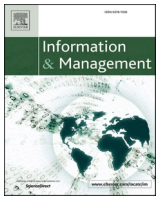
Information & Management 61 (2024) 103948

Contents lists available at ScienceDirect

Information & Management

journal homepage: www.elsevier.com/locate/im



Knowledge sharing leads to engagement during Covid-19 for online gamers

Justin Paul [a,b], Mohsen Akbari [c], Subhra Mondal [d], Subhankar Das [d,*]

[a] Graduate School of Business Administration, University of Puerto Rico, San Juan, PR, USA
[b] Adnan Kassar School of Business, Lebanese American University, Beirut, Lebanon
[c] Department of Management, University of Guilan, Rasht, Gilan Province, 4199613776, Iran
[d] Department of Marketing, South Star Management Institute, Duy Tan University, Da Nang, 550000, Viet Nam

ARTICLE INFO

Keywords:
Online Travian game
Intrinsic factors
Flow state
Interpersonal engagement
Lockdown
Quarantine
COVID-19

ABSTRACT

Online games have emerged as a breath of fresh air in the lives of the current digital generation amidst the backdrop of COVID-19 and subsequent global lockdowns. Within Internet communities, online gamers actively engage in knowledge sharing, exchanging insights and updates on their experiences. This study introduces a model designed for Massive Multiplayer Online Gamers of Travian, focusing on intrinsic factors such as perceived usefulness, perceived ease of use, and the flow state, supported by the Technology Acceptance Model. Amidst the COVID-19 pandemic, with lockdowns and quarantine as moderators, this study uses partial least squares structural equation modeling (PLS-SEM) methodology, encompassing 496 gamers, to elucidate the impact of technology acceptance and flow theory on intrinsic motivational factors that drive online gamers' knowledge-sharing activities, underpinning the social protection theory. This pioneering research explores the implications of COVID-19 restrictions on gamers' behavioral patterns, contributing significantly to the existing literature by providing a deeper psychological understanding of the less-explored realm of diverse online gamers' activities during the pandemic.

1. Introduction

The COVID-19 pandemic has profoundly impacted various facets of society, imposing concomitant movement restrictions that have significantly curtailed our social and physical engagements. They restrict our movements and bring a wide range of changes in daily lifestyle. This pandemic also questions our coping mechanism for these sudden unprecedented changes. During COVID lockdowns, online gaming surged as people sought entertainment and social connections virtually. With restrictions limiting outdoor activities, gaming provided an accessible and engaging escape. Its interactive nature facilitated social interactions, fostering a sense of community in a time of isolation. Additionally, the diverse range of games catered to different preferences, attracting a wider audience. The convenience of gaming from home offered solace and a means to alleviate stress during uncertain times. Gamers have more participation and communication exchange in these socializing prevention restrictions. The World Health Organization (WHO) and various gaming companies bring promotional initiatives like #playaparttogether to promote physical distancing and keep the younger generation from socializing among themselves [199]. Engaging in gaming across diverse platforms serves as a stress-relieving activity, contributing to a positive mental state for gamers. Particularly for isolated individuals, gaming functions as a coping mechanism, albeit raising readaptation challenges in the post-COVID-19 era. Amidst the pandemic, online gamers faced prolonged periods of physical and social isolation, potentially leading to technology-driven adverse effects and lifestyle complications. A balanced gaming approach offers a practical means for gamers to manage psychological distress and physical limitations amidst the global pandemic. So, in that respect, various online gaming platforms and intangible social exchange have been the new normal lifestyle of online gamers [23,104,205]. Postpandemic, online gaming will continue to grow as individuals become more dependent on digital activities [75].

