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# Role of Personalization in Continuous Use Intention of Mobile News Apps in India: Extending the UTAUT2 Model

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**Abstract:** The aim of this study was to empirically examine the extended unified theory of acceptance and use of technology 2 (UTAUT2) model by adding “personalization” as one of the antecedents, as well as a moderator to determine the key factors for the continuous use intention of mobile news applications (apps). For this study, an online and manual sample survey of 309 respondents, who had used the news app earlier, was collected and analyzed, using quantitative methods such as explanatory and confirmatory factor analysis, structural equation modeling, and Hayes process for finding moderating effects among variables. The findings of the direct effect demonstrated that performance expectancy (PE) has the most influential effect on continuous use intention, followed by habit (HT), hedonic motivation (HM), and facilitating conditions (FC). Furthermore, the outcome of tests for the moderating effect of personalization between UTAUT2 constructs and continuous use intention (CUI) showed that personalization has a significant moderating effect on performance expectancy and habit. Therefore, this research establishes the key role of PE, HT, HM, and FC as main factors that trigger the users’ continuous use intention of news apps and provides an integrated framework to assess the moderating effect of personalization on technology acceptance. The findings of the research expand the existing literature on news applications and provide foundation for future research studies in the area of mobile news apps.

**Keywords:** mobile news app; personalization; UTAUT2; continuous use intention; India

## 1. Introduction

The rapid surge in the number of smartphone users has drastically spurred the growth of mobile applications (apps) usage. Mobile apps are now a central and essential part of day-to-day life, having streamlined daily human activities, meeting various needs for any plausible purpose [1–3]. The significance of mobile apps will continue to grow. Globally, a staggering 178.1 billion apps were downloaded in 2017, and this figure is projected to increase further to 258.2 billion app downloads by 2022, a record increase of 45% [4]. In India, too, apps are rapidly proliferating due to the increase in ownership of smartphones and low data prices. In fact, in India, the usage of mobile apps has been higher than the global growth. Statistics from App Annie, an analyst and business intelligence firm, show that from 2016 to 2018, India witnessed a whopping growth of 165% in app downloads, the fastest among major countries [5]. In terms of the number of mobile app downloads, India even surpassed US and ranks second, trailing only China [6]. Mobile apps have transformed the entire

business ecosystem in the way they are now increasingly used to promote businesses, altering people's consumption habits. A wide variety of apps with easy-to-use and download features that can be conveniently accessed on smartphones are being developed to cater to consumers' needs.

Mobile news apps are among the most popular apps that have been widely installed and used by consumers, and have therefore substantially transformed the news delivery process. News reading on smartphones is now one of the most common activities users perform on a daily basis [7]. Increasingly, a large number of users now depend on news apps for their daily news and media diet [8], while cutting down their exposure to legacy media. The enhancement of mobile phones will lead to more users receiving information in fragments through these devices [9].

While news is highly diverse and unpredictable at the same time, the preferences of news consumers are varied too. The heterogeneity of users has impelled news service providers to deliver personalized information to their target users [10]. To this end, media organizations have created apps that facilitate access to information on mobile devices based on users' choice, interest, and search history. This has also led to the proliferation of news apps, known as aggregators, that syndicate content from diverse news sources, convert them into personalized repertoires, and deliver the customized information to target users with the help of recommendation agents or algorithms [11]. Headlines Today (toutiao), a leading Chinese news app, uses personalization. Similarly, Dailyhunt, News Dog, Inshorts, and UC Browser are among the many news apps in India that work on data mining and provide personalized information to the consumers. Media organizations are adopting innovative technologies to reach the consumers. In particular, personalization of news apps and user behavior is an emerging phenomenon that deserves scholarly attention.

Despite the rapid growth of mobile news apps and its multifaceted implications, very few academic studies have been done on news apps, and much less enquiry into understanding the different dimensions of the subject, making it worth exploring [12,13]. Furthermore, even in the growing body of literature on apps, not much attention has been given to the intersection of personalization and the role it plays in technology acceptance. Some studies have highlighted the importance of personalization, for instance, Islam [14] identified personalization as a determinant impacting the behavioral intention of youth to use mobile internet, while Kang and Namkung [15] highlighted the significance of personalization on continuance intention in food service mobile apps. However, there have been very few specific studies conducted on the importance of personalization of news apps. By adding personalization of news apps in the research model, this research provides a thorough assessment of the significance of personalization and its effects on other variables leading to the continuous use intention and eventually extending the existing literature on personalization and news apps.

There has been a greater level of interest in the unified theory of acceptance and use of technology (UTAUT2) in the context of mobile and digital technology in recent years. Researchers have used UTAUT2 for several studies related to mobile and digital technology areas, like mobile payment, mobile banking, online shopping, food delivery, and mobile TV [2,16–19]. However, the significance of mobile news technology and user behavior in the growing literature on technology adoption has received scant attention. In the context of mobile news apps, researchers have used the expectation-confirmation model (ECM) to explain continuous usage intention [13], the diffusion of innovations theory (DIT) for the adoption of news apps offering specific location-based features [20], and Technology Acceptance Model (TAM) for investigating factors in the adoption of news apps [21]. Meanwhile, Wang [22] adopted the method of taxonomy of experience (ToE) to understand user experience of news apps among college students. However, previous studies on news apps have not applied the UTAUT2 model, despite its use in a diverse and vast array of mobile and digital technologies, evidently leaving a significant theoretical gap.

In addition to this, most studies related to the intersection of users and technology, and particularly to those concerning apps, have largely focused on intention and initial adoption [23,24], while at the same time, the UTAUT2 model has not been fully explored to address the issue of continuous intention.

Some researchers have used perceived usefulness (performance expectancy) [25,26], while others have used the ease of use dimension [15] to assess the continuous use intention. However, not much focus has been given to measure continuous usage using all the UTAUT2 variables. Therefore, there is a pressing need to understand the effect of UTAUT2 variables on continuous use intention, and even more so in the context of mobile news apps.

Therefore, the aim of this study is to extend the UTAUT2 theory in the context of mobile news apps, identify the determinants of continuous use intention of news apps, and thus address the gap in theory. “Personalization” as a concept has been explored from several aspects in technology acceptance studies, but by adding personalization as a determinant for news apps, this research contributes to the existing literature on apps’ continuous usage behavior. In addition, by empirically analyzing the influence of personalization as a moderating variable on other determinants, this research adds to the ongoing debate on the effectiveness of personalization in mobile apps. Since this study is conducted in India, which is witnessing one of the fastest growths of app downloads and usage, it provides a deeper understanding of mobile news apps and its continuous use intention for one of the biggest emerging digital markets in the world.

The structure of the paper is as follows. Section 2 deals with the literature review, in which UTAUT2 and concepts related to personalization are explained. Based on the existing literature we formulate our conceptual model and develop hypotheses. In Section 3, we discuss the research methodology and processes we follow to draw on our results. Section 4 takes up the empirical findings and reports the results obtained. Section 5 enumerates the discussion, the implication of our findings, and limitations of our study, underlining the issues that form the basis for future research. In Section 6 we conclude our research.

