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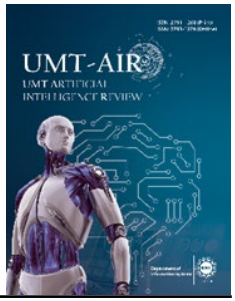

Title: **Factors Behind Virtual Reality (VR) Enactment for Netflix Watching in Pakistan: An Integrated SEM-ANN-based Study**

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Factors Behind Virtual Reality (VR) Enactment for Netflix Watching in Pakistan: An Integrated SEM-ANN-based Study

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ABSTRACT From the Netflix perspective, "entertainment is just like you eat buffet." In this regard, Netflix services prefer to deploy modern technology solutions that facilitate the consumers regularly. By keeping in view the potential integration of modern technology in Netflix watching, the current study adopted an integrated SEM-ANN technique to scrutinize some basic characteristics of Netflix as dynamic mechanisms of Virtual Reality (VR) adoption in Pakistan. The current research used a self-proposed study model and randomly selected a sample of n= 400 students from n= 4 private sector universities in Islamabad. The analysis, using Structural Equation Modelling (SEM) results, indicated several significant associations. Specifically, it was observed that social influence, satisfaction, and relevance were notably linked with Netflix usage. Additionally, there was a robust and statistically significant relationship between Netflix usage, perceived ease of use, and behavioral intention. Furthermore, perceived ease of use and behavioral intention demonstrated significant correlations with virtual reality adoption. In the subsequent Artificial Neural Network (ANN) analysis, an accuracy of 51.1% was achieved during the training phase and a further improvement to 54.4% during the testing phase. In light of these results, while adopting technology in Pakistan may have been relatively gradual, the transition from conventional media to social TV, integrated with VR, marks the inception of a new technological era in the country. This shift holds important implications for the media landscape and consumer behavior. Finally, the study limitations and contributions have also been discussed accordingly.

INDEX TERMS behavioral intention**,** Netflix, Pakistan, perceived ease of use, Virtual Reality (VR)

I. INTRODUCTION

Television is one of the most popular electronic sources of information, entertainment, and education. Earlier, the advent of digital technologies and satellite television contained many channels and provided the desired content to its audiences. For instance, information regarding politics, culture, weather, and entertainment through different video content including dramas, sports events, and comedy programs are the fundamental components of television content [1]. Besides information and entertainment, education is another most prominent part of television content. Television channels are nowadays specially designing different and innovative content regarding education for junior and senior-level students. However, the term "television" has altered tremendously regarding its hardware and software characteristics during the past few years. In this regard, “Social TV” is one of the most widely used terms that indicates a

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transformative change and improvement in television as a technologically revolutionized version of conventional television. The term "Social TV" is previously known and is now attaining increased attention from technological researchers and stakeholders. Furthermore, Social TV watching has been divided into three primary categories: group watching experiences, updated information, and recommendations. With these categories, the usage and advantages of Social TV can be further identified into different dimensions. Social TV indicates a substantial shift in the existing patterns of communication, entertainment, information, and education. Different social networks, such as Twitter, Facebook, Instagram, and others are now incorporated with widely available video content websites. Motorola Social TV, Tata Sky India, Nayatel Pakistan, and many other internet-providing companies have introduced more services that enable television devices to communicate directly with the internet, allowing access to different social networking platforms and Social TV websites. Today's popular Social TV-based platforms include YouTube, Amazon Prime, Netflix, Hulu, Viki, PLEX, WebTV, Playit, Twitch, Amazon Fire TV, IPTV Smarters, IQIYI, DAZN TV Time, OSN, DailyMotion, and many others. The abundance of Social TV applications also signals the potential commercial interests for incorporating social networks with television and even live streaming.

Similarly, from the Netflix perspective, "entertainment is just like you eat buffet". Especially for teenagers, Netflix is a synonym for television watching. However, not all millennials were born with strong exposure to internet technology, yet they have increased exposure to social TV-based content today. It is also notable that Netflix content is not based on conventional seasonal and weekly programs. Instead, it has new styles and contemporary content that is unique, regular, and easily available through simple internet subscription-based services. Notably, Netflix was debuted in 2018 in Pakistan as a collaboration with Pakistan Telecom Limited (PTCL). It was gradually distributed by many other internet services providers to enhance the entertainment experiences of the local audience. Despite a duplicate platform, Iflix was already working, however, the advent of Netflix was a revolutionary step to merge television with the internet for entertainment and communication purposes. PTCL also offered six months of free Netflix subscription to their consumers. According to Netflix, the local entertainment industry brought local and popular American culture together under one umbrella.

Modern media is continuously evolving, merging communication, education, information, and entertainment. These transformations in media along with the incorporation of technology also indicate structural changes in media industry and technological revolution as a fundamental part of our lives. Besides, the integration of social media with television also provides an insight into digital intelligence which helps to improve television watching experiences. Digital platforms are based on intelligent systems, mainly known as "Artificial Intelligence (AI),. AI has received considerable attention due to its combination with digital architecture, digital sensors, and software-based automation services. However, media platforms are much improved and intelligent in various ways. AI in different fields, particularly media has become more ubiquitous. Large media services, such as

Netflix, Spotify, Amazon, and many others prefer to deploy modern technology-based solutions that regularly facilitate consumers. These unique AI-based media systems provide the users with improved services, increased chances of communication, content management, and content suggestions. As the media industry is evolving to embrace AI-centric models and approaches, they are digitalizing their existing system by integrating communication and entertainment in the same category, removing human labor and management skills that help to enhance the technology experiences of the audiences in a better possible manner.