Lockdowns, home isolations, and quarantines have caused the consumption of online gaming to skyrocket [156]. In the United States and Italy, online gaming traffic will see nearly a 75 % increase during various pandemic stages in 2020 [10]. Different live streaming platforms like Twitch and YouTube have a 10 % increase in active viewership for gaming-related channels in 2020 [190]. The WHO supported online video gaming as an additional step in promoting physical distancing [1,71]. Through online video gaming, the WHO also spreads the COVID-19 prevention awareness campaign to vulnerable youth

* Corresponding author.
E-mail address: subhankardas26@outlook.com (S. Das).

https://doi.org/10.1016/j.im.2024.103948
Received 26 May 2021; Received in revised form 15 March 2024; Accepted 18 March 2024
Available online 30 March 2024

across the world [137]. The WHO also wants a balanced timing for gaming and the screen usage time so that there will be no physical or mental problems for the gamers [28]. Online gaming enhances gamers' lives in these turbulent times of COVID-19 by reducing stress and keeping the virtual socialization among the players intact. So, overall, in the context of lockdown and isolation, gaming can help in reducing negative sentiments or psychological distress.

Internet-based online games are exponentially growing due to the addition and advent of new technologies [164]. They add intellectual, social, and cultural value among online peer communities [138,177]. Unlike traditional PC games, where just one or two players are involved, many players can participate together via the Internet from every corner of the world. Attractive features of online games are always in demand for gaining long-term patronage [165]. Time, design, and features attract gamers, and COVID-19 is no different. The gaming market attracts new entrepreneurial start-ups, which is very encouraging [189]. This lucrative market is now perhaps the only sector seeing high profits as there is colossal demand due to these pandemic infused situations [72]. Gamers try to beat the mental stress of the pandemic by engaging more in the game.

Contrary to the stereotypical competency-centric thought process of inter and intra-knowledge sharing for companies' growth, these organizations developing Internet-based online games depend on externalities of community players who routinely exchange information between themselves [8,105,112]. These external users empower game development companies to cultivate new ideas and technicalities from the users and process them to bring new updates into the games and that are cost-effective [15,32,132]. Therefore, online game participation must convert the game environment to a unique sharing community where players actively interact with each other, discuss issues, express problems, find and offer solutions and decide which key to use [34,82]. As a general principle, members of such online gaming communities discharge specific activities and remain socially interconnected with each other through information sharing [95]. The members participate in these communities for their transactional needs, which are also related to self-interest, fantasy, and sense of belonging [80]. A specific and significant strength of online gaming communities is their capacity for interaction and sharing knowledge that is broadcast globally [62]. Online gamers always rely on peer groups to update information that they can use or help the game propagate further, irrespective of their identity and social culture [64]. Online gamers always look for decreasing problems of online sharing as technical glitches reduce the gaming performance and prevent peer communication [30].

Recent developments in online games have been deeply intertwined with Technology Acceptance Model (TAM) concepts, the flow state, and knowledge contribution. The TAM framework, encompassing perceived ease of use and perceived usefulness, has influenced gamers' acceptance of new technologies and game features. As games evolve, integrating intuitive interfaces and valuable functionalities, user adoption increases. Flow, the psychological state of total immersion and focus, has become a cornerstone in game design. Games aim to induce this state by balancing challenge and skill, keeping players engaged and absorbed. Recent advancements in game design leverage flow to enhance user experiences, ensuring that players remain captivated. Furthermore, knowledge contribution within gaming communities has gained significance. Gamers share insights, strategies, and expertise, fostering a collaborative environment. This knowledge exchange enriches gameplay and elevates the overall gaming experience. Recent developments in online games underscore the symbiotic relationship between TAM concepts, flow state integration, and the burgeoning culture of knowledge contribution, shaping the landscape of gaming and user engagement.

Recent publications in the realm of online gaming research have significantly contributed to our understanding of various facets within the online gaming landscape. However, an evident research gap emerges concerning the impact of COVID-19 policies, such as lockdowns and quarantines, on gaming behavior. While studies have highlighted the surge in online gaming during the pandemic, a nuanced exploration into how these policies specifically influenced gaming motivations, user behavior, and community dynamics remains relatively nonexistent. As the spectre of COVID-19 gradually diminishes, there is an urgent need to explore this gap more deeply. Understanding the lasting effects of lockdowns and quarantines on gaming habits beyond the pandemic era is crucial. This exploration holds relevance not only in comprehending the adaptive strategies employed by gamers during crises but also in anticipating potential shifts in gaming behavior postpandemic. Filling this research gap is imperative as it offers insights into the evolving nature of online gaming. By elucidating the nuanced impact of COVID-19 policies on gaming patterns, we can better grasp the dynamics of user engagement, community interactions, and the broader societal implications. Ultimately, addressing this gap ensures a comprehensive understanding of the evolving gaming landscape and provides valuable insights for future policymaking and game development strategies.