## 2. Materials and Methods

### 2.1. Mobile Apps

Mobile apps are “small programs that run on a mobile device and perform tasks ranging from banking, gaming to web browsing” [27] (p. 60). Apps can serve both informative needs with personalized and focused information services and entertainment needs through games, music, movies, or social media apps. Thus, based on the types of apps and their usage need, apps are capable of satisfying both hedonic and utilitarian values [28]. Another prominent aspect of mobile apps is that they help users to easily navigate through the enormous information clutter and take them directly to the content they need and value [29]. Moreover, opening apps is “quick and easy”, offering bite-sized updates compared to information on websites [30]. As the definition suggests, consumers are increasingly using apps for ordering food, banking, entertainment, shopping, etc. [2,16,23,31].

### 2.2. Personalization (PER)

Personalization is a process in which consumers are provided with custom-made products or services that are designed on their individual preferences using consumer data [32,33]. It is also a commonly used term for preference matching [34]. Personalization makes access to customized information more efficient and convenient [35]. From a technology viewpoint, Thurman and Schifferes [36] (p. 776) defined personalization as a form of interaction between user and system that depends on “technological features to adapt the content, delivery, and arrangement of communication to individual users’ explicitly registered and/or implicitly determined preferences”. For companies, personalization is vital because of its ability to create one-to-one relationships, which facilitates them to establish and maintain relationships with customers for a protracted period [37] and help in formulating effective marketing strategies and achieving a sustainable competitive advantage over others [38].

Researchers have explored the concept of personalization from various dimensions. Among them, the popular areas are the influence of personalization on consumer behavior [39–41] and how consumers respond to it [42–44]. In addition, studies on identifying the effect of personalization on privacy

and trust [45,46], satisfaction, and consumer loyalty [47,48] have been actively pursued. Krishnaraju, Mathew [49], and Tam and Ho [50] conceptualized web personalization having three core features viz. self-reference, content relevance, and navigational content, impacting the behavioral intention.

### 2.3. Mobile App Personalization

Similar to other forms of personalization, app personalization customizes experiences according to the specific needs of the consumers. Therefore, app personalization is an internet-based process of developing a smartphone application that caters to the specific needs of consumers. Many apps have incorporated aspects of web personalization [39]. Successful firms engaged in e-commerce are relying on app personalization more than ever to understand customers' needs and offer targeted services to them. Personalization has become an inevitable strategy to improve business. Mobile apps have a unique advantage in terms of storing data [51] that allow firms and retailers to access and use them for providing location-based services to the users, assessing the context of users, and as result, offer more personalized services [52]. Moreover, personalization is a new and useful feature that apps offer compared to other media outlets [53]. In mobile apps, personalization as a feature has the intrinsic ability through which users can interact, reflect, and identify themselves.

### 2.4. News Apps Personalization

Personalization plays a significant role in mobile news apps. A personalized news app is a system that uses data and information based on user navigation and delivers content that is specifically tailored for the user. With huge information generating and trending, it becomes imperative for an online news services to assist readers in finding content that matches their preference. According to Constantinides [7], "apps that adapt their display and interaction behavior in response to recurrent patterns of users' behavior are an opportunity to personalize the way people access and read news". In a study on implicit profiling and adaptive user interfaces for mobile news apps Constantinides and Dowell [54] observed that different readers benefited from different forms of news app interfaces. This strengthens the argument that personalization plays a significant role in news apps. Determining the users' intention for continuous usage intention of mobile news apps. Ye and Luo [13] found that personalization of the system and service quality of news apps results in greater user satisfaction and concluded that those seeking information through news apps prefer more personalized services. A study by Franke and Keinz [55] observed that customized newspapers benefit customers because they deliver content that matches their preference. Personalized news services are already enabling users to access and search important news of relevance, keeping users informed by aggregation over multiple sources and facilitating in providing the right information to the right users.

### 2.5. Personalization and Continuous Use Intention

Personalization is a pertinent determinant of information system (IS) continued usage intention and has been observed to have a considerable impact on the continuous use intention of mobile banking apps [47]. In his theory of diffusion of innovation, Rogers [56] proposed that personalization has a positive effect on the initial and continuous use of an innovation. In an online environment, empirical evidence indicates that personalization has an effect on the continuous usage of websites. Personalization features in a restaurant recommendation website had a significant influence on the intention to reuse it [57], whereas personalization was found to be an influencing source of continued usage in social networking sites [58]. These results were in accordance with other studies [55,56], which found that website content that matches with the users' personal interest leads to positive [59,60] perception and greater intentions to revisit. Kang and Namkung [15] in their study on food delivery mobile apps investigated the impact of personalization on continuance intention through several mediating factors. Personalizing app usage experiences, conceptualized as "self-app connection", where a user incorporates apps into their self-concept, influences the actual as well as future purchase intentions [24].

Empirically, it has been established that when users are presented with an opportunity to explicit their needs or preferences or are personally involved, it influences their behavior intention positively [55,61]. Therefore, when news apps involve users to configure how, when, and what type of content they prefer, it enhances their experience and will prompt them to revisit particular news apps. By increasing interactivity with users and providing them with tailored information based on that interaction, news apps can keep users personally involved, which will facilitate their re-use intention. Moreover, besides involving users, the continuous content personalization throughout usage also significantly influences behavioral intention [62]. Therefore, apart from one-time information obtained during registration, a personalization process based on algorithms and machine learning enables apps to serve and suggest the most suitable content to users. This intrinsic ability of personalized news app over other non-personalized content providers can influence the continuous intention of users. Based on the above findings and observations, we hypothesized that the introduction of personalization features in news apps would result in continuous use intention.

Hence, the following hypothesis is proposed:

**Hypothesis 1 (H1).** *Personalization in mobile news apps has a significant influence on the continuous use intention of news apps.*

## 2.6. Unified Theory of Acceptance and Use of Technology 2 (UTAUT2)

Technology acceptance studies started with the need for organizations to grasp the influence of the growing use of technology at the work place [63]. Among the initial models shining light on the behavioral intention (BI) of a person to use technology was the theory of reasoned action (TRA), in which attitude and subjective norm were posited as key factors in influencing the individual's intention [64]. Later, Ajzen [65] introduced the theory of planner behavior, in which perceived behavior control was added in the TRA model as an additional determinant. Adapting TRA, Davis [63] developed the technology acceptance model (TAM), in which perceived usefulness and perceived ease of use were postulated as key constructs influencing the intention of a person for technology acceptance. TAM remains a dominant framework in the literature and has been extensively used to study adoption behavior in areas like mobile apps [66], tourism [67], and mobile financial services [68]. However, the model has received criticism because of its inability to capture negative emotions and intrinsic motivations [69]. Furthermore, TAM could not provide a general explanation of the work–technology environment [70].

To address these limitations, the unified theory of acceptance and use of technology (UTAUT) was conceptualized by Venkatesh and Morris [71], which combined eight previous well-known theories, including TAM, on technology adoption. UTAUT proposes that four predictors—performance expectancy, effort expectancy, social influence, and facilitating conditions—significantly determines the users' behavioral intention and use. To explain the differences between individuals, moderators such as age, voluntariness, gender, and experience were included in the model. Empirically, UTAUT has accomplished explaining variance of about 70% in behavioral intention and has been widely applied for analyzing information systems in m-health [72], smartphone applications [73], and the hospitality industry [74]. However, the UTAUT model is primarily used in studies from the perspective of organizations and does not factor in the cognitive or psychological states affecting technology adoption [75]. Later, Venkatesh and Thong [76] extended UTAUT to UTAUT2 by including hedonic motivation, price value, and habit, which are considered consumer behavior-specific factors, and proposed the model fit to evaluate technology acceptance from a user perspective. Moreover, the revised model was empirically tested and claimed to have a higher percentage of variance than UTAUT. In our study, we applied UTAUT2 as it deals with a consumer perspective, which is vital for any app to succeed in a market place. Also, it yields higher variance, and if the explained model variance percentage is on the higher side, it is considered a better model [77].