Accompanied by AI, with the inception of Netflix as a leading Social Television service, the factors influencing Social TV usage in Pakistan were examined in the current study. Besides, the characteristics of Netflix as dynamic mechanisms of modern technology adoption in Pakistan were also linked and analyzed. Notably, despite brisk Netflix usage and wearable Virtual Reality (VR) integration, yet no study highlighted or investigated the Netflix usage linked with wearable VR device which indicates a major research gap in this arena. It is also worth noting that, after the COVID-19 outbreak, the Netflix adoption and dependency also increased, indicating a grey area demanding conducted and explored factors behind its usage as a social network in general and Social TV platform in particular. For this purpose, the first phase of the current study involves elaborating core concepts including problem statements. Whereas, the second phase comprises literature containing supportive studies to propose the study model and hypotheses. The third phase includes study methodology and justification of the study methods. The fourth section comprises data analysis and results. Finally, the fifth section discusses the results and recommendations accordingly.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

A. THEORETICAL UNDERPINNINGS

The theoretical framework of the current research is based upon two well-established models: the Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM). These models examine the factors affecting Social TV usage in Pakistan, especially in the context of Netflix's emergence as a major Social Television service, accompanied by AI integration. Both TPB and TAM provide stronger insights as TPB delves into the behavioral intentions and social influences affecting Netflix adoption [2]. At the same time, TAM highlights the critical aspects of perceived usefulness and ease of use. Together, these two models offer a potent framework to understand and predict the adoption of Netflix, especially in conjunction with emerging technologies, such as wearable VR devices. In addition to their merits, the incorporation of TPB and TAM brings a synergistic benefit to understand the adoption of Netflix [3], especially in the context of wearable VR integration. TPB provides a detailed understanding of the social and psychological factors affecting individual behavior. Regarding the Netflix adoption, the relevant theory provides insights pertaining to the intricate interplay of attitudes, subjective norms, and perceived behavioral control. This is especially relevant while considering the potential impact of social networks, where recommendations from friends, family or influential figures can significantly persuade individuals' intentions to adopt Netflix with VR.

On the other hand, TAM's focus on ease of use aligns perfectly with the technological aspect of Netflix's adoption. With the integration of VR, users need to perceive both the content and technology as beneficial and accessible. TAM's structured process helps to assess how users perceive the value of combined Netflix-VR experience and how user-friendly they find the integration. Additionally, the TAM model acknowledges the crucial role of external influences, such as social recommendations. This aspect synergizes with TPB, since social influence is a critical component of TPB. When individuals receive positive feedback or observe others enjoying the Netflix-VR experience, it can significantly strengthen their belief in ease of use, eventually influencing their adoption behavior [4].

B. SOCIAL INFLUENCE IN NETFLIX ADOPTION

The rise of several social networking platforms led many researchers to determine the factors that affect an increased social networking adoption. The services, such as accessibility, ease of use, user-generated content dissemination, and others are dominant, affecting accelerating social networking adoption among the users. However, this increased usage behavior also depends on variables, such as peer pressure, word of mouth, and social influence to adopt digital media usage. The social influence process is mainly described in terms of adopting special online services according to the recommendations of the other users [5]. Especially, those who regularly use it have a positive opinion about it. They share their opinions with others through three broad categories of social influence: identification, internalization, and compliance. These three categories are considered as the most suitable approaches to examine the users' technology adoption, integration, and usage experiences which further lead to users' acceptance of digital technology for various purposes.

Many researchers have analyzed the role of social influence framework in many areas, particularly network and externalities and the digital communication process. Furthermore, increased penetration of different digital devices that are portable, wireless, rechargeable, and can be taken anywhere also enhanced social networking acceptance among the users. A study [6] also examined the role of social influence in Netflix acceptance among the users. The researchers adopted a technology acceptance framework and gathered data from n= 251 individuals by using Netflix for entertainment and communication purposes. Results indicated that social influence works as an important factor in Netflix usage. Here, the perceived ease of use and usefulness are foreground factors that lead to positive perceptions about Netflix adoption.

Furthermore, these factors are also among the leading cause to suggest the other internet users take Netflix under consideration. Therefore, in the evolving media industry in terms of hardware and software, social influence is helping people to adopt and integrate several social networking platforms. Resultantly, today, Netflix has become a part of our daily entertainment needs, with an increasing number of users worldwide.

H1: Social influence has a positive impact on Netflix usage.

C. SATISFACTION IN NETFLIX ADOPTION

Different social networking platforms, such as Facebook, Twitter, YouTube, GooglePlus, blogs, and many others are

widely adopted by various industries. Social networking adoption has rapidly integrated from large companies to domestic level users during the past few years. For instance, many internet providers, such as Alphabet, Amazon, Jd.com, GeoCinema, Verisign, Zynga, Twilio, Sina Corp, Snap, and others were the early adopters of social media. These platforms provided their consumers with basic internet services and integrated several attractive packages to switch their conventional entertainment preferences to Social TV platforms [7]. Notably, internet service providers focus to provide improved and unique services to maximize users' Satisfaction. These companies consider users' Satisfaction as a primary source to attract more consumers. For this purpose, they keep on introducing new services and various social networking platforms to improve their communication, information, education, and entertainment experiences.

Additionally, the consumers search for online platforms that need minimum efforts to enhance one's social life experiences and collaboration by utilizing simple technological devices. According to [8], this brisk technology adoption is directly attributed to the technical characteristics at different levels. These characteristics are usually associated with shaping and controlling one's technology acceptance and usage, indicating Satisfaction as their main indicator of internet acceptance and integration.

Similarly, when the DVD subscription service first introduced Netflix in 2007, the main concept was technology acceptance as a source of enhancing one's internet usage satisfaction. In this context, the first preference was to introduce services free from conventional antenna and heavy devices, such as boxed televisions, receivers, and the internet. Secondly, real-time internet streaming and even program downloading services further promoted and enhanced Netflix adoption among potential users. The popularity of Netflix can be determined because today, Netflix has more than 209 million users worldwide, yet this adoption process is still growing day by day [9]. Arguably, service providers are keeping pace with rapidly changing and booming technological devices, such as smart televisions, smartwatches, tablet devices, screen projectors, and others. These devices are necessarily web-enabled which have the potential to directly connect with the internet through wired or wireless internet modems. Moreover, Netflix and other similar platforms are subscription-based and quite affordable for the users. They provide multiple screens subscriptions that further satisfy the clients to log in and watch their favorite content whenever and wherever they want [10].