In this study, researchers aimed to investigate the moderating influence of lockdowns and quarantines on the knowledge-sharing dynamics and the flow state of online gamers, examining their impact on interpersonal engagement amidst COVID-19. The present study proposes a model for Massive Multiplayer Online Gamers of Travian for intrinsic factors like perceived usefulness, ease of use, and flow state supported by TAM during COVID-19 by using lockdowns and quarantine as two moderators. This study employs PLS-SEM of 496 gamers to reveal the combined impact of technology acceptance and flow theory on intrinsic motivational factors influencing online gamers' knowledge-sharing activities along with social protection theory. Here, researchers consider online gaming a modern technology platform that manifests social interactivity among gamers [21].

Exploring a diverse spectrum of online games alongside Travian fosters a richer understanding of gaming dynamics. Incorporating varied gaming experiences within knowledge-sharing initiatives during COVID-19 enhances engagement among online gamers. Embracing this diversity cultivates a more comprehensive perspective, encouraging cross-game insights and strategies. It stimulates cognitive flexibility, problem-solving, and collaborative skills, augmenting engagement and community interaction. Integrating diverse game discussions bolsters engagement, providing a multifaceted approach to learning and fostering a supportive environment for gamers seeking diverse experiences during these challenging times. Online games like Forge of Empires, Grepolis, Tribal Wars, Ikariam, OGame, and Rise of Nations offer strategic gameplay, city-building elements, and opportunities for alliances and battles, similar to the dynamics found in Travian. Gaming activity represents all the methods of using smartphones, tablets, game consoles, and desktops for the Travian game.

This research extends beyond existing studies in some key ways. Primarily rooted in prior literature on COVID-19 consumer engagement and gamer activities, it explores the realms of knowledge sharing and communication among gamers. While prior research explores interactions between gamers, this study uniquely focuses on their knowledge-sharing mechanisms and strategies for coping with COVID-19 challenges. With the pandemic accelerating the growth of online gaming, the investigation into how lockdowns and social distancing influence gamer engagement becomes imperative. A substantial volume of related material has been identified, totaling 61,783 search results encompassing webpages, books, and journal publications, but none directly addresses the application of flow theory to gamers' behavior and knowledge sharing amidst the COVID-19 time.

This manuscript tries to significantly contribute in three pivotal areas. First, it will enrich the flow theory by delineating how knowledge sharing fosters a state of immersive engagement among gamers during the pandemic, enhancing the understanding of psychological involvement in gameplay. Second, it presents an augmentation of TAM by demonstrating how knowledge exchange influences perceived ease of use and usefulness, expanding TAM's application in the gaming context amidst COVID-19 crises and showing how policy makers can plan in

postpandemic times. Finally, it advances online game research by highlighting the pivotal role of knowledge sharing during COVID-19, elucidating its impact on sustaining user engagement and community dynamics in unprecedented times.

2. Literature review

2.1. COVID-19 and online gaming

This pandemic brings two critical effects on gaming: the increased money and time spent on playing the games worldwide and the popularity of multiplayer live streaming of games. Gamers' social life during lockdown is explored [18], but their way of communication, knowledge sharing, and interpersonal engagement are not yet studied. Playing online games is a daily, dynamic, social, and mundane activity for these gamers to pass their spare time during the lockdown. It can also amplify social interaction and knowledge sharing among each other. As COVID-19 has engulfed the world in a depressing pandemic, people remain in the confines of their households [54]. Almost everyone is facing unprecedented health risks. Governments worldwide have tackled this by implementing various measures, for example, shutdowns, lockdowns, social distancing, travel restrictions, and rigid quarantine [147]. These activities ultimately affect the world more considerably than expected [229].