In this study, the UTAUT2 model was extended by including personalization construct, having a direct effect on CUI as well as a moderator for UTAUT2 variables. The six determinants—performance expectancy, effort expectancy, facilitating conditions, social influence, hedonic motivation, and habit—from UTAUT2 are postulated to have a positive effect on the continuous use of mobile news apps, directly as well as in the presence of personalization as a moderator. However, the price value construct, that is, “consumers’ cognitive trade-offs between the perceived benefits of the applications and the monetary cost for using them” [76] (p. 161), from the original UTAUT2 was excluded from our model. The majority of news apps in India are available free to download from app stores. Since users do not have to pay to avail the services of news apps, it was assumed that price value will not impact consumers’ continuous use intention.

### 2.6.1. Performance Expectancy (PE)

The performance expectancy (PE) infers the capability of new technology and applications to be helpful for users in performing certain activities in more productive and convenient way [76]. In communication technology parlance, it suggests that users perceive mobile apps to be useful as they facilitate in carrying out their goal-oriented tasks [31]. Users adopt a system or technology when they perceive that it saves more time and effort than the traditional one. If news apps provide information more conveniently, users will have a positive reaction to continue using it. The PE construct is the same as perceived usefulness in TAM and is one of the core predictors for the behavioral intention of users. Studies conducted in the past have empirically tested the relationship between PE and continuous use intention and found it to be significant in areas like food ordering apps [23], online courses [26], and news apps [13].

Since performance expectancy relates to technology helping to complete tasks vigorously and faster, personalization in news apps corresponds to how aptly and conveniently users are able to perform tasks like navigate, select, read, or watch their preferred news or content. If relevant content is provided to users, their need to seek more information and time to make decisions reduces [50], reflecting enhancement in their performance. The personalization feature was observed to boost the perception of utility and, in turn, increase the continuous use intention of e-banking services [78]. Based on previous findings [55,79], in their study on the effects of personalization on purchase intention for online news, Wessel and Thies [62] argued that personalization increases utility among users who opt for personalized website services. Similarly, Krishnaraju and Mathew [49] also postulated that under a higher level of web personalization, PE has a greater influence on the intention to use e-government services. Therefore, the following hypotheses are proposed:

**Hypothesis 2 (H2).** *Performance Expectancy significantly influences the continuous use intention of news apps.*

**Hypothesis 3 (H3).** *Personalization plays a role in moderating the causal relationship between performance expectancy and the continuous use intention of news apps.*

### 2.6.2. Effort Expectancy (EE)

Effort expectancy (EE) is referred to as, “the degree of ease associated with consumers’ use of technology” [76] (p. 159). The EE construct corresponds with the perceived ease of use in TAM and is a significant determinant of BI. Perceived ease of use can induce users to engage more with the given technology [2,3], while complexity can have a negative impact on users’ intention to adopt or reuse it [80]. For mobile apps usage, EE remains one of the crucial factors and significantly effects the behavioral intention of a user [81,82]. Similarly, operational comfort and complications involved can meaningfully influence users’ intention to use mobile news apps. If the perception of news apps among users is developed as being effortless and easy, they will have positive intentions towards it.

With personalization, news app services are expected to be more effortless and easy to use for the user. Krishnaraju and Mathew [49], in their study, proposed that personalization aids self-reference, content relevance, and navigational content, which results in reducing mental effort, inducing users to adopt the given technology. Choi and Lee [44] underscored that recommended systems lower the search effort of users, while Wang and Cho [78] postulated that personalization affects effort expectancy for e-banking services. Meanwhile, personalization features allow users to configure the homepage and interface of their app. Thus, based on their interests and preferences, users can add sections (like business and sports instead of politics or entertainment) and personalize the flow of content that they want to read first, and can check the latest updates on those topics with less effort and time.

Hence, the following hypotheses are proposed:

**Hypothesis 4 (H4).** *Effort Expectancy significantly influences the continuous use intention of news apps.*

**Hypothesis 5 (H5).** *Personalization plays a role in moderating the causal relationship between effort expectancy and continuous use intention of news apps.*

### 2.6.3. Social Influence (SI)

Social influence, according to Venkatesh and Thong [76] (p. 159), is “the degree to which users perceive that important others (peers, friend, and family members) believe they should use a particular technology”. Users develop intention towards a technology when encouraged and motivated by the people close to them and whose opinion they value [83]. Studies have demonstrated the importance and empirically established the significant impact of social influence on predicting users’ intention to use mobile commerce apps [84], mobile payment [85], and diet apps [86]. Studies by Shen and Cheung [87] and Zhou and Li [88] observed that social influence has a significant effect on continuous use intention.

Social influence triggers when users start measuring their opinion with others in the same social group. Personalization has the intrinsic ability to identify people with similar preferences, likes, and tastes from the identical social network. According to Choi and Lee [44], with regard to recommended systems, the identification of friends or neighbors who have the same predilections can have a significant impact on users, as it generates a perception of social presence. Gefen and Straub [89] argued that having a sense of social presence among users has a positive effect on reuse intention. Li and Karahanna [90] also highlighted that personalization based on social network is an effective way to create continuous use intention, as it provides recommendations from people belonging to the same social network to the target users. Based on the literature, it can be implied that a personalization feature in a news app can propel users to use it continuously.

Hence, the following hypotheses are proposed:

**Hypothesis 6 (H6).** *Social influence significantly influences continuous use intention of news apps.*

**Hypothesis 7 (H7).** *Personalization plays a role in moderating the causal relationship between social influence and continuous use intention of news apps.*

### 2.6.4. Facilitating Conditions (FC)

Facilitating conditions (FC) mean that users possess the required resources and expertise to use the given technology. It is referred to as “the degree to which an individual believes that organizational and technical infrastructure exist to support use of the system” [76] (p. 159). Since news apps are software that run on smartphones, it is hard to access news apps without proper internet connection. Meanwhile, users also place equal consideration on the quality of these apps and whether they can perform steadily without any technical glitches and downtime or not [23]. Along with the necessary

infrastructure, additional facilities, like customer support and service delivery, are also essential for providing quality services to users. Therefore, facilitating conditions have been observed as a very important factor in influencing users' intention and actual usage behavior [84,85].

It is important for users to have a feeling of service exclusiveness and their intentions properly recognized if they are using personalized news apps. FC is closely related to the delivery of quality services, which includes sending timely updates, push notifications, or breaking news to users on their preferred subjects, instantly and without any technical malfunction. Other aspects of FC, like providing native language support or aiding users with the option of translating content from one language to other can also lead to continuous use intention of personalized news app. In addition, one-on-one communication with the users, promptly responding to their queries and designing apps that fit users' perception, are all-important factors of system quality that influence the continuous intention of mobile news apps [13]. In their study on E-government services, Krishnaraju and Mathew [49] also proposed that personalization moderates the relationship between facilitation conditions and behavioral intention. Therefore, we assume that personalization will influence the relation between FC and CUI.