H2: Satisfaction has a positive impact on Netflix usage.

D. RELEVANCE IN NETFLIX USAGE

Internet-based digital platforms have been evolving for many years, and the relevant process continues. Some researchers attributed it to the initial form of electronic mail when communication was a direct and two-way process with an instant communication facility [11]. At the same time, some consider it as a part of contemporary technological development process. However, digital technology has a strong relevance with the conventional mass media platforms. As noted, Marshal McLuhan also proposed the booming media technology in the future to explain the mass media. For instance, when an electric bulb is used for brain surgery or a sports event, the main component that facilitates this process is the "electric bulb."

Without the bulb, these functions cannot be performed. This example highlights the stance "medium is the message" as being a medium, the electric bulb controls and scales the activities and shapes human interaction and action. Furthermore, McLuhan cited an example of IBM as a company providing business equipment and further facilitating the innovation and its integration process in the best possible manner.

Today, this technology is taken over, adopted, and regulated by many companies, showing a stronger social and economic relevance that has increased during the last two decades. Moreover, it also enables the users to communicate with others, share and receive messages, providing real-time face to face conversation, entertainment, and information, education and further sharing social networking experiences [12]**.** Social TV is accompanied by primitive characteristics that increase customers' switch to new media from the conventional television watching patterns. Today, the audience has increased chances to interact more with the system and enhance their prior television watching experiences. Despite increased functionalities sometimes resulting in obscuring content, its adoption is briskly penetrating.

H3: Relevance has a positive impact on Netflix usage.

E. EASE OF USE AND BEHAVIORAL INTENTION IN NETFLIX USAGE

A few years ago, the digital revolution started with just a single cable and desktop/personal computer system that virtually eliminated the time, distance, language, culture, and other barriers. The development of internet-based communication, entertainment, information, and education-based platforms has widely influenced humankind by incorporating technology in almost every field of life. There is a clear difference between conventional and digital media's speed, accessibility, and usefulness. This difference is due to the nature, design, and structure of new media technology that provides users with maximum ease of use and simple features that enable them to access their desired content with just a single click. Moreover, the rapid advancement of internet-enabled devices, including smartwatches, mobile phones, and tablets, further increased opportunities to modify communication and entertainment patterns [13]. Resultantly, the technological revolution gave rise to new models of entertainment and communication, indicating a rapid emergence of new platforms that incorporated content containing both communication and entertainment for their users. Today, users are not only capable to entertainment themselves, however, they can also communicate and interact with each other to share their television watching experiences through online discussions. Particularly, Netflix allows people to communicate anytime, anywhere, with ease of usage. Due to this specialty, today, Netflix has reached almost every part of the world, offering entertainment and communication hand-in-hand. The idea behind Netflix is to provide the users with entertainment and communication. It is focused on developing and adding more into a virtual community where like-minded people may gather and share their experiences. This idea aims to facilitate the users, content creators, showbiz industry, and Netflix itself to generate more revenue and modify the entertainment and communication arenas [14].

Consequently, an active adoption of technological devices can be observed, such as personal computers, mobile phones,

and others as users fully acknowledge and prefer using them to communicate and socialize themselves. For instance, the expected performance of devices, such as mobile phones highly influences the users to consider online platforms for personal chat and communication. As these users find digital platforms easy to use, they indicate a positive behavior technology acceptance and share their positive opinions with others [15]. Social networking platforms are widely influential and compelling for their potential users. The compelling nature of online platforms also led them to prefer virtual meetings over traditional face-to-face communication, in which accessibility was limited along with several geographical and cultural barriers. Thus, social media offering features, such as participation, opinion sharing, and direct communication are the dynamic factors that affect one's behavior to adopt digital platforms. Existing research has widely discussed these factors and every platform requires individual-level research to validate this phenomenon.

H4a: Netflix usage has a positive impact on perceived ease of use.

H4b: Netflix usage has a positive impact on behavioral intention.

H5: Perceived ease of use has a positive impact on behavioral intention.

F. IMPACT OF PERCEIVED EASE OF USE AND BEHAVIORAL INTENTION ON VIRTUAL REALITY (VR) ADOPTION

Generally speaking, VR incorporates computer-generated, virtual events, environments, and content into a real-world phenomenon through technological devices, such as smartphones, computers, and eyeglasses. VR allows a technological combination of real-world and computer-based environments that let the users to have advanced entertainment and communication experiences. Considering the excellent characteristics of VR, people are using this technology on both individual and collective levels to enhance their specialized experience, enabling them to create a very thin line between real-world and virtual environments [16]. The visualization capability of VR in wearable headset device is so advanced and of clear quality that users actively adopt them, especially to watch entertainment-based media content. VR has revolutionized the entertainment industry in many aspects, such as technological aspects, communication patterns, and switched from conventional to contemporary patterns.

Besides communication and entertainment, VR also provides other advantages, such as cost-effectiveness, ease of access, and ease of use that further motivate the potential users to explore more regarding VR and technological devices linked with VR. The overlaying virtual environments are merged with the real world specially through smart wearable VR devices. Resultantly, the immersive interface of VR allows the users to overlay the reality. Today media, business, and even architecture have also incorporated 3D and 4D technologies to watch, evaluate, modify, and enhance real-world through smart wearable VR devices. An example can be cited by a study conducted [17], examining the VR adoption by undergraduate-level university students in Seville, Spain. The results revealed that young students widely use VR for television watching and digital learning purposes. According to the participants, VR allows the students to stay connected with the virtual world through their mobile

phones, laptops, and even smartwatches. Respondents also showed complete trust and usefulness in VR as a part of their daily life necessities, indicating a positive attitude towards VR adoption for communication, learning, and entertainment purposes. Figure 1 below graphically illustrates the conceptual model of the current study.