As COVID-19 struck the world, the dynamics of the gaming industry are also affected. But the effect is positive for a change. Consumers like to play the game and engage in getting rid of the mental disintegration effect of COVID-19. In Fig. 1, researchers compile some insights into the growth of online gaming in numbers for 2020. During these turbulent times, the researchers may say that online game industries scale new heights in monetary numbers when many popular sectors have gone down drastically. The so-called X-factor of gaming industries lies in gamers' profound indulgence and how they share in their communities both on and offline.

Amidst imposed restrictions, individuals seek entertainment and engagement through gadgets. Notably, online video games have become increasingly popular among young millennial gamers, as evidenced in Fig. 1. This trend has propelled online gaming into the realm of electronic sports, marked by substantial revenue, a burgeoning player base, and significant economic impact [116]. Currently, this colossal industry hinges on user experience and community engagement, underscoring its tremendous scope. Consequently, over the past decade, researchers globally have found the expansive landscape of this industry to be an appealing area for exploration and study.

Gamers indulge in these games for various reasons and online gaming is intergenerational [139]. Researchers can conclude that gamers get involved with gaming for multiple reasons [51,140,210]. Some can enhance their subsequent reciprocal learning, enrich holistic understanding for different playing methods, and ultimately reduce restriction-imposed anxiety. The existing game console developers understand these vantage points as providing a very satisfactory gaming experience—the plethora of recent research linked social association or connectivity and loneliness to adult gamers' mental health. In addition, factors like social emotive disconnection with peers lead to more indulgence in gaming [55,74,83].

According to Gierveld [74], being alone involves a negative feeling of discomfort or adverse effect. The person has a disconnected perception about the quantity of social connectivity over a period. Due to the absence of social connectivity, the person becomes lonely, and the feeling gets quantifiable with the passage of time [217]. The COVID-19 lockdown and social distancing practices add fuel to the already burning issue of disconnected social loneliness in young adults [59], disabled adolescent minds [166] and childless adults who stay outside of the family home [79]. To eliminate this imposed social loneliness, consumers attempt to explore the potential technological benefits from gaming during the COVID-19 pandemic [179]. Technology always plays a critical role in the different social ecosystems to connect and enhance social connectivity among young, isolated adults or adolescent gamers [139].

COVID-19 also brings a new dimensional change and adds a whole group of new gamers to gamer communities' diversity [219]. The pandemic forces the overburdened health workers devoid of their families to indulge in online gaming for their momentary satisfaction or stress relief. The mental health of health workers is a serious issue here. Therefore, they engage themselves in games or such forms of recreation to find some solace from their hectic schedules. Online games like Player Unknown's Battlegrounds (PUBG), Pokémon Go, and Travian are prevalent among these health workers [139,140].