Hence, the following hypotheses are proposed:

**Hypothesis 8 (H8).** *Facilitating conditions significantly influences the continuous use intention of news apps.*

**Hypothesis 9 (H9).** *Personalization plays a role in moderating the causal relationship between facilitating conditions and continuous use intention of news apps.*

#### 2.6.5. Hedonic Motivation (HM)

Hedonic motivation is another determinant that was added to UTAUT2 by Venkatesh and Thong [76]. It refers to the pleasure, enjoyment, and fun obtained while using technology and is a key factor in influencing technology acceptance and use [80]. Feelings of pleasure and playfulness can be associated with the extent of uniqueness, creativeness, and innovativeness in using mobile news apps. Hedonic motivation emerged as a significant construct in mobile apps usage intention [81], while Kim and Yoon [91] observed that if users find using mobile apps enjoyable, they are more inclined to adopt them. Moreover, Krishnaraju and Mathew [49] suggested that HM significantly influences the behavioral intention in the presence of personalization. Hence, it is argued that if news apps are creative, novel, and bring joy, users will be inclined to use them.

Personalization was observed to be a crucial element in evoking emotions and when offered optimally, it was found to foster positive emotions like enjoyment and pleasure, resulting in purchase intention [92]. Fiore and Jin [93] noted an increase in enjoyment and arousal among users when personalized services were used to boost interaction between customers and online shopping websites. Similarly, Ho [94] highlighted that when users perceive personalization as a novel feature, they will have a higher perception of enjoying it. Since hedonic motivation is related to positive emotions, such as joy and playfulness, it can be assumed that the personalization feature will escalate these emotions and feeling among users when they use personalized news apps, and will result in continuous use intention.

Therefore, the following hypotheses are proposed:

**Hypothesis 10 (H10).** *Hedonic motivation significantly influences the continuous use intention of news apps.*

**Hypothesis 11 (H11).** *Personalization plays a role in moderating the causal relationship between hedonic motivation and continuous use intention of news apps.*



### 2.6.6. Habit (HA)

Habit is a behavioral pattern which people inevitably perform because of their past learning [84], and it is a “perceptual construct that reflects the results of prior experiences” [76] (p. 161). After using an app, if users are pleased with the performance, they possibly inculcate habitual behavior and therefore are more inclined to repeat the usage of those apps in the future too [95]. Habit was observed to have an effect on consumers’ intention to use mobile payments [70], mobile apps [81], and the actual use of internet banking services [96]. Moreover, Barnes [97] stated that continuance intention can be determined by habit, while Tam and Santos [82] showed that for continuous intention to use mobile apps, habit is an influential predictor.

Developing habitual use among users remains a crucial element for the continuous use of news apps. Users are responsive towards self-referent personalization [50], and therefore, we believe that it will exert influence on habit to promote continuous use intention for personalized news apps. Moreover, Mark and Vogel [98] argued that perhaps personalization is the key with regard to developing habit for the use of information systems. For online shopping, it has been empirically established that a personalization feature creates re-purchasing habits among users [99]. Krishnaraju and Mathew [49] in their study also postulated that web personalization influences habits and intention to use. Based on the above literature, it can be presumed that due to personalization features, users will get their preferred content, which will help to develop a habit to use the app and consequently keep using it for long-term.

Therefore, the following hypotheses are proposed:

**Hypothesis 12 (H12).** *Habit significantly influences the continuous use intention of news apps under the moderating effect of personalization.*

**Hypothesis 13 (H13).** *Personalization plays a role in moderating the causal relationship between habit and continuous use intention of news apps.*

Hypotheses proposed in the theoretical model are presented in Figure 1.

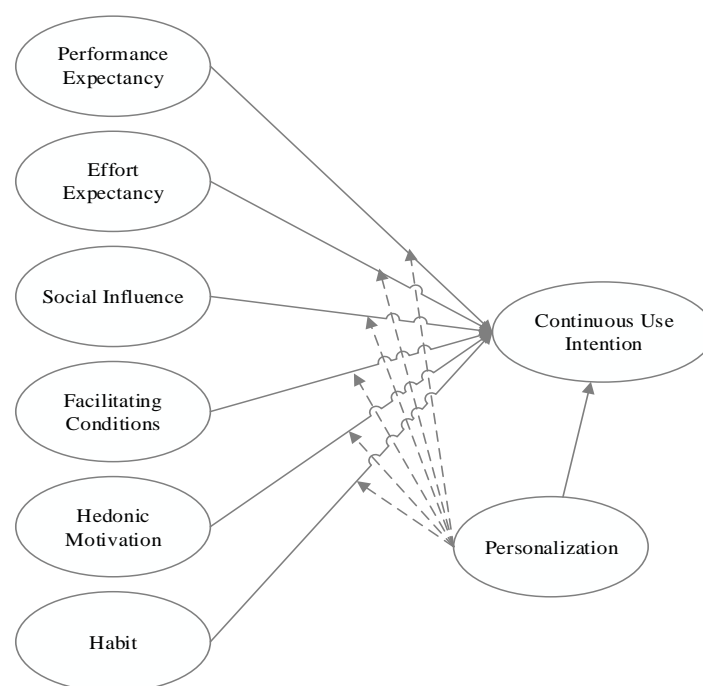


Figure 1. Research model.

### 3. Methodology

#### 3.1. Sampling and Data Collection

The data for the study were collected from three major cities in India—New Delhi, the national capital; Bangluru, the hub of the IT industry; and Mumbai, the financial capital of India. The reason for selecting these cities was that they have a large English-speaking population and people from different parts of the country work there. This provides more generalizability and demographic diversity to our sample. Moreover, all three cities are major urban centers with active smartphone users and high internet penetration. The survey was conducted by sending a questionnaire online, while some samples were collected by distributing a paper questionnaire, over a period of one month, July to August 2019. Since no dataset of news app service users was available, we employed different methods to reach out to potential respondents. Therefore, we used a convenience sampling method, a low budget as well as widely accepted method in information system research [100]. Questionnaires were distributed to working professionals both in public and in private sectors, and some visits were made to the university students, to reach a sufficient response rate.

Each respondent who agreed to participate in the survey was first asked a qualifying question to ascertain whether they were actual users of news apps. Only those who had already downloaded and had been using news apps, at least once in a month, were screened for completing the survey form. All participants were given information at the beginning of the survey form, explaining the intent of the study and secrecy of recorded data, along with their right to pull out from the survey anytime during the study. Participation was on a voluntary basis so as to avoid any potential biases and sufficient time was given to fill out the survey form to avoid overclaim usage. A total of 320 questionnaire forms were received, in which 108 were online and 212 were obtained through the paper questionnaire. Among the online responses, 40 of the respondents were working in public sector units, while 68 were from private companies. In the final analysis, a total of 11 responses, 3 from online and 8 from paper questionnaires, were removed because those responses were incomplete or entries were invalid. Eventually, a total of 309 samples were used for the final analysis, which is more than the threshold level of 200 and adequate to test and validate the proposed model and hypotheses under structural equation modeling [101]. Table 1 represents a profile of the respondents.