H6a: Perceived ease of use has a positive impact on VR adoption.

H6b: Behavioral intention has a positive impact on VR adoption.

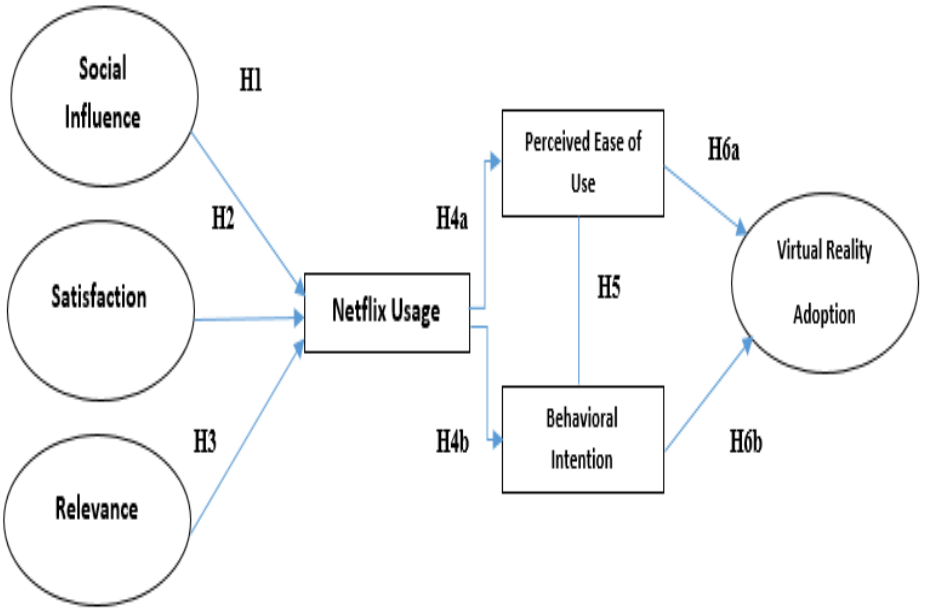

FIGURE 1. Conceptual framework of current research

III. RESEARCH METHOD

The current study is based on a cross-sectional design. Cross-sectional designs help to measure the outcomes and highlight the respondents' characteristics concerning a relevant phenomenon. Unlike longitudinal studies, cross-sectional design involves participants directly based on some criteria. Moreover, the current study employed structured, close-ended questionnaires designed on a three-point Likert scale. The questionnaires involved items from different sources (See Table 1) that also helped in designing the research model after reviewing relevant literature. Notably, the methodology employed in the current research replicates the study, previously conducted by Habes and colleagues. Thus, the current study involved Structure Equation Modelling (SEM), Artificial Neural Network analysis (ANN), and Importance Performance Map Analysis (IMPA) to further provide an in-depth analysis of the research model and variables by using Microsoft Excel 2016, Statistical Package for Social Sciences (SPSS) 64 bit, and Analysis of Moment Structures (AMOS) Version 26.

TABLE I

SOURCES OF RESEARCH VARIABLES

	Items	Sources
1.	Social Pressure	[18]
2.	Satisfaction	[19]
3.	Relevance	[20]
4.	Netflix	[21], [22]
5.	Perceived Ease of Use	[23]
6.	Behavioral Intention	[24]
7.	Virtual Reality Adoption	[25]

A. SAMPLING TECHNIQUES

The population of this study comprised all the *n*= 188 universities currently working in Pakistan. However, according to the research rules, criteria, and limitations, the data was collected randomly from *n*= 4 private sector universities in Islamabad city. Islamabad is the federal capital of Pakistan, with 1,015 million population. This city has 94% of literacy rate and majority (59.6%) have age range from 15-64 years. The current research was conducted in Islamabad city for having higher literacy rate and large number of population currently enrolled in different higher education institutions [26]. Furthermore, a sample of *n*= 400 individuals was selected based on two criteria. Firstly, G Power* technique was used to identify the ideal number of samples and found *n*= 74 participants as the minimum size of an ideal sample (See Figure 2). However, according to Gabler and Hader [27], the designated sample size for SEM should exceed at least *n*= 200 participants. In this regard, *n*= 400 was an ideal sample size that was further processed for data collection by using convenient sampling technique. The study required individuals currently using both Netflix and VR for different purposes. However, despite the researcher's bias as a major limitation of convenience sampling, it enables the researchers to select better sources for data collection purposes.

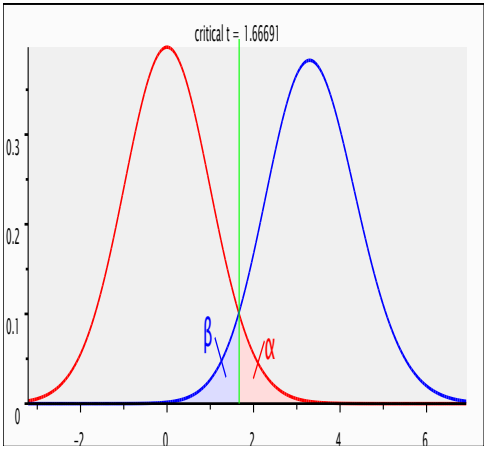

FIGURE 2. Central and non-central distributions regarding sample size

Nonetheless, after distrusting the questionnaire, the study carefully checked and shortlisted n= 389 questionnaires with an 85.1% response rate as 97.2% of questionnaires were wrong or incompletely filled by respondents. It is also notable that the respondents were allowed to quit recording their responses whenever they want and informed content was also ensured in the current study. Informed consent is an important part of the research process. It restricts the researchers from complying with all the ethical guidelines including informing the participants about the research focus, purpose of their inclusion, and the confidentiality of the gathered information.