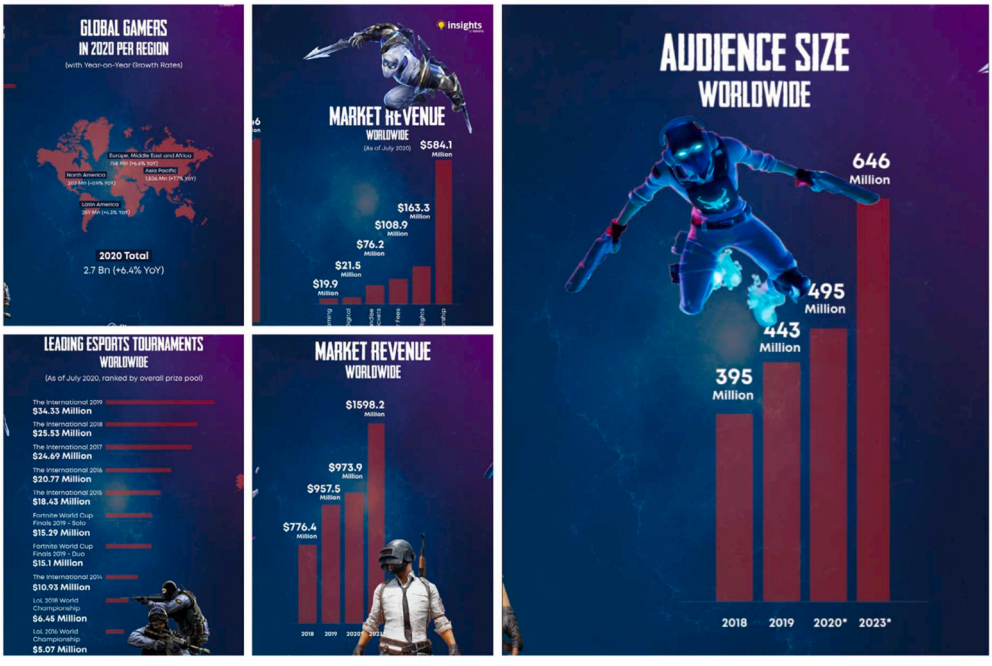


Fig. 1. Growth of online gaming in numbers for 2020 (Source: Statista).

COVID-19 very rapidly wiped the boisterous happiness out of every physical and social ecosystem, such as communities or families of young and middle-aged adults [141]. Everywhere there is a sense of negativity and fear is present. So, to some extent, these online games have become a way of continuing and increasing social connectivity and associations in the current social ecosystem. The original differentiated contribution of online games moderated social association and increased attachment while reducing anxiety. These games are playful, fun-oriented, and, most importantly, interactive, which stands out when put up against the physical source of communication like texting or pinging on social media (Kowert, 2005). These online games help the gamers in real-time connectivity, which is the most critical psychological aspect of mental health [38].

Playing these games creates stress reduction and a decrease in depression along with the constant release of endorphins that relax our mind and body [172]. In addition, the in-game socialization benefits (stress, depression, loneliness reduction) help these online games nullify the negativities of COVID-19. There is a lack in the previous research of a primary focus on the social connectivity and loneliness due to forced lockdown/shutdown and quarantine situations that are now part and parcel of COVID-19. Here, the researchers try to explore these factors and their moderation role in knowledge sharing among gamers, aided by the flow of interpersonal engagement.

Online gaming is a method of self-engaging to negate the COVID-19 adverse effects on mental health. The quarantine rules, social distancing restrictions, and lockdown collectively increase the mental agony among many gamers. Individuals do a collective threat assessment depending on how they would like to cope and engage in other activities that invoke a feeling of happiness. The behavioral coping by gamers is to immerse themselves into continuous gaming. They do this by knowledge sharing and bringing more people to join so that they can end the mental stalemate. All individuals cope with the adverse effects of COVID-19 in their own way. Coping activities help the individuals to avoid the mental agony caused by COVID-19. So, the gamers may be intrinsically motivated to indulge in gaming activities due to various provisions of COVID-19 to protect each other. While COVID-19 spreads its tentacles worldwide, quarantine and lockdown have rapidly become the ***new normal*** for consumers, now to be behind closed doors and indulge in some activities that can give them satisfaction and a feeling of social connectivity. In that aspect, online gaming is the hour's call for this situation, and the world is reflected in numbers (Fig. 1). As COVID-19 is slowly spreading and engulfing the world, lockdowns have rapidly become the new normal, forcing gamers worldwide behind closed doors, cancelling events, and learning new ways of staying safe from COVID-19 [37].

Online gaming has undergone a transformative journey interlinked with knowledge sharing among gamers, significantly influenced by pre-COVID, COVID, and post-COVID eras. Pre-COVID, the gaming landscape saw burgeoning online communities fostering knowledge exchange through forums, chats, and multiplayer interactions. Gamers shared strategies, tips, and walkthroughs, building a robust ecosystem of shared expertise. The COVID-19 pandemic acted as a catalyst, amplifying this trend. Lockdowns and social distancing measures resulted in a surge in online gaming engagement, leading to an exponential rise in knowledge-sharing platforms, streaming services, and collaborative gameplay. Gamers sought connection and information, intensifying their interactions to cope with isolation. Discord servers, Twitch streams, and YouTube channels became hubs for sharing insights, fostering a sense of community and deepening gaming knowledge.