**Table 1.** Profile of respondents.

Demographic Characteristics		Frequency	Percentage
Gender	Male	205	66.3
	Female	104	33.7
Age	20–29 years	165	53.4
	30–39 years	105	34.0
	40–49 years	22	7.1
	50–59 years	05	1.6
	Above 60 years	12	3.9
Educational Level	Graduate	100	32.4
	Post Graduate	147	47.6
	PhD	51	16.5
	Other	11	3.6
Frequency of use for one month	1–2 times	67	21.6
	3–4 times	102	33
	5–6 times	113	36.5
	7–8 times	18	5.8
	Above 9 times	09	2.9

### 3.2. Research Instrument

To achieve the objectives of this study, we considered eight factors for our research, which were drawn from the findings of past studies [23,49,102], and modified them to fit the continuous use intention of mobile apps in the context of India. There was a total of 29 questions on the main factors of our conceptual framework. Of the UTAUT2 factors, we followed the original items from Venkatesh and Thong [76] and they were revised to suit the framework of mobile news applications. All the questions of UTAUT2 variables were measured using a seven-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Among the six selected variables, performance expectancy consisted of four questions, such as, “I find news apps useful in my daily life”. Similarly, effort expectancy included four items, such as, “I find news apps easy to use”. Social influence had three items, such as, “People who are important to me think that I should news apps”. The facilitating conditions dimension had four items, such as, “News apps are compatible with other technologies I use”. Hedonic motivation was measured using three questions, such as, “Using news apps is fun”, while habit dimension also had three questions, such as, “The use of news apps has become a habit for me”. In our study, since the price value variable was not part of the framework, it was not included.

To measure personalization, we used five items. The first three questions were selected from the scale developed by Komiak and Benbasat [103], and the last two question were taken from Xu and Luo [102], and were modified and made suitable in the context of news apps. A sample question is, “News apps understand my needs”. To measure continuous use intention, the original three items were adapted from the study of Bhattacharjee [104] and made suitable for measuring news app CUI. A sample item is, “I intend to continue using news apps in future”. Both in personalization and CUI, a seven-point Likert scale ranging from “strongly disagree” to “strongly agree” was used to measure all the items.

### 3.3. Analytical Methods

For preliminary analysis to confirm the suitability of the data for structural equation modeling (SEM) and to describe the demographic profile of respondents, we used SPSS 22.0. It was followed by the three-step approach, in which confirmatory factor analysis (CFA) was performed for confirming the reliability and construct validity of scales. Then, the conceptual model with the proposed direct hypotheses was analyzed using SEM. In the final part, to test the moderating effect of the construct personalization, we performed moderating effect analysis. To carry out all these analyses, we used AMOS 24.0.

## 4. Data Analysis and Results

### 4.1. Measurement Model

In our study, confirmatory factor analysis (CFA) was carried out to assess the measurement model fit and to evaluate standardized factor loadings, reliability, and validity for the variables of interest. To assess the reliability and validity of the constructs, the output values of Cronbach’s alpha, composite reliability (CR), and average variance extracted (AVE) were observed. To estimate the measurement model fit, seven common indices were used  $\chi^2/df$  (<3), GFI (>0.90), RMSEA (<0.08), RMR (<0.08), NFI (>0.9), NNFI (>0.9), and CFI (>0.9) [105]. Table 2 shows the results of CFA, after one of the facilitating conditions items was dropped from the initial output of CFA with 29 manifest variables due to low factor loading.

**Table 2.** Standardized loadings and reliability measures.

Variable and Item	Standardized Loading	CR	AVE
Performance Expectancy ( $\alpha = 0.890$ )			
I find news apps useful in my daily life	0.69	0.896	0.685
Using news apps helps me accomplish things more quickly	0.91		
News apps help me accomplish tasks more quickly	0.90		
Using news apps increases my productivity	0.78		
Effort Expectancy ( $\alpha = 0.862$ )			
Learning how to use news apps is easy for me	0.82	0.866	0.618
My interaction with news app is clear and understandable	0.83		
I find news apps easy to use	0.77		
It is easy for me to become skillful at using news apps	0.73		
Social Influence ( $\alpha = 0.927$ )			
People who are important to me think that I should use news apps	0.85	0.929	0.814
People who influences my behavior think that I should use news apps	0.96		
People whose opinions that I value prefer that I use news apps	0.90		
Facilitating Conditions ( $\alpha = 0.751$ )			
News apps are compatible with other technologies I use	0.89	0.844	0.650
I can get help from others when I have difficulties using news apps	0.97		
I have the knowledge necessary to use news apps	0.91		
I have the resources necessary to use news apps	Dropped		
Hedonic Motivation ( $\alpha = 0.922$ )			
Using news apps is fun	0.81	0.925	0.806
Using news apps is enjoyable	0.97		
Using news apps is entertaining	0.91		
Habit ( $\alpha = 0.851$ )			
The use of news apps has become a habit for me	0.89	0.853	0.661
I am addicted to using news apps	0.77		
I must use news apps	0.77		
Personalization ( $\alpha = 0.934$ )			
News apps understand my needs	0.90	0.932	0.734
News apps know what I want	0.94		
News apps take my needs as their own preference	0.87		
News apps can provide me with personalized news to my activity context	0.80		
News apps can provide me with more relevant information tailored to my preferences or personal interests	0.76		
Continuous Use Intention ( $\alpha = 0.939$ )			
I intend to continue using news apps in the future	0.87	0.940	0.840
I will always try to use news apps in my daily life	0.94		
I will keep using news apps as regularly as I do now	0.93		

The final model had acceptable fit with the data collected ( $\chi^2 = 730.757$ ,  $df = 322$ ,  $CMIN/df = 2.269$ ,  $RMR = 0.0607$ ,  $GFI = 0.855$ ,  $AGFI = 0.817$ ,  $NFI = 0.900$ ,  $IFI = 0.942$ ,  $CFI = 0.941$ ,  $RMSEA = 0.064$ ). Furthermore, to verify the adequacy of the model, we tested convergent validity to determine the correlation between items and their variables. All the values of average variance extracted were above the threshold value of 0.5, confirming the convergent validity of the variables [105]. Then, to evaluate the internal consistency of the variables we assessed CR values. All the constructs had values above the threshold value of 0.7, confirming acceptable composite reliability [105]. To evaluate whether the constructs had reasonable discriminant validity, comparison was made between the average variance extracted of the latent variables and squares of inter-correlation values [106]. Since AVE values were higher, as seen in Table 3, it was confirmed that there was reasonable discriminant validity among constructs.

**Table 3.** Discriminant validity test.

Variable	FC	PER	EE	PE	CUI	SI	HM	HT
FC	<b>0.806</b>							
PER	0.395	<b>0.857</b>						
EE	0.590	0.426	<b>0.786</b>					
PE	0.176	0.504	0.383	<b>0.827</b>				
CUI	0.338	0.498	0.373	0.548	<b>0.916</b>			
SI	0.200	0.400	0.231	0.450	0.319	<b>0.902</b>		
HM	0.278	0.559	0.408	0.515	0.581	0.356	<b>0.898</b>	
HT	0.323	0.470	0.404	0.388	0.542	0.287	0.625	<b>0.813</b>
Mean	6.035	5.238	5.632	3.204	4.976	3.819	4.370	4.972
S.D.	0.915	1.465	0.828	0.786	1.090	1.249	1.122	1.429

Bold values on the diagonal represent the square root of AVE for each construct. Below the diagonal is the correlation coefficients.