IV. STATISTICAL ANALYSIS AND RESULTS

A. DEMOGRAPHICS OF STUDY RESPONDENTS

The current study first calculated the frequencies of participants' demographic data based on their gender, age, and educational level. In this regard, it was first found that a majority (*n*= 288 or 58.5%) of respondents were males and *n*= 161 or 41.3% were females. Regarding the age of respondents, *n*= 144 or 36.9% were 18 to 22 years old, *n*= 98 or 25.1% were 27 to 30 years old, *n*= 81 or 20.8% were 31 years old or above, and *n*= 66 or 16.9% of respondents were 23 to 26 years old. Finally, most of the participants (*n*= 244 or 62.6%) were undergraduate level students, *n*= 75 or 19.2% were pursuing their diplomas/professional certificates, *n*= 44 were doctorate-level scholars, n= 14 or 3.6% were graduate-level students, and n= 12 or 3.1% of participants were master's level students. Furthermore, to examine any potential variations based on study participants' demographics concerning their Netflix usage, a One-Way Analysis of Variance (ANOVA) was conducted. ANOVA revealed that, based on gender and education, the significance value remained p> 0.000. However, the significance value of education indicated that it is exceeding (p, .751) the threshold values of 0.05. Thus, it was concluded that no potential differences were found based on the gender and education of the participants. Yet, the age levels varied regarding Netflix usage among the study participants.

B. CONVERGENT VALIDITY

In order to analyze the internal consistency of the measurement model, firstly a convergent validity analysis was conducted. A primary focus of the social sciences-based study is to provide empirical evidence to validate a relevant phenomenon. In this regard, examining the internal consistency of the measurement model is of greater magnitude. Thus, firstly, the Cronbach Alpha and Composite Reliability values of the measurement model ($CR=(\sum i=1n\lambda i)2+\sum i=1n(\varepsilon i)(\sum i=1n\lambda i)2$) were conducted. It was found that all the calculated values concerning Cronbach Alpha and Composite Reliability exceeded the threshold values of 0.7.

Moreover, the current study further analyzed the Average Variance Extracted (AVE) values after calculating the mean of each variable having three scale items in the Factor Loading values ($AVE=\sum i=1n(\lambda i2)+\sum i=1n(\varepsilon i)\sum i=1n(\lambda i2)$. Both Factor Loading values and AVE values were also found stronger than the threshold values of 0.5. Thus, the concurrent validated analysis affirmed that the measurement model is internally consistent. See Table 2 for the summary of convergent validity analysis.

TABLE II
RESULTS OF THE CONVERGENT VALIDITY ANALYSIS

Variables	Items	FL	AVE	CA	CR
Netflix	NFX1	.811	.748	.888	.741
	NFX2	.782			
	NFX3	.652			
Social Influence	SFE1	.706	.653	.859	.785
	SFE2	.564			
	SFE3	.691			

Variables	Items	FL	AVE	CA	CR
Satisfaction	STN1	.730	.769	.956	.762
	STN2	.778			
	STN3	.799			
Relevance	REL1	.520	.677	.875	.794
	REL2	.765			
	REL3	.746			
Perceived Ease of Use	PEU1	.687	.652	.838	.745
	PEU2	.715			
	PEU3	.555			
Behavioral Intention	BHN1	.739	.728	.836	.775
	BHN2	.716			
	BHN3	.731			
Virtual Reality Adoption	VRA1	.742	.757	.936	.730
	VRA2	.753			
	VRA3	.776			

C. DISCRIMINANT VALIDITY

After the affirmation of convergent validity, the discriminant validity of the measurement model was also examined. Two criteria-based examinations of both reliability and validity of measurement model in SEM provide a study with strong empirical foundations. Thus, by considering the importance of validity, the discriminant validity was first examined by using the Fornell-Larcker Criterion ($AVEi = \sum j=1 p(\lambda ij2) + \sum j=1 p(\varepsilon ij) \sum j=1 p(\lambda ij2)$. The correlation matrix in Table 3a below indicates that all the square AVE values are greater than the correlation values given in the Table. Besides, the correlation matrix given in Table 3b indicates further calculation to determine the Heterotrait-Monotrait Ratio value. The Heterotrait-Monotrait Ratio value, less than 0.85, indicates a good criterion for the fulfillment of the discriminant validity. Thus, to dig out the favorable HTMT value, some items were removed from the scales and the HTMT value was calculated by first calculating the average values of all the variables and then the relevant formula, that is, [NFX/(SFE*STN*REL*PEU*BHN*VRA)^0.5] was applied. The results indicated a good HTMT value = .644, indicating that the obtained value was favorably lower than the designated value of 0.85. Hence, it was found that the discriminant validity of the measurement model was successfully established.

TABLE IIIA
FORNELL-LARCKER CRITERION

Variables	NFX	SFE	STN	REL	PEU	BHN	VRA
NFX	.559						
SFE	.521	.426					
STN	.528	.422	.591				
REL	.672	.332	.549	.458			
PEU	.502	.302	.491	.221	.425		
BHN	.535	.305	.472	.444	.419	.529	
VRA	.551	.301	.652	.412	.412	.511	.573

TABLE IIIB
CORRELATION MATRIX FOR THE DISCRIMINANT VALIDITY ANALYSIS (HETEROTRAIT-MONOTRAIT-RATIO)

	NTU1	NTU2	SIE1	PEU1	PEU2	BHN2	VR1
NTU2							
NTU3	.406						
SIE1	.602	.515					
SIE2	.342	.289	.374				
STS1	.528	.498	.606				
STS2	.636	.597	.593				
REL1	.418	.363	.257				
REL2	.721	.695	.455				
REL3	.761	.753	.556				
PEU1	.469	.524	.418	.510			
PEU2	.534	.601	.486	.202	.096		
BHN1	.526	.465	.493	.541	.481		
BHN2	.574	.567	.526	.532	.628	.446	
VR1	.520	.520	.399	.473	.481	.587	
VR2	.554	.527	.523	.482	.600	.633	.346

D. COEFFICIENTS OF DETERMINATION R^2

E. To examine the research model's predictive power and the extent to which independent variables explain the variations in the dependent variables, the current study analyzed the R^2 values or mainly known as Coefficients of Determination R^2. Thus, the results indicated that 43.7% of variation was found in the Social Influence, 43.1% variation in the Satisfaction, 67.9% variation in the Relevance, 60.5% in the Perceived Ease of Use, 47.9% in the Behavioral Intention, and 67.4% of the variation in the VR adoption due to Netflix usage (Independent Variable). Table 4 summarizes the results of the Coefficients of Determination R^2.

