Security and Privacy on usage behaviour of mobile applications.

H_0: There is no significant influence of satisfaction level on the usage behaviour of mobile applications.

H_3: There is a significant influence of satisfaction level on the usage behaviour of mobile applications**.**

Table 3. ANOVA Table: Usage Behaviour of Mobile Applications * Satisfaction Level

ANOVA Table						
		Sum of Squares	Df	Mean Square	F	Sig.
Usage Behaviour of Mobile Application * Satisfaction Level	Between Groups	0.021	1	0.021	2.103	0.0023
	Within Groups	16.09	424	0.0379		
	Total	16.1	425			

The above table shows that the p-value is 0.0023 which is lower than the significant value of 0.05 so the null hypothesis 'There is no significant influence of Satisfaction Level on the usage behaviour of mobile applications' is rejected. Therefore, there is a significant influence of Satisfaction Level on usage behaviour of mobile applications.

H_0: There is no significant influence of Digital Literacy Level on the usage behaviour of mobile applications.

H₄: There is a significant influence of Digital Literacy Level on the usage

behaviour of mobile applications.

Table 4. ANOVA Table: Usage Behaviour of Mobile Applications * Digital Literacy Level

ANOVA Table					
		Sum of Squares	Df	Mean Square	F	Sig.
Usage Behaviour of Mobile application* Digital Literacy Level	Between Groups	0.0102	1	0.0102	1.927	0.0310
	Within Groups	11.01	424	0.0259		
	Total	11.0202	425			

The above table shows that the p-value is 0.0310 which is lower than the significant value of 0.05 so the null hypothesis 'There is no significant influence of Digital Literacy Level on the usage behaviour of mobile applications' is rejected. Therefore, there is a significant influence of Digital Literacy Level on the usage behaviour of mobile applications.

H₀: There is no significant influence of Internet Accessibility on the usage behaviour of mobile applications.

H₅: There is a significant influence of Internet Accessibility on the usage behaviour of mobile applications.

Table 5. ANOVA Table: Usage Behaviour of Mobile Applications * Internet Accessibility

ANOVA Table					
		Sum of Squares	Df	Mean Square	F	Sig.
Usage Behaviour of Mobile Application * Internet Accessibility	Between Groups	0.0207	1	0.0207	2.310	0.0392
	Within Groups	14.07	424	0.0332		
	Total	14.0907	425			

The above table shows that the p-value is 0.0392 which is lower than the significant value of 0.05 so the null hypothesis 'There is no significant influence of Internet Accessibility on the usage behaviour of mobile applications' is rejected. Therefore, there is a significant influence of Internet Accessibility on the usage behaviour of mobile applications.

Findings

The research sought to understand the factors that influence the usage behaviour of mobile applications in specific rural areas of Uttarakhand. Throughout the study, key factors such as the ease of use of applications, Security and privacy considerations, satisfaction levels, and Internet accessibility were rigorously examined. The findings revealed a noteworthy impact of Ease of Use, Security and Privacy, Satisfaction levels in utilizing mobile applications, Digital Literacy

Level, and Internet Accessibility on the usage behaviour of mobile application users.

Conclusion

Technological advancements have significantly reshaped the socio-economic landscape with a rapid surge in mobile usage observed throughout India. This surge is attributed to the sustained growth of economic activities and the flourishing private sector. The pervasive use of mobile applications has witnessed a notable uptick, even in rural India. The current study endeavors to discern the factors influencing the usage behavior of mobile applications in specifically chosen rural areas spanning the districts of Chamoli, Pauri Garhwal, Rudraprayag, Tehri Garhwal, and Uttarkashi in Uttarakhand. The investigation comprehensively considered factors such as the ease of use of applications, privacy and security considerations, satisfaction levels, digital literacy levels among users, and Internet accessibility. The study discerned that ease of use, privacy and security, satisfaction levels, digital literacy levels, and internet accessibility exert a substantial influence on the usage behavior of mobile applications. Additionally, the research unveiled a noteworthy awareness among the populace regarding mobile apps offered by various communication companies and governmental entities. India, ranking as the second-largest community of mobile phone users globally, exhibits a robust growth in mobile app usage fueled by ongoing technological advancements.

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