Examining Elderly Internet Adoption: Insights for Internet Marketing Enterprises

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Abstract: This study aims to investigate how the cost of internet access affects its use among the elderly and to explore how internet marketing can motivate this demographic to increase their internet usage. By addressing this research gap, the study seeks to provide insights into the specific economic barriers and promotional strategies that influence internet adoption and usage among elderly users and non-users. While previous research focused on factors predicting the behavioral intention of the elderly to use the Internet, this paper shifts to understanding the financial barriers and the potential of targeted marketing strategies through qualitative and quantitative data collection. 127 elderly users and 51 non-users participated in a questionnaire survey designed using the Unified Theory of Acceptance and Use of Technology (UTAUT). Additionally, 20 users and non-users were interviewed for more detailed insights into the research topic. The findings indicate that the cost of internet access significantly impacts its use among elderly people. This study has important implications for the research community and the technology industry in Iran and beyond, as it highlights the financial obstacles hindering elderly individuals from adopting internet technology. Understanding these barriers can help stakeholders develop targeted strategies to make internet access more affordable and appealing to the elderly, promoting greater digital inclusion and improving their quality of life.

1 INTRODUCTION

The adoption and utilization of Internet technology among elderly individuals have emerged as focal points of interest for various stakeholders, including marketers, policymakers, and researchers. As demographics continue to shift and technology becomes increasingly integrated into daily life, understanding the dynamics of Internet adoption among the elderly has become paramount for effective marketing strategies and policy formulation (Eastman & Iyer, 2004).

Marketers are keenly attuned to the unique needs, preferences, and behaviors of elderly consumers, recognizing the substantial purchasing power and influence this demographic holds. Consequently, comprehending the adoption rates and patterns of technology among the elderly is essential for tailoring marketing efforts to effectively reach and engage this demographic (Tsai & Cheng, 2012). By gaining insights into how elderly individuals adopt technology and engage with digital content, marketers can develop targeted campaigns that resonate with this audience, ultimately driving brand awareness, loyalty, and sales. Moreover, policymakers recognize the significance of addressing digital inclusion among the elderly population to ensure equitable access to information, services, and opportunities in the digital age. Understanding the barriers and facilitators to internet adoption among the elderly informs the development of policies and initiatives to bridge the digital divide and promote digital literacy among older adults (Eastman & Iyer, 2004).

For researchers, exploring the complexities of internet adoption and technology use among the elderly offers valuable insights into the socio-cultural, cognitive, and economic factors influencing technology adoption across different age groups. By delving into these dynamics, researchers can contribute to the body of knowledge surrounding aging, technology, and society, informing future

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interventions and initiatives to enhance the digital experiences of elderly individuals. In essence, the exploration of internet adoption and technology use among the elderly represents a multidisciplinary endeavor with far-reaching implications for marketers, policymakers, and researchers alike. By shedding light on the intricacies of elderly internet adoption, stakeholders can collaborate to develop strategies and interventions that empower older adults to navigate the digital landscape confidently and effectively (Bianchi, 2021).

1.1 Research Aim

This study aims to assess the barriers associated with the cost of internet access and internet devices for elderly people in Iran. It also seeks to identify the facilitators that can enhance internet use within this demographic. Furthermore, the study explores how targeted internet marketing strategies can effectively motivate elderly users to engage more with online technologies.

2 LITERATURE REVIEW

2.1 Online Access for the Aging Population

Early studies exploring technology use among the elderly include one research that focused on smart scanners in supermarkets, digital money transfers, and phone calls. This study reported a low uptake of technology among the elderly. Another study, employing grounded theory, sought to understand the reluctance of the elderly to use the Internet. It found that elderly individuals have a slower learning rate and require more time to adapt to new technologies. However, it also noted that they are enthusiastic about using the Internet and capable of acquiring the necessary skills. Consequently, the researchers suggested that short training courses could help accelerate their internet usage (Svobodova & Cerna, M. 2017).

Further research confirmed lower internet usage among the elderly and noted differences in the services they utilized. For many elderly individuals, the Internet serves as a vital tool facilitating communication through emails and information searches. Men were more likely to use the Internet for seeking information, while older women were more inclined to use it for email communication.

Studies have also examined how the elderly prefer to connect with technology. For example, a survey of 500 elderly respondents in Portugal found that nearly 75% limited their technology usage to mobile phones, while 13% used computers and 10% used the Internet (Neves & Amaro, 2012).