F. HYPOTHESES TESTING: PATH ANALYSIS

Finally, path analysis was conducted to examine the causal relationships between the study variables and validate the structural model. Path values, t-values, and significance values of the proposed relationships were recorded (See Figure 3). Notably, causal relationship validation is an important step to conclude the significance of a study and its contribution, meaningfulness, and role in the existing literature ($Y = \beta XY * X + \varepsilon Y$). The validation of these propositions provides an evidential basis to highlight and affirm the results. In this regard, Table 5 summarizes the results of path analysis conducted through AMOS.

TABLE IV
R^2 VALUES OF DEPENDENT VARIABLES

Variable	R^2	Strength
Social Influence	.437	Moderate
Satisfaction	.431	Moderate
Relevance	.679	Moderate
Perceived Ease of Use	.605	Moderate
Behavioral Intention	.479	Moderate
Virtual Reality Adoption	.674	Moderate

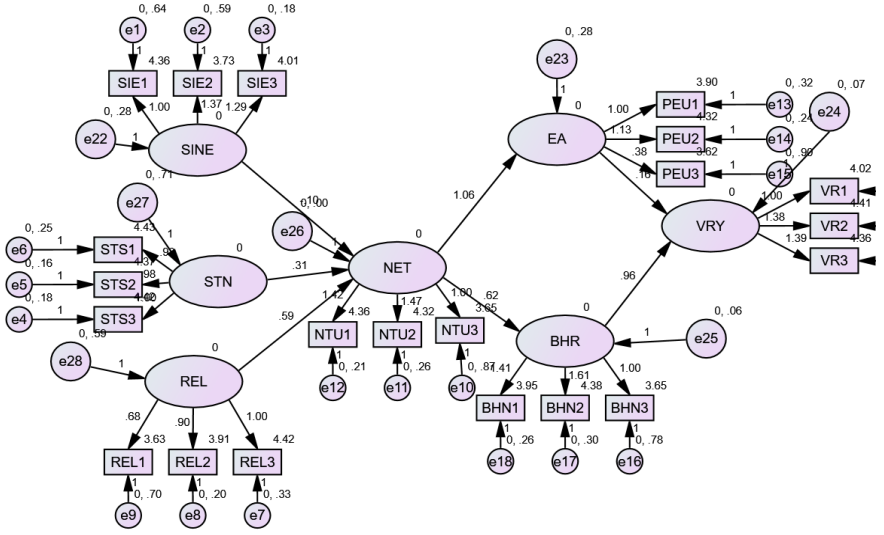

FIGURE 3. Structural model analysis

Thus, it was found that, the relationship between Netflix usage, social influence *(t=3.001, p > .003),* satisfaction *(t=8.987, p > .000),* relevance *(t= 9.441, p >.000),* perceived ease of use *(t= 8.404, p > .000),* and behavioral intention *(t= 6.273, p > .000)* was strongly significant. Furthermore, the proposed relationship between perceived ease of use and VR adoption and the relationship between behavioral intention and VR adoption was also strongly validated. *(t= 3.890, p > .000, t= 6.606, p > .000),* respectively.

TABLE V
PATH ANALYSIS, *T*-VALUES, AND PEARSON CORRELATION

Hypotheses	Path	*t*-value	*p*-Value	Decision
SFE>NFX	.033	3.001	.003***	Validated
STN>NFX	.035	8.987	.000***	Validated
REL>NFX	.062	9.441	.000***	Validated
NFX<PEU	.126	8.404	.000***	Validated
NFX<BHN	.099	6.273	.000***	Validated
PEU>BHN	.046	5.087	.000***	Validated
PEU>VRA	.041	3.890	.000***	Validated
BHN>VRA	.145	6.607	.000***	Validated

G. ARTIFICIAL NEURAL NETWORK ANALYSIS (ANN)

ANN analysis is one of the most significant techniques in machine learning to investigate how a human brain usually functions. ANNs are also named as computational models' universal approximations along with highly distinguished features, such as data

generalizability, ability to learn and adapt, and data organization process. Thus, in this research, the ANN was conducted by using the variables including social influence, satisfaction, relevance, netflix usage, perceived ease of use, behavioral intention, and VR adoption (See Figure 4). Relevant analysis indicated the Sum of Square Error Value at 410.844 and overall relative value as .489 or 48.9%. It was found that an overall 51.1% of accuracy was attained regarding training. Moreover, the Sum of Square Error Value was attained at 181.330 and overall relative value as .452 or 45.2%, indicating the overall acquired accuracy at 54.4% (testing). Therefore, it was found that the model is daringly significant.