Post-COVID, while physical distancing eased, the momentum of online knowledge exchange persisted and evolved. The gaming community witnessed a hybrid model, blending the virtual connectivity of the pandemic era with the resurgence of in-person events. This hybridization amplified the reach and depth of knowledge sharing. Conventions, tournaments, and esports events integrated online streaming and interaction, catering to a global audience while maintaining the camaraderie forged during COVID-19. Innovations in augmented reality (AR) and virtual reality (VR) further enriched the experience, enabling gamers to collaborate and share insights in immersive environments. Moreover, gaming companies embraced this trend, leveraging user-generated content and community-driven insights to refine game development and user experiences.

The evolution of online gaming and knowledge sharing among gamers represents a dynamic synergy between technological advancements and social connectivity. Pre-COVID foundations set the stage, COVID-era circumstances accelerated the trajectory, and post-COVID adaptations propelled it into a hybridized future. This continuum underscores the resilience of gaming communities in fostering collaboration, innovation, and the seamless transfer of expertise across diverse digital landscapes. The landscape of online gaming has evolved dynamically across pre-COVID, COVID, and post-COVID times, ushering in transformative changes in user engagement, knowledge sharing, and strategic gamification design.

Before the pandemic, online gaming communities were vibrant hubs of knowledge exchange; gamers actively shared insights and strategies, fostering a culture of collaborative learning. This phenomenon was heightened during the COVID era as lockdowns and social distancing measures led to a surge in online gaming participation. The consequences of this heightened engagement were multifaceted. Gamification, leveraging elements of game design in nongame contexts, became a pivotal tool in M-commerce, where the strategic integration of game mechanics influenced user behavior, driving engagement and purchase decisions [20,127]. The Peak-End theory played a crucial role, emphasizing that users' perceptions of an experience are shaped by its peak moments and how it concludes. This principle was strategically employed in game design and M-commerce platforms to create memorable and rewarding experiences, influencing user engagement and retention.

Amidst these developments, studies like "Users' subsequent innovation after organizational adoption" shed light on how online gaming communities fostered user-driven innovation, showcasing how gamers innovatively utilized platforms and technologies [128]. "Moving Consumers from Free to Fee in Platform-Based Markets" presented empirical insights into the monetization strategies of multiplayer online battle arena games, exploring the transition of users from free to fee-based models, influenced by strategic gamification designs [213]. Moreover, the influence of media capabilities on knowledge contribution in online communities was a critical factor [129]. Administrator-users, equipped with enhanced media capabilities, significantly contributed to community knowledge, shaping discussions and facilitating learning experiences [201]. Skill growth expectancy was intricately linked to online game commitment, where gamers' anticipation of skill development correlated with their dedication to the game [100].

The concept of immersive time (ImT) emerged, conceptualizing the duration spent in the metaverse, illustrating how the immersive nature of online gaming environments captured users' time and attention, and impacting their experiences and commitments [145]. Power structures within these gaming ecosystems significantly contributed to building gamer loyalty, shaping the dynamics of engagement and community participation [100]. Gatekeepers' innovative utilization of IT, as per the absorptive capacity model at the unit level, highlighted the pivotal role of key actors in leveraging technological advancements to enhance user experiences within online gaming communities [98]. Throughout these phases, the interplay of user engagement, strategic gamification design, and knowledge sharing within online gaming communities played a pivotal role in shaping the dynamics of the gaming landscape [101]. The pre-COVID era laid the groundwork, fostering a culture of collaboration and knowledge exchange. The COVID era accelerated these trends, magnifying the significance of gamification and community-driven innovation [202]. Post-COVID, the legacy of heightened user engagement and the evolution of strategic gamification strategies continue to shape the future of online gaming, creating immersive experiences and fostering communities of enthusiastic and engaged gamers.