#### 4.2. Structural Model

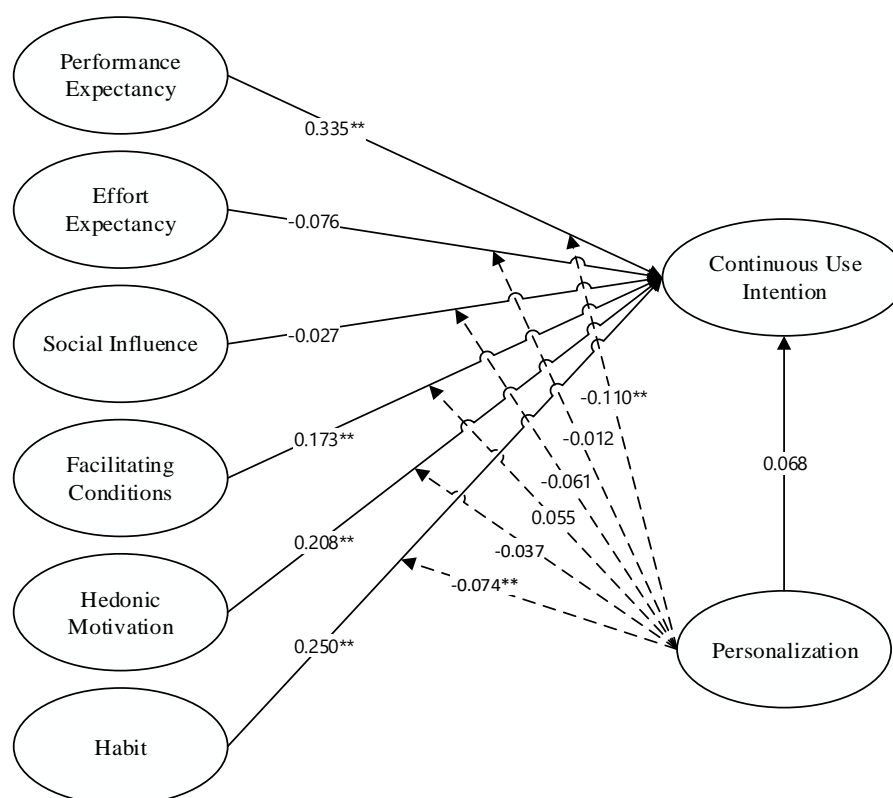
To test and analyze the direct hypothesized relationship in our final model, we employed structural equation modeling (SEM) and the AMOS 24.0 statistical package was used to carry out the process. For the moderating effect of personalization, we conducted the tests suggested by Hayes [107]. To verify the established hypotheses using the path coefficients, acceptable model-fit indices were evaluated first. The results obtained ( $\chi^2 = 951.167$ ,  $df = 323$ ,  $CMIN/df = 2.945$ ,  $p = 0.000$ ,  $RMR = 0.061$ ,  $GFI = 0.819$ ,  $NFI = 0.870$ ,  $IFI = 0.911$ ,  $CFI = 0.910$ ,  $RMSEA = 0.079$ ) indicate that indices were acceptable. The results of hypothesis testing for direct relationships between variables are presented in Table 4 and Figure 2. Personalization did not influence continuous use intention ( $\beta = 0.068$ ,  $t = 1.236$ ,  $p = 0.217$ ), and therefore, H1 was rejected. Performance expectancy influenced continuous use intention ( $\beta = 0.335$ ,  $t = 6.263$ ,  $p = 0.000$ ) significantly, and therefore, H2 was supported. Effort expectancy ( $\beta = -0.076$ ,  $t = -1.327$ ,  $p = 0.185$ ) and social influence ( $\beta = -0.027$ ,  $t = -0.593$ ,  $p = 0.553$ ) were both observed to not have any significant influence on continuous use intention, thus, H4 and H6 were rejected, respectively. Facilitating conditions ( $\beta = 0.173$ ,  $t = 3.203$ ,  $p = 0.001$ ) and hedonic motivation ( $\beta = 0.208$ ,  $t = 3.479$ ,  $p = 0.000$ ) influenced continuous use intention significantly; therefore, H8 and H10 were both supported. Similarly, habit ( $\beta = 0.250$ ,  $t = 3.479$ ,  $p = 0.000$ ) was also found to influence continuous use intention significantly; thus, H12 was supported.

**Table 4.** Overview of hypothesis testing with direct effect.

	Hypotheses	Beta	t-Value	p-Value	Decision
H1	PER -> CUI	0.068	1.236	0.217	rejected
H2	PE -> CUI	0.335	1.236 **	0.000	supported
H4	EE -> CUI	-0.076	1.327	0.185	rejected
H6	SI -> CUI	-0.027	-0.593	0.553	rejected
H8	FC -> CUI	0.173	3.203 **	0.001	supported
H10	HM -> CUI	0.208	3.479 **	0.000	supported
H12	HA -> CUI	0.250	3.479 **	0.000	supported

Note: Critical t-values. \*\*  $p < 0.01$ .





**Figure 2.** Structural equation model with path coefficients. \*\*  $p < 0.01$ .

#### 4.3. Moderating Effect

In the study, we used personalization to moderate the relationship between exogenous variables such as performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, and habit with continuous use intention (dependent variable). For the moderation analysis, we used PROCESS v3.4 in SPSS 22.0 and carried out tests for two-way interactions using model number 1. Regression analysis between independent variables and a moderator was performed to achieve interaction or product term. Based on the results that came out as significant, we plotted the interaction effects on graph using Excel StatTools to understand under which condition the moderation effect was greater. The results of the interaction moderating effect obtained are presented in Table 5. Based on the analyses we conducted, out of six only two hypotheses with some moderating effect were accepted. Personalization at a low level was observed to have a significant moderating impact on performance expectancy with continuous use intention ( $\beta = -0.1109$ ,  $p = 0.0254$ ), thus supporting hypothesis H3. Therefore, a low level of personalization in mobile news apps increases the performance expectancy of users and they are more inclined to continue using it. However, there was no significant moderating effect of personalization between effort expectancy and continuous use intention (CUI), therefore rejecting hypothesis H5 ( $\beta = -0.0126$ ,  $p = 0.765$ ), social influence and CUI, hypothesis H7 ( $\beta = -0.0613$ ,  $p = -0.080$ ), facilitating conditions and CUI, hypothesis H9 ( $\beta = 0.055$ ,  $p = 0.147$ ), or hedonic motivation and CUI, hypothesis H11 ( $\beta = -0.037$ ,  $p = 0.282$ ). Personalization was found to have some moderating effect on habit and CUI, hypothesis H13 ( $\beta = -0.074$ ,  $p = 0.008$ ), at its lower level. Therefore, modest personalization can result in enhancing the habit of using news apps among users and results in continuous use intention.