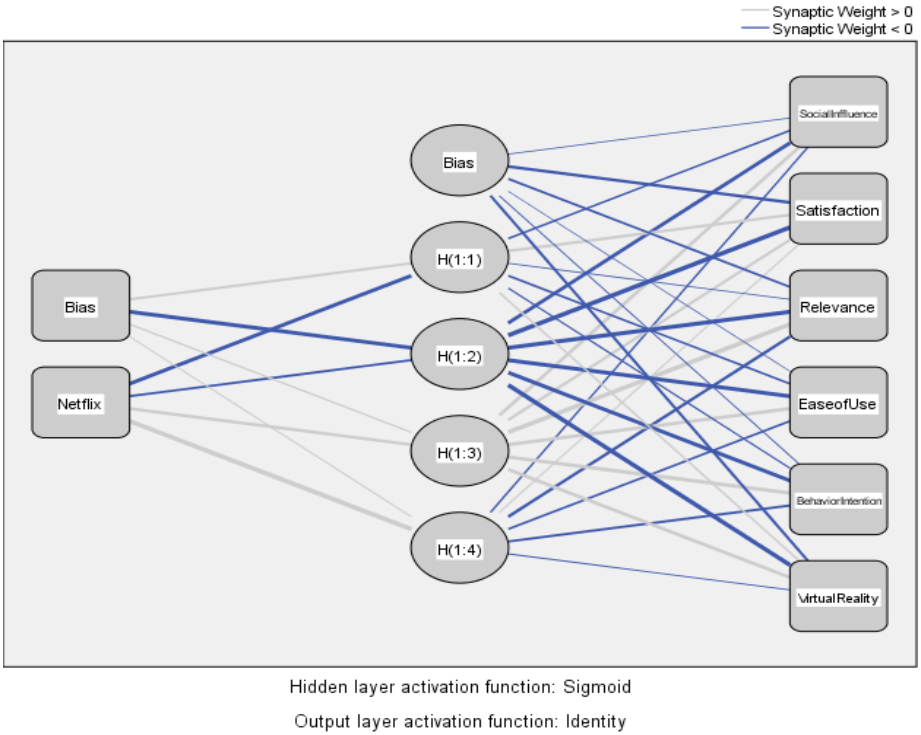

FIGURE 4. Artificial Neural Network Analysis (ANN)

H. IMPORTANCE PERFORMANCE MAP ANALYSIS (IPMA)

Finally, Importance Performance Map Analysis (IPMA) was performed while conducting Partial-Least Square Structural Equation Modelling, since the main variable is VR adoption . To conduct the IPMA, the current study had *n*= 6 variables including social influence, satisfaction, relevance, Netflix usage, perceived ease of use, and behavioral intention (See Figure 5). Hence, it was found that satisfaction attained the highest score (8.603), behavioral intention (8.565) remained the second-highest ranked variable, and perceived ease of use remained the third-highest ranked variable (7.717) regarding the IMPA. Notably, social influence, Netflix usage, and relevance remained the lowest-ranked variables (7.288, 7.009, 6.750 respectively).

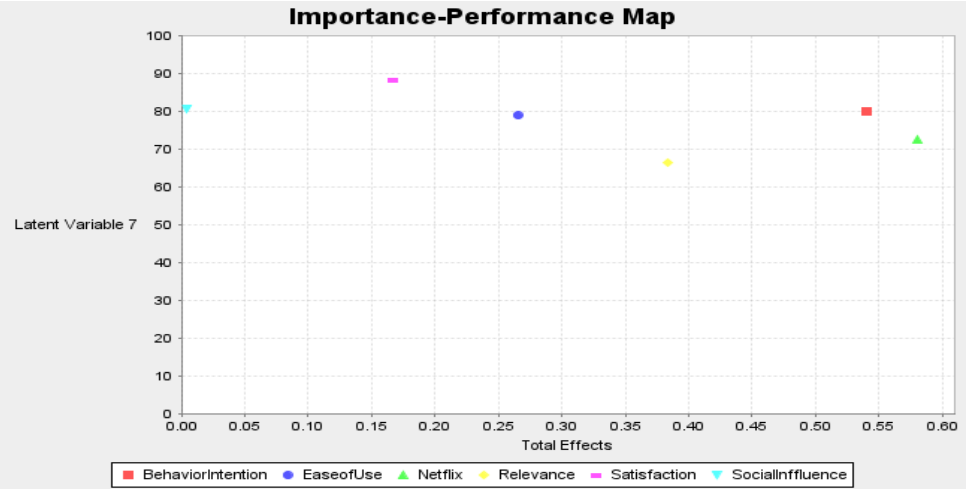

FIGURE 5. Importance Performance Map Analysis (IPMA)

V. DISCUSSION AND CONCLUSION

IP-based transmission paths, also known as OTT, provide direct access to video, audio sharing, and other existing social networking applications worldwide. Notably, this IP-based transmission path enables remote devices, such as smart televisions, tablets, mobile phones, laptops, and smartwatches to access the required content efficiently [27]. In the current era, Netflix, Amazon Prime, and Hulu are the three most prominent OTT streaming services that provide flexible and comprehensive content to the users who want to watch. Moreover, in the case of VR, the incorporation of physical and VR is performed through different QR codes, 3D objects, deploying coordinates through GPS, and images mainly to use the heat signatures. The importance of VR for different purposes can be determined through its distinguishing characteristics, such as being a mixed reality if it offers integration of information layers that validate its position as a potential interactive technology. By keeping in view an increased technology acceptance, especially Netflix usage and VR integration, this study also examined the relevant phenomenon among Pakistani youth. As mentioned earlier, Netflix officially entered Pakistan in 2018; today, subscribers are rapidly growing. As of January 2021 platform., Netflix generated a total of 7.1 million dollars in revenue from Pakistani subscribers which is a witness of the popularity and adoption speed of Netflix as a major Social Television. Despite technology adoption being comparatively slower in Pakistan due to conventional media watching and functioning patterns, Pakistanis are now rapidly switching to new technology due to its superior capabilities and relativity [29]. This shift may be attributed from conventional media to Social TV technology as what McLuhan called “the message from medium is another medium,". Apart from this, the most reasonable argument can be taken from the example of the bulb whose light is used in the brain surgery, which could not be performed without the bulb itself. In this context, technology adoption took time in Pakistan; however, once it started, it

accelerated, resulting in technology adoption in various fields of life.