2.2. Online gamers' knowledge sharing

In online communities, knowledge sharing happens frequently, and customers are considered active partners in adding value [200]. Their knowledge and information are used to create new ideas for improving the game, including users' needs and demands [68,196]. For knowledge sharing, all consumers interact and interconnect to bring the most evolved thoughts or ideas via their expertise and experience [35,157]. Therefore, later, pertinent information and relevant knowledge become explicit and tactic knowledge, respectively, depending on how they are cultivated and shared [46]. Online gamers can enhance their stored data and experiences only if they communicate with other members. In general, user knowledge signifies the relevant information accumulated by the customer over time, the importance of this experience to them, and their profiles about each other in a community. At the other end of this sharing of information, users share their stories, experience, ideas, and knowledge about themselves and other gamers with other members and companies while gathering their required information from the online community. The company considers the information received from the customer and the users' profiles as input and the resultant knowledge about different customers as the online community's output [73].

According to the hierarchical needs theory [142], one of the most important reasons for explaining users' knowledge-sharing behavior relies on the satisfaction of their needs. This theory believes that the more a user's basic needs are satisfied, the more attention they will pay to a higher level of needs. For example, suppose online games provide an appropriate environment to fulfil the entertainment needs. In that case, users will be more motivated to interact and imbibe the experience, knowledge, and expertise from the community's fellow members. Previous literature points to perceived ease of usability (PEOU), perceived usability (PU), and the flow state of consumers' minds as factors of attraction for appealing games [109]. These factors attract many online players as the need to share knowledge is fulfilled, improving their positive attitude towards the game ([122]; Fan et al., 2012).

The current study focuses on Massive Multiplayer Online Games (MMOGs) and their immense popularity among gamers. These games excel in facilitating global player interaction, enabling simultaneous communication, cooperation, and competition among numerous participants. MMOGs are celebrated for their ability to unite players worldwide, fostering a platform for shared knowledge exchange within a flexible gaming environment. Their appeal lies in the capacity to engage players in collaborative and competitive endeavors while enabling seamless communication and knowledge dissemination on a global scale. The MMOG addiction is mainly to technology use and immersive social adaptation for mood enhancement [124]. In 2020, they had gathered nearly $10 billion in the US market alone, and looking into the near past, it is relatively higher in China, amounting to $11.8 billion in 2017 [168]. The jump in the US market is quite remarkable. From $6 billion in 2010 to $8 billion in 2014, and now at $10 billion, it shows rapid growth in the West [91,92]. The German-developed Travian game is one such populist MMOG, initially having three English versions and one in German. But the meteoric rise of this MMOG quite literally reflects that it has evolved over time. Now it has more than 300 servers with 40 different language options and over 5 million gamers worldwide. From winning the best Super browser award in 2006 to having captured many online gamers' imaginations, it has indeed come a long way during its development. This study has considered only the Travian game's intrinsic variables [184], including PU, PEOU, and flow state. It ignores extrinsic variables such as subjective norms, social ties, social trust, and social goals, for example [82], for precise evaluation.

This study's primary purpose is to lay a structural model for the intrinsic factors that attract and motivate such a colossal scale of gamers to play the game and share knowledge with other members. By sharing their knowledge with other players and the company, game players can have a better experience while playing, and the company can upgrade the game more efficiently. This whole scenario will lead to a better place for the players and can be rewarding to those who share knowledge. In other words, this paper tries to show how the intrinsic features of Triavian motivate game players to engage more actively with in-game improvement through sharing their knowledge with other players and the company. The researchers of this study's proposed hypothesis and conceptual model follow the literature review.

2.3. Online gamers' engagement

Over the last decade or so, researchers have explored consumer knowledge from different relevant aspects to understand how customers process external experiences [102,106]. In the 20th century, consumer engagement and knowledge sharing have soared. Customers actively contribute insights on products, fostering healthy market competition [198]. Empowered by social media, they drive modern market dynamics, notably in online gaming [22,84,90]. Their interactive experiences serve as catalysts, reshaping the landscape of competitive innovation in the industry. As online gamers play the game to enjoy and distinguish themselves among gaming communities, this process uses their experiences to improve their role in the game [11]. They also have essential knowledge and expert opinions about games.