Internet usage among the elderly varies according to cultural and economic conditions. A comparative study of elderly internet use in the UK and Japan found that social interactions significantly enhance aging satisfaction, a key predictor of internet usage. In the UK, elderly individuals who are open to embracing technology are more likely to use the Internet, whereas in Japan, no such relationship is observed (Shirahada, 2019).

2.2 Challenges in Accessing the Internet Among Elderly

Although internet usage brings various advantages for the elderly, including staying active, reducing social isolation, and alleviating loneliness, some studies have pointed out several drawbacks. For example, Svobodova & Cerna (2017) note that while the Internet can keep seniors engaged, those who do not acquire the necessary skills might develop a reluctance to use it in the future. Additionally, Hussain (2018) identifies further issues, such as the financial strain of internet equipment and service costs, which can be challenging for those with limited incomes. Age-related mobility declines can also impact internet use, even though modern smartphones and laptops come equipped with accessibility features to address these issues. Finally, privacy and security concerns are particularly significant for the elderly, who may be more susceptible to pop-ups, phishing scams, and other cyber threats due to their lower awareness of such dangers.

The limitations on internet usage among the elderly encompass more than just potential risks. The absence of well-integrated Internet tools and services tailored to this demographic presents a significant barrier to their readiness to adopt the Internet (Iwasaki, 2013). Furthermore, the dearth of scholarly research on Internet usage by the elderly impedes the creation of a supportive information technology infrastructure for this age group. These constraints collectively hinder the development of an inclusive digital environment for the elderly population (Nikou, 2015). Other researchers have also emphasized that the elderly perceive modern equipment as costly. Coupled with a lack of clarity regarding the internet's utility, they demonstrate disinterest in its usage (Morris, 2007). Studies highlight various barriers to internet usage among the elderly, including limited access, insufficient website navigation and

information retrieval skills, and even ocular discomfort (Loipha, 2014).

Consequently, efforts such as training, awareness programs, and improved internet infrastructure must be coordinated to enhance internet usage among the elderly. Cost has been identified as a significant barrier for older adults, particularly those living on limited or fixed incomes, such as pensions (Cajita MI, 2018). The financial constraints associated with acquiring necessary equipment often deterred this demographic from engaging with e-health technologies. Willson (2021) highlighted that the high cost of the required devices frequently outweighed the perceived benefits, making e-health adoption less appealing. However, the situation changes when the financial burden is alleviated. A study by Smith et al. (2020) revealed that providing free or low-cost electronic devices, such as computers or smartphones, can significantly enhance the adoption of e-health among older adults. By reducing or eliminating the cost barrier, these technologies become more accessible, allowing older adults to reap the benefits of e-health services without the prohibitive expense. This finding underscores the importance of considering economic factors when promoting e-health initiatives to ensure broader and more equitable access for all older adults.

2.3 Understanding Technology Adoption in Seniors Using the UTAUT Model

The Unified Theory of Acceptance and Use of Technology (Venkatesh, 2011) stands out as one of the most prevalent theories to analyse technology adoption trends. Consequently, numerous researchers have applied it to investigate factors influencing the elderly's adoption of internet-based services. For instance, a study examining the adoption of mobile health services among the elderly revealed that performance expectancy, effort expectancy, and social influence positively influenced their intention to adopt these services (Ozdil & Hoque, 2017). Conversely, elderly individuals with high technological anxiety and resistance to change were less inclined to use the Internet.

In a separate study focused on the adoption of mobile banking among elderly populations in Spain, factors such as price value and habit, in addition to performance and effort expectancy, emerged as significant predictors of technology adoption (Arenas, 2015). These findings align with previous research, which emphasized the importance of performance and effort expectancy as critical determinants of technology use (Jang, 2017). Similarly, another study highlighted the significance of performance and effort expectancy in predicting technology adoption, specifically with smart home devices and the Internet of Things (Pal, 2018). Moreover, the study underscored the importance of expert advice and trust as influential factors shaping the elderly's intention to use the Internet.

Research has also shed light on the generational gap in technology adoption. For instance, a comprehensive study spanning respondents aged nine to 99 years uncovered stark differences in technology usage patterns between the youngest and oldest participants (Magsamen-Conrad, 2015). In this study, effort expectancy and facilitating conditions emerged as the primary predictors of intention to use tablets. Based on these findings, researchers recommended implementing training programs tailored to the elderly to enhance their technology usage, consistent with earlier findings (Naumanen & Tukiainen, 2007).