**Table 5.** Results of the moderating effect of personalization on variables.

Hypotheses	Moderator	Moderation	Coefficient	SE	T	<i>p</i> *	LLCI	ULCI	Decision
Moderating effect of PER b/w PE and CUI									
H3	PER	PE × PER	−0.1109	0.0494	−2.2456 *	0.0254	−0.2081	−0.0137	supported
Moderating effect of PER b/w EE and CUI									
H5	PER	EE × PER	−0.0126	0.0423	−0.2985	0.7655	−0.0958	0.0706	rejected
Moderating effect of PER b/w SI and CUI									
H7	PER	SI × PER	−0.0613	0.0350	−1.7513	0.0809	−0.1301	0.0076	rejected
Moderating effect of PER b/w FC and CUI									
H9	PER	FC × PER	0.0550	0.0378	1.4538	0.1470	−0.194	0.1295	rejected
Moderating effect of PER b/w HM and CUI									
H11	PER	HM × PER	−0.0376	0.0349	−1.0760	0.2828	−0.1063	0.0311	rejected
Moderating effect of PER b/w HT and CUI									
H13	PER	HA × PER	−0.0743	0.0279	−2.6597 *	0.0082	−0.1292	−0.0193	supported

Note: Critical t-values. \*  $p < 0.05$ .

## 5. Discussion, Implication, and Limitations, and Future Research Direction

### 5.1. Discussion

This study's main objective was to validate the key determinants that influence the continuous use intention of mobile news apps and examine the role of personalization in it by applying an integrated model of UTAUT2. The final model consisted of explanatory variables—performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation, and habit—along with personalization as an additional determinant for the use of news apps. Personalization was also used as a moderating variable to understand the relationship between continuous use intention and other key determinants.

The output from the data analysis demonstrated that performance expectancy, habit, hedonic motivation, and facilitating conditions were key determinants that positively affected the continuous use intention of mobile news app users. However, personalization, effort expectancy, and social influence were observed to have no direct influence on the behavior of users. Therefore, it can be deduced that the continuous intention to use mobile news apps is influenced by the users' perceived usefulness of the app, along with habit, hedonic motivation, and facilitating conditions. These findings partially corroborate the findings of previous studies [17,31,96] and substantiate that users place equal importance on the cognitive benefits of reducing time and effort, along with intrinsic utilities like hedonic motivation, in addition to habit and facilitating conditions when using mobile news apps.

By observing the results it can be argued that performance expectancy has the strongest influence on the continuous use intention and is consistent with the findings of Chopdar and Korfiatis [31], who found PE to be the most significant driver of behavioral intention for shopping apps in the US and India. Mobile news apps provide greater mobility, enabling users to access information anytime and anywhere. Since users do not have time to go through newspapers every morning, they look at mobile news apps as a recourse. Therefore, this indicates that the usefulness of the news app service—that is, news apps are convenient, save time, and quickly provide information that they need—influences the continuous use intention. In our research, habit was found to have an important relationship with continuous use intention. The role of habit in app usage intention has been confirmed by Hew and Lee [81] and is an important dimension in the continuous use intention of mobile news apps. This could be attributed to users being more engaged with their smartphones and they inadvertently develop habits for different kinds of apps, including news apps. In addition, given the extent to which human lives revolve around computer technology, individuals have unconsciously become dependent on mobile apps, too.

The study found a strong relationship between facilitating conditions and CUI, which confirms the findings of Venkatesh and Thong [76]. Using mobile news apps requires resources like smart phones, the internet, and mobile internet service. In their absence, there is no way that users can access news apps. In addition, news apps are a new technology and at times people may require some technical assistance, like previews of how to use certain functions in the app. Furthermore, compatibility issues of news apps with other mobile apps regularly used by users also have significant impacts on user behavior. In addition to this, the significance of intrinsic motivation was established, with a positive relationship between hedonic motivation and continuous use intention. Our findings corroborate those of Alalwan [23], who established the influence of HM on CUI for food ordering mobile apps. The findings indicate that Indian users are believed to be satisfied with their mobile news apps usage and are inclined to continue using them if they derive fun, enjoyment, and pleasure from them. The possible reason behind this is that from the user perspective, the functional benefits, i.e., usefulness and performance expectancy, are adequate to ensure users remain satisfied [76]. Therefore, it is argued that hedonic and psychological benefits are vital in forming users' sense of pleasure and the subsequent decision to adopt or discard new products and innovations [80,108].

Conversely, three factors of our model—personalization, effort expectancy, social influence—failed to determine the users' continuous use intention of mobile news apps. It signifies that the users were not much worried by the degree of ease of use in mobile news apps and this is possibly because most respondents were existing users of news apps, and they have overcome the initial challenge of complexity and difficulty of using news apps. Furthermore, the profile of the respondents indicates that the respondents were educated, young, and gained enough expertise in dealing with technology and the internet. Meanwhile, with the advancement of information technology and constant improvisation of smartphones, users now face fewer hurdles in using them. Therefore, our findings were consistent with the results of Lee and Sung [17], who noticed a non-significant impact of effort expectancy on CUI for food delivery apps. Social influence was another non-determinant factor in our study and was in accordance with the previous study of Hew and Lee [81]. SI was found to be not significant, because news surfing/browsing is considered a personal activity, and therefore, it is not easy to influence users and their beliefs and behavior by the people around them. Moreover, the concern for support of a social system reduces as users gain enough knowledge and know-how about technology and how to use it more effectively [71]. Most of the respondents in this study had sufficient knowledge of using mobile news apps.

In contrast to Park [54], who observed that personalization directly influenced the continuous use intention of social networking sites (SNS), we observed that personalization has no significant influence on CUI for mobile news apps. Although, the results corroborate the findings of [98], where the direct relationship between personalization and continuous use intention was found to be insignificant. Perhaps, this is because of the availability of focused apps in a market that provides specific news types. For example, subjects like business, entertainment, weather, or fashion can have particular apps instead of a generic news app, and therefore, personalization has not figured as an important determinant. Since scholars acknowledge the uncertainty over the value potential of personalization [109], we can arguably assume that for news apps' continuous use intention, personalization in itself is not a determinant factor.

Personalization does not have a discernible moderation impact on the relationship between the dependent variable, continuous use intention, and independent variables, effort expectancy, facilitating conditions, social influence, and hedonic motivation. However, personalization was observed to have a considerable impact on performance expectancy and CUI, along with habit and CUI, which is in contrast with the findings of Krishnaraju and Mathew [49]. The results demonstrate that personalization was instrumental in reducing time for task completion and enhanced efficiency. Personalization is able to offer desired information in the right form to the targeted users. However, after a certain point, personalization results in reducing the performance expectancy of users. This outcome validates the findings of Wessel and Thies [62], who observed that adding extra personalization features in

addition to continuous content personalization will reduce the perceived utility. Chen and Hitt [110] also posited that personalization is not always as successful in retaining users as other factors, as personalization may reduce the overall effect. The basic purpose of news apps is to serve users with continuous content. A higher level of personalization would result in several other features of apps—design, interface—competing with each other for the limited attention span of the user, along with its core feature, which is content [62]. Another possible reason is that with higher personalization in a news app, users will have to rely on the quality and dimension of a personalized system, leaving them with little control over the automation process [62]. Since most respondents to our survey were educated, they would not favor a scenario where they are commanded by the recommender system over using their own discretion, which may result in negatively affecting perceived performance expectancy. Therefore, app developers must be mindful of the level of personalization for news apps. Similarly, because of utility benefits, personalization can help to develop habit among news app users, which in turn keep them hooked on the same app. However, if personalization increases it will reverse the relationship between habit and CUI. Habits are formed when users are pleased with their previous experience, which in news apps relates to getting preferred content. The continuous supply of preferred news would eventually develop the habitual dependency of users on a personalized delivery system for news consumption [111], and further intensify their existing news preferences. With the continuous use of personalized news apps, people will eventually be exposed to only particular clusters of information, through which their existing beliefs deepen and they are locked inside the ‘filter bubble’ [111]. Such a situation is incompatible particularly in a nation like India, where an average information seeker is politically aware, heterogeneous, and highly diverse. Setting them in a particular news cycle through enhanced recommendation algorithms would likely backfire, as their information needs are not uniform and constantly evolving. Meanwhile, it is argued that users also develop a negative perception when the information they are receiving is based on their private data [112,113]. Therefore, privacy concerns that emerge out of content personalization affect the habitual behavior of users negatively for availing personalized services.