Similarly, by keeping in view the growing Netflix usage and VR dependency, the respondents revealed that social influence, satisfaction, and relevance were rightly proposed as the strongest mechanisms with the significance values not exceeding the threshold value of 0.5. The selection of a suitable digital platform is largely affected by social influence (that is, peer pressure, trending technology, and bandwagon) and satisfaction plays another major role as the digital technology remains accessible and efficient, providing people with useful outcomes. Regarding relevance in digital technology acceptance, incorporation, and usage, when individuals find technology as relevant to their demands and criteria, they readily adopt it. This is another prominent reason behind Netflix adoption and wearable VR device incorporation in Pakistan.

After affirming the dynamic mechanisms of technology acceptance in general and Netflix as popular Social TV platforms, the questionnaire switched to examine the relationship between Netflix usage and behavioral intention. After the worldwide accessibility to Netflix, the number of televisions watching and using social networking sites both have dramatically increased. Although, binge-watching is also attributed to Netflix, the audience behavior can also be observed as an active factor strongly correlated with Netflix usage [30]. Thus, his research also observed similar results, as the significance level at $p > .000$ strongly correlated with the assumption. Nonetheless, while discussing the relationship between behavioral intention, the relationship between perceived ease of use with both Netflix usage ($p > .000$) and behavioral intention ($p > .000$) remained strongly significant. This relationship was found as strongly consistent with the study. Perceived ease of use was also found as a strong determinant and correlated with technology adoption in general. Finally, both Netflix usage was found as linked with behavioral intention and perceived usefulness, validating the VR adoption for the relevant television watching experiences. In this regard, the significance value at ($p >.000$) indicated strong compatibility with the study conducted by Pasha and their colleagues[31], in which the researcher found VR adoption due to people's active adoption and perceptions about the characteristics of VR in watching and enjoying their favorite televised content. Overall, the results affirmed the proposed relationship between factors behind Netflix usage, perceived ease of use, behavioral intention, and ultimately the VR adoption in Pakistan. Therefore, the increased Netflix usage also narrowed down the preferences and choices to opt for the most favorable and refined watching experiences. Netflix helps to skip less interesting content for people, thus leading the people to watch their favorite content. It also helps people to communicate, share their watching experiences, and influence their program selection process.

A. STUDY IMPLICATIONS

The current study is based on one of the initial efforts to theoretically explain the Netflix adoption which is further accompanied by wearable VR devices into a hybrid model. The current study empirically assessed the impact of certain cognitive factors that influenced users' adoption behavior (PEU, BHN). Although existing literature widely addressed TAM, the focus remained on other different aspects (that is, e-Learning, mobile learning, SPSS, adoption factors). Additionally, behavioral intention also

remained a considerable, yet underrepresented phenomenon. It indicates that the implication represented by the current study was consistent with the existing literature in the relevant field where PEU and BHN were also indicated as effective factors in technology incorporation process. Consequently, the study empirically claimed that PEU and BHN should be further taken under consideration to magnify the Social TV adoption in Pakistan.

B. STUDY CONTRIBUTIONS

The current study is novel since no such study has been conducted so far in Pakistan addressing Netflix usage in terms of VR adoption. A research model was also proposed by the current study completely validated by SEM that adds to the existing literature's contribution. Moreover, it also provides a strong foundation for future researchers to investigate technology, especially Social Television usage and VR adoption in Pakistan. The research significantly contributes to understand Social Television usage in Pakistan, particularly in the context of the emergence of Netflix as a prominent player in this domain. By harnessing the power of AI, the study delves into the multifaceted factors that influence the adoption and utilization of Social Television services. This exploration is crucial to comprehend the evolving landscape of entertainment consumption in a technologically advancing society, such as Pakistan. Moreover, the research also sheds light on the dynamic mechanisms that underlie the adoption of modern technology in Pakistan, with Netflix serving as a prime example. Through rigorous analysis, the study discerns the critical characteristics of Netflix that make it a compelling choice for users in the Pakistani market. This insight provides valuable information for industry stakeholders and policymakers seeking to understand the nuances of technology adoption patterns in the region. One of the notable gaps this research attempted to address lie in the intersection of Netflix usage with wearable VR devices. Despite the prevalence of both Netflix and VR technology, no prior study has examined the correlation between these two realms. This represents a significant contribution, as it pioneers a new avenue of investigation in entertainment technology, potentially unlocking novel insights into user behaviour and preferences. Furthermore, the research acknowledges the transformative impact of the COVID-19 pandemic on entertainment consumption patterns. With the outbreak acting as a catalyst, the study highlighted the heightened adoption and dependence on Netflix during this period. This observation underscores the platform's role as a social network in the broader sense and as a pivotal Social Television platform in particular. This aspect of the research resonates with the current global context, providing a timely analysis of changing media consumption habits. The theoretical framework employed in this research draws upon established theories of social influence, ease of use, and behavioural intentions. By anchoring the study in these well-founded theoretical perspectives, the research bolsters its academic rigour and ensures a comprehensive understanding of the factors influencing Social Television usage in Pakistan. This theoretical foundation serves as a robust framework for analyzing and interpreting the empirical findings, enhancing the overall validity and reliability of the study.

C. LIMITATIONS

As mentioned earlier, the current study aimed to examine the factors affecting Netflix usage that further help to adopt VR.

This study is comprehensive yet contains four limitations. Firstly, it was conducted only in Islamabad, Pakistan, questioning its generalizability in other geographical regions. Secondly, only three factors were selected behind Netflix usage, while there can be several other factors. The third and last limitation was the number of respondents which remained finite due to study requirements and basic research criteria. Finally, the fourth limitation was only the selection of Netflix, while Amazon Prime and Iflix are also under strong consideration by the potential audiences. However, every possible effort was made to clarify the investigation which remained unbiased during the data collection and results writing process.

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