By increasing customers' knowledge and information in the current era, companies pay more attention to outside sources ([201,161]). As gamers' experiences become more positive, their willingness to learn and be involved in the company's activities has also improved. As a result, the companies are looking for their customers' active participation [13,78]. Nowadays, companies must listen to their customers to foster symbiotic co-creation of new products and services that can fulfill customers' needs and result in their satisfaction [85]. Companies in online gaming foster collaborative environments like online communities, gathering valuable insights from player interactions. This symbiotic relationship aids data-driven game improvement while fulfilling players' social and informational needs.

The online gamers' knowledge is of three types: knowledge from customers, information about customers, and knowledge of customers [25,69,187]. The explicit knowledge about customers provides further insight into their motivation and need requirements. This type of knowledge provides the socio-economical, demographical, and transactional background of fellow gamers [187]. This type of knowledge for customers also comprises the online game developer company guidelines to develop and further amplify the gamers' information [69]. Finally, about customers' knowledge; strategically it represents the customers' detailed know-how about the products, operating markets, and potential competitors gained during transactions [68]. This type of knowledge is essential in decoding the experience and related behavioral drivers, and serves the company in bringing out new ideas and more refined products and services [230]. The knowledge from and about the customers gives the company insight into customers' dynamic needs, whereas experience for customers educates and provides the customers' new information [48,198].

2.4. Spiral model of knowledge in online games

Owing to intense cut-throat competition in the online gaming industry, the process of identifying the real needs of gamers proves to be the most innovative tool of survival and prosperity [9]. Game developers rely on testers who analyze postdevelopment for any last-minute defects in software to control the quality and achieve the company's goals. But this has its shortcomings due to reliability issues. So, in totality, these developers of the game try to ensure constant investment flow in sync with changing customer preference, bringing new innovative up-gradation day in day out. Indeed, the new age social media empowered communication modalities have decreased the gap between developers and online gamers in the last few years [89]. Through the pertinent *ticketing system* composed of forums, system-generated reports,

and e-mails, developers keep in touch with the gamers [88,94,108]. During constant exploration by developers in *Clusterball games*, they use the information gained from engagement in virtual forums. The community use model of Holmström explains in three ways the process of accessing the shared information knowledge of games by the players and the relevant outcomes, which is beneficial for developers.

The knowledge accumulation phase's initiation starts with online gamers themselves, where software use and bug find are subsequent updates [121,123,134]. Then, gamers share the information about the system crashes with developers. The following step is knowledge enrichment, where customers keep adding information to the developers' collection [135,148]. Then, customers communicate via web forums and page reports [150,153]. The last part is the exploitation of knowledge, where developers try to strengthen the product by implementing bug finding and patch-crack types of activity. The cyclical knowledge sharing for online gaming is focused on building, elicitation, and exploitation of information; ; see Fig. 2.

2.5. Technology acceptance model (TAM) for online gaming

Over the last 20 years, the impact of technology and influencing factors for technology use is vastly explored, with prominent output reflected in theories like the Theory of Reasoned Action (TRA) and TAM. TRA explains the individual's action as influenced by intentions, which is affected by the suitable or unsuitable result of behavior (Attitude) and perceived social peer pressure for performing the above behavior (subjective norm) [6]. It is very generalized with no specific exploration of beliefs (Hsu & Lu, 20007). TAM is an extended TRA adaptation for information technology (IT) [113,152]. It is now primarily used in a broad range of IT services [14,70,97]. Other pertinent theories contemporary with TAM are the Theory of Planned Behavior (TPB) and Task-Technology Fit (TTF) ([36,131]; Pin & Lin, 2005). It is notable to mention Perceived Characteristics Innovation (PCI), which challenges TAM's validity [52,171,223]. Having gone through the grinder, TAM has a broader acceptance than its so-called contemporaries [163] and still holds its own in information science literature [125].

TAM speaks about the impact of perceived usefulness (PU) along with