## 5.2. Implications

From the aspect of theoretical contribution, this research adds to existing literature on mobile news apps in a number of ways. We used UTAUT2 to assess the user behavior for continuous use intention of mobile news apps. UTAUT2 was considered for the study because of its better explanatory power over the TAM and UTAUT models that are widely used for measuring technology acceptance. This study is distinct from others, since no previous research has used UTAUT2 in the context of news apps. Another significant academic contribution of this research is that it integrates the personalization construct with the UTAUT2 model in the domain of news apps. It is unique in the literature and enhances our understanding of the personalization concept within the sphere of mobile apps, an emerging area in IT. This study is also in accordance with the Venkatesh and Thong [76] recommendations on testing UTAUT2 in different contexts, technologies, and countries. More so, our findings are crucial for app developers in a developing country like India, where literature on news apps is scant. This research on the continuous use intention of information technology within the framework of developing nations takes into account factors that are specific to that particular environment. The field of news apps is an emerging area, and this work not only enriches the existing studies but also augments the growing body of literature by identifying variables that affect continuous user intention. Therefore, in the model of our study, the theoretical framework we have proposed can be used as reference for future research on the user behavior of news app services.

In addition to the theoretical contribution, this research highlights the practical and empirical knowledge of factors that form the basis of effective designing and marketing of mobile news apps in India. For example, the role of performance expectancy must be emphasized, as it emerged as the most significant factor predicting the continuous use intention of mobile news apps. Therefore, app

developers need to focus on making their news apps more performance-oriented and convey to users how it is better than traditional sources of news, such as newspaper and television.

The biggest advantage of news apps is that they are ubiquitous, mobile, and easily accessible, and therefore, users expect news apps would save their time and effort, while enhancing their overall performance. News apps must deliver news on time, regularly update news, and provide the latest information on a wide range of issues that the user is seeking. Since some events develop throughout the day, like the share market, developers can keep their users abreast with the latest developments by sending notifications. For special events like election results or budget announcements, news apps must deliver frequent updates to their users. The turnaround and delivery time is a critical element in news apps, as it influences the customers' perception of the usefulness and efficiency of the apps [23]. The use of a personalized service for users will immensely help developers enhance their performance expectancy.

The results of our study also demonstrate that habit plays an important role in the continuous use intention of news apps. However, it must be noted that previous experience of using a technology is a mandatory qualification to inculcate habit. Therefore, it is extremely important for the success of news app developers to manage existing users or those with experience using news apps. The app service providers should encourage users to develop habit by providing distinct services using personalization. For example, they can offer content that caters to the specific needs, likes, or dislikes of the users, or in their preferred language, as part of differential services. Gratifications like discount vouchers to regular users or free passes for special events can also further motivate users to make news apps a part of their routine life.

Hedonic motivation is another factor that keeps people hooked on mobile news apps. This is a clear indication that developers should design applications that are more fun and enjoyable to use. The service providers should also concentrate on making their content interesting, for example, by introducing daily quiz games on news of the day, or creating a separate segment on entertaining videos. If news app service providers are able to give their users happiness, comfort, satisfaction, and pleasure, it will likely result in forming habit.

Similarly, app developers must pay equal attention to the technical aspect of news apps, ensuring that it functions smoothly and consistently without any technical fault or downtime. While technical issues are inevitable, developers need to have the necessary technical support and customer care service to facilitate users to deal with any issue and to ensure successful use of news apps. Regular maintenance is also important for any error free access to new apps. In addition to this, updated versions and compatibility with other applications and smartphone users already using are desirable from news app developers.

### *5.3. Limitations and Future Research Direction*

While the study made an effort to enrich the current body of knowledge on the continuous use intention of news apps in India, there were visibly some limitations in this research. For our study, we used the convenience sampling method, and therefore, the results cannot be generalized as representative of the whole population. By gaining access to databases of news app users from service providers, future researchers can employ different random sampling techniques and avoid this discrepancy. Since the sample for the study was drawn from just three cities, a wider and more representative sample and data collection from more parts of the country would provide more accurate findings. Unlike the original UTAUT2 study, which was longitudinal, the nature of our research was cross sectional. Hence, we were not able to register the changing perceptions of users over the passage of time. Therefore, there is a need for a longitudinal study that would provide more insight, given that news apps are relatively unexplored area.

Moreover, the survey was conducted in urban centers, while nearly 67% of India's population lives in rural areas, with different set of infrastructure and socio-economic conditions. The study under these settings may influence the predictors used in our research differently. Considering these aspects, future



research could further enrich our understanding of the subject. The results in our research observed that effort expectancy, social influence, and personalization have no impact on the continuous intention of news apps among users. This finding does not conform with other studies and therefore there is scope for future studies to re-examine the role of these three constructs. As for personalization, this study attempted to address its significance in mobile apps and user behavior, however, the complexity of the subject calls for further investigations from different perspectives. In this regard, subsequent studies can explore the impact of culture, gender, and education on personalization. Although our study covered a good number of determinants to analyze continuous use intention of news apps, it is suggested that future research studies the quality dimension (information, system, and service).

## 6. Conclusions

This study was an attempt to evaluate the main determinants for the continuous use intention of mobile news apps in India, which is a growing market and requires due scholarly attention. The endeavor of this research was to determine the main predictors of continuous use intention for mobile news apps by extending UTAUT2 and adding personalization as one of the determinants, as well as a moderator. The study was conducted in India, one of the hot markets for app developers, to gain insight from the perspective of a developing nation. We gathered a sample of 309 responses through a structured questionnaire and empirically tested the extended model using SPSS and AMOS. The analytical outcome established that performance expectancy, habit, hedonic motivation, and facilitating conditions are key factors that directly influence CUI. Moreover, personalization does have a mitigating effect as moderator on performance expectancy and habit. Therefore, by focusing these factors, news app developers can draw a successful strategy for a diverse and emerging digital market of India. In addition to this, this study broadens the literature on news apps and user behavior and contributes to the ongoing debate on the effectiveness of personalization.

**Author Contributions:** S.S. and Y.C. conceived and designed the experiments; S.S. and P.S. performed the experiments and analyzed the data; S.S. and K.K. wrote the paper. All authors have read and agreed to the published version of the manuscript.

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