3 RESEARCH METHODS

3.1 Ethical Approval

This study was conducted in accordance with the ethical guidelines set forth by Multimedia University. Ethical approval was obtained from the Multimedia Ethics Committee, affiliated with Multimedia University. The study adhered to the principles outlined in the Declaration of Helsinki and followed the specific ethical guidelines.

3.2 Informed Consent

Informed consent was obtained from all participants prior to their involvement in the study. Consent was documented as written or verbal consent. For participants who provided written consent, this was done through a signed consent form that outlined the purpose of the study, the procedures involved, and the rights of the participants, including the right to withdraw from the study at any time without penalty (See it in appendix section). For participants who provided verbal consent, this was due to illiteracy or cultural practices. Verbal consent was documented; the interviewer took audio recordings and detailed notes. The researchers ensured that all participants fully understood the study's objectives and their rights before proceeding with data collection.

The research methodology has been carefully selected and structured to guarantee that the necessary data is collected appropriately, ensuring the process

maintains sufficient rigor (Gray, 2014). This study utilizes a mixed methodology approach to examine the factors related to the cost of accessing the Internet influencing the elderly population's decision to use the Internet in Iran. The selection of this research design was motivated by the objective of obtaining comprehensive insights from a diverse sample of the elderly population in Iran. This study employs both survey data and in-depth interviews to explore their perspectives on internet usage thoroughly. Great care was taken to enhance the content validity of the questionnaire. Expert opinions were sought at multiple stages and reviews were conducted to ensure accuracy. Initially, an English questionnaire was translated into Farsi by a language expert from the English Institute of Education. Another Persian language expert from the same institute then reviewed the translation. Experts discussed the questionnaire to eliminate any ambiguous items. Finally, a pilot study with four students of different grades was conducted. Consequently, the content validity of the questionnaire is considered very high.

The hypotheses were formulated to provide a framework for the data analysis.

H1: The Affordability of Services (AS) has a significant impact on the Internet usage among the elderly population in Iran.

H2: The Affordability of Devices (AD) has a significant impact on the Internet usage among the elderly population in Iran.

A sequential explanatory design was employed, wherein the results from the questionnaire survey informed the formulation of open-ended questions for the subsequent interviews.

In this study, a sampling frame of the elderly population (aged 60 and above) in Iran could not be created due to a lack of up-to-date information. Consequently, non-probability sampling was used, affecting the findings' generalizability. Despite this, purposive sampling ensured a representative sample by capturing responses from elderly individuals across various regions and age profiles in Iran. Table 1 presents the demographics of the participants who were questioned.

Table 1: Demographic details of the sample.

Demographic Characteristic	Frequency	Percentage	Mean	SD	Min	Max
Gender						
Male	87	48.9				
Female	91	51.1				
Age			66.73	5.75	60	88
60-65 years	89	50				
66-70 years	56	31.46				
71-75 years	17	9.55				
78-80 years	12	6.74				
81 -90 years	4	2.25				

The researcher selected respondents from places like mosques, organizations of retired people, and parks, where elderly people are more likely to be found. 200 questionnaires were collected, with 100 from Broujerd and 100 from Tehran. After excluding 22 incomplete questionnaires, the final sample size comprised 178 responses.

Convenience sampling was implemented for the interviews to enable the inclusion of both internet users and non-users among the elderly population. Tables 2 and 3 present the demographic profile of internet users and non-users among the elderly interviewees in the study.

Table 2: Demographic Profile of the user Interviewees.

	Users		
Demographic Characteristic		Frequency	Percentage
Gender	Male	10	50
	Female	10	50
Age	60-65 years	5	25
	66-70 years	9	45
	71-75 years	4	20
	78-80 years	2	10
Highest Level of Education	High School	4	20
	Diploma	10	50
	Masters	4	20
	Doctoral	2	10
Occupation	Retired	11	55
	Housewife	3	15
	Self-Employed	2	10
	Working	4	20
Marital Status	Single	10	50
	Married	6	30
	Divorced	2	10
	Widow/er	2	10
Living Status	Alone	14	70
	With children	1	5
	With Spouse	5	25
Income Range (T)	Less than 1,000,000	Nil	0
	1,000,000-5,000,000	16	80
	More than 5,000,000	4	20

Expert feedback was obtained during various stages of its development to ensure the survey instrument's validity and reliability. The finalized questionnaire contained 32 items, evaluating different

Table 3: Demographic Profile of the non-user Interviewees.

	Users		
Demographic Characteristic		Frequency	Percentage
Gender	Male	12	60
	Female	8	40
Age	60-65 years	3	15
	66-70 years	13	65
	71-75 years	2	10
	78-80 years	2	10
Highest Level of Education	High School	10	50
	Diploma	6	30
	Masters	4	20
	Doctoral	Nil	0
Occupation	Retired	8	40
	Housewife	4	20
	Self-Employed	6	30
	Working	2	10
Marital Status	Single	15	75
	Married	2	10
	Divorced	Nil	0
	Widow/er	3	15
Living Status	Alone	13	65
	With children	5	25
	With Spouse	2	10
Income Range (T)	Less than 1,000,000	Nil	0
	1,000,000-5,000,000	19	95
	More than 5,000,000	1	5

aspects of UTAUT as well as demographic information, using a Likert-type scale from one to five. This research has adopted an interpretive epistemological perspective to effectively integrate quantitative and qualitative. Data analysis conducted in this study was well-suited to the mixed-methods approach of the research design. All questionnaire responses were input into SPSS version 22 for the quantitative segment. The initial statistical analyses aimed to provide descriptive statistics of the collected data. This included examining the demographic characteristics of the respondents, such as gender, age, education level, occupation, current monthly income, marital status, living arrangements, and the monthly budget allocated for internet use, with the analysis utilizing mean values and standard deviations to summarize the information. The affordability of services and devices was assessed using items derived from the studies by Dwivedi, Khoumbati, and Lal (2007) for cost elements and Kuo and Yen (2009) for perceived cost elements. These items, presented in Table 4, were reviewed and adjusted to create the final list for the affordability scale.

Table 4: Elements that Measure Affordability of Services and the Sources.

Element Codes	Element Statements in this study.	Source
AS1	The cost of internet services today is expensive.	(Dwivedi et al., 2007)
AS2	Unlimited internet service is expensive.	
AS3	The cost for buying extra service to watch online videos is costly.	(Kuo & Yen, 2009)
AS4	Government should provide some subsidy for the elderly to pay for internet services.	
AS5	Internet service providers should reduce the price of service packs.	
AD1	Personal internet devices are expensive.	(Kuo & Yen, 2009)
AD2	The price of the internet devices should be reduced.	(Kuo & Yen, 2009)
AD3	The cost of Internet modem is high.	
AD4	The price of buying an internet modem should be subsidized.	

The data analysis involved using a MANOVA to compare the responses to AS and AD between users and non-users. All the initial conditions required for conducting the MANOVA were satisfied.

4 RESEARCH RESULTS

An analysis of the mean values for all items, as reflected in Table 5, revealed that the statement "The prices of Internet devices need to be reduced for the elderly" received the highest rating, with a standard deviation of 0.71. In contrast, the statement "Using the internet enables me to access and send information" received the lowest rating, with a mean of 1.96 and a standard deviation of 0.89. The normality of the data distribution was evaluated using the Kolmogorov-Smirnov test, which produced significant results, a common occurrence in large sample sizes.

Table 5: MANOVA between elderly users and non-users of the internet.

Dependent Variable	**F**	***df***	**Significance**	**Partial Eta Squared**	**Estimated Marginal Means**
Affordability Services	of.022	1	.882	.000	19.84 19.75
Affordability Devices	of27.181		.00	.134	16.42 18.63

According to the results, elderly internet users and non-users significantly differed in their perceptions of the Affordability of Devices (AD), with a p-value of .00. The effect size for this relationship was estimated at 13.4% for AD. An examination of the Estimated Marginal Means indicated mean values of 16.42 for users and 18.63 for non-users. Additionally, the results of the ANOVA test demonstrated that this difference was statistically significant.

Table 6: T-test between user and non-user with the affordability of devices and services.

User and Non-User	Leveness's test for equality of variances [t-value]		Significance value	Significance Value-Two Tailed
	Equal variances	Equal variances not assumed		
Affordability of Services	0.947	0.947	0.878	0.345
Affordability of Devices	-1.530	-1.537	0.003	0.126

Looking at the Mean values shown in Table 6, the Estimated Marginal Means show that the differences between users and non-users is statistically large for affordability of devices.

Table 7: ANOVA for Regression model.

Model	Unstandardized Coefficients		Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	Part
1(Constant)	3.27	1.98		1.66	.10	
Performance Expectancy	.235	.067	.32	3.49	.001	.303
Effort Expectancy	.189	.063	.233	3.02	.003	.193
Social Influence	.316	.083	.313	3.80	.00	.243
Facilitating Conditions and Knowledge Acquisition	-.032	.103	-.022	-.310	.78	-.020
Affordability of Services	-.054	.066	-.061	-.822	.413	-.053
Affordability of Devices	-.067	.096	-.053	-.701	.485	-.045

Looking at the values of the ANOVA test in Table 7, the data analysis indicated a significant disparity between elderly Iranian Internet users and non-users, confirming the validity of hypothesis H1. This finding highlights a noteworthy variation in Internet usage patterns among the elderly population in Iran, underscoring the importance of considering user status when studying this demographic.

The interview results have been summarized using the 6Cs framework, as proposed by Glaser (Glaser, 1992), shown in Figure 1.

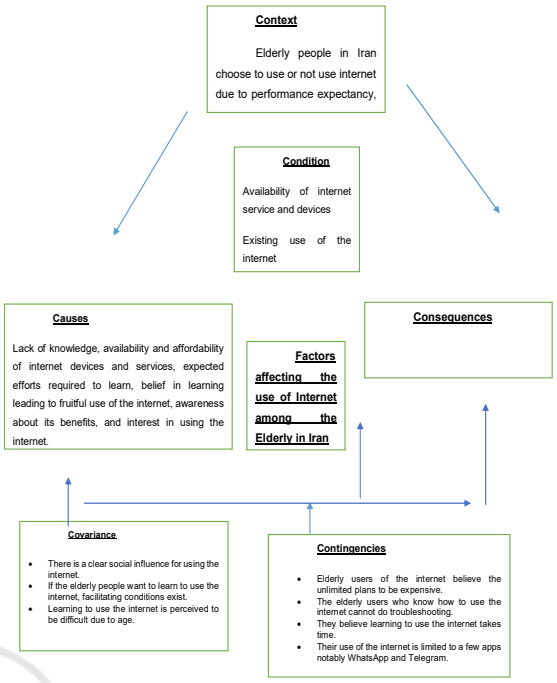

Figure 1: 6 Cs Framework for factors affecting Internet usage, adapted from Glaser (1992).

The 6Cs framework has elucidated the causal relationship between limited internet knowledge, the availability and affordability of internet devices and services, and other associated factors. Facilitating conditions, such as access to devices, internet connectivity, support from a coach (often a family member), and the possibility of immediate resolution of tasks online, significantly enhance the likelihood of elderly individuals learning to use the internet. On the other hand, contingent factors include the perception that internet plans and devices are costly. However, some users have indicated that this perception is not always accurate and varies depending on the internet service provider. This highlights a knowledge gap identified in previous studies, suggesting that addressing this gap could lead to increased internet usage among both current users and non-users.

4.1 Discussion

The findings indicate that elderly users and non-users have different views regarding the affordability of devices (AD) and services (AS). Although the affordability of devices might stay the same, the users' opinions could change once they recognize the benefits of the internet. Users who have experienced the advantages of internet connectivity, such as access to information, social interactions, and convenience,

tend to view the cost of devices and services more favorably. Non-users, on the other hand, often perceive these costs as prohibitive and fail to see the value proposition. Additionally, interview insights revealed that many non-users viewed the prices of unlimited internet data plans as high and not tailored to their needs. As demonstrated by certain users, increased awareness could guide these individuals towards more affordable options from other service providers in Iran. Regarding the conceptual model based on UTAUT used in the previous study, the results of the multiple regression analysis showed a connection between AD, AS, and behavioral intention to use the Internet among elderly people in Iran.

4.2 Suggestions for Internet Marketing Enterprises

Policymakers can draft better-informed policies by leveraging insights to offer awareness programs and short training sessions for the elderly, addressing this demographic's unique challenges and needs. As the global population ages, the necessity for targeted interventions becomes increasingly evident. Awareness programs can educate seniors about essential topics such as health management, financial literacy, digital literacy, and social engagement. These programs ensure that the elderly are equipped with the knowledge to navigate modern complexities, promoting their independence and quality of life. Short training sessions can also provide hands-on experience in crucial areas such as using technology, understanding healthcare options, and preventing fraud. Such initiatives can significantly reduce the risk of isolation and vulnerability among older adults.

Furthermore, policymakers can enhance these efforts by offering unlimited internet packages specifically tailored for the elderly, alongside providing free or affordable internet devices. These initiatives can include subsidized or free installation services to ensure that all seniors, regardless of their technical proficiency, can easily access and utilize the Internet. This connectivity is crucial for maintaining social connections, accessing online services, and engaging in lifelong learning opportunities. By ensuring that the elderly have reliable and affordable access to the internet, policymakers can help bridge the digital divide that often marginalizes older adults.

Government cooperation is essential in these endeavors. Partnering with technology companies, internet service providers, community organizations, and governments can create a comprehensive support system for the elderly. This collaboration can facilitate the distribution of resources, ensure the sustainability of these programs, and monitor their impact on the elderly population. Engaging with geriatrics, technology, and education experts during the policy drafting process ensures that these initiatives are well-designed to meet the specific needs and preferences of older adults. Additionally, involving the elderly community in the planning stages provides invaluable feedback, further refining these initiatives to maximize their effectiveness. Ultimately, policies that incorporate these insights can lead to a more informed, empowered, and resilient elderly population, contributing to the overall well-being and social cohesion of society.

Here are several suggestions for internet marketing strategies targeting elderly individuals:

Targeted Advertising Campaigns:
Educational Content: Create advertisements that emphasize the benefits of internet usage tailored specifically to the interests and needs of elderly individuals, such as staying connected with family, accessing healthcare information, and online shopping.
Success Stories: Share testimonials and success stories from elderly internet users to build trust and demonstrate the value of being online.

Special Discounts and Promotions:
Senior Discounts: Offer special discounts for elderly users, particularly for unlimited internet plans, to make them more affordable.
Bundled Packages: Develop bundled packages that include affordable internet devices and service plans, reducing the initial cost barrier for non-users.

Collaborations with Healthcare and Other Organizations:
Healthcare Partnerships: Partner with healthcare providers to promote internet usage among elderly patients, emphasizing the health benefits of online resources.
Community Programs: Work with community centers and senior organizations to offer workshops and training sessions on how to use the internet effectively and safely.

Enhanced Customer Support:
Dedicated Helplines: Establish dedicated customer support helplines for elderly users, assisting with setting up and using internet services.
In-Home Support Services: Offer in-home setup and troubleshooting services to help elderly users get started with their internet devices and services.

User-Friendly Technology:
Simplified Devices: Promote and provide user-friendly, specifically designed internet devices for seniors, with larger text, simplified interfaces, and easy-to-navigate features.
Training and Resources: Provide easy-to-follow guides, tutorials, and online resources to help elderly users become comfortable with their new devices and internet services.

Awareness Campaigns:
Local Community Outreach: Conduct outreach programs in local communities, hosting events and seminars that explain the importance and benefits of internet usage for the elderly.
Health Benefits: Highlight the mental health benefits of staying connected and engaged online, which can combat loneliness and promote a more active lifestyle.

Implementing these strategies can help bridge the digital divide for elderly individuals, making internet access more appealing and accessible to this demographic.

4.3 Data Availability Statement

The data that support this study's findings are available upon reasonable request. However, due to ethical and privacy concerns, some data, particularly those containing personally identifiable information of the participants, cannot be publicly shared. Researchers interested in accessing the data should contact the corresponding author at tina.houshangi@gmail.com for further information. The data will be provided following the approval of an appropriate data-sharing agreement to ensure compliance with ethical guidelines.

5 CONCLUSION

This study provides significant insights into the barriers and facilitators of internet adoption among the elderly in Iran, focusing on the financial constraints associated with internet access and devices. The findings confirm that the cost of internet services and devices is a critical factor that influences whether elderly individuals choose to engage with digital technologies. The study also highlights the disparities in perceptions between internet users and non-users within this demographic, where non-users often view the costs as prohibitive. In contrast, users, once aware of the benefits, are more accepting of the associated expenses. Furthermore, applying the Unified Theory of Acceptance and Use of Technology (UTAUT) model underscores the importance of performance expectancy, effort expectancy, and social influence in shaping the behavioral intentions of elderly individuals towards internet usage. The study also identifies that targeted marketing strategies, such as awareness programs, discounted packages, and tailored internet services, can play a pivotal role in overcoming the economic barriers that hinder internet adoption among the elderly. This research contributes to the existing body of knowledge by offering actionable recommendations for both policymakers and marketers to enhance digital inclusion among the elderly. By addressing the financial barriers and leveraging targeted marketing strategies, stakeholders can foster greater internet adoption within this demographic, ultimately improving their quality of life and bridging the digital divide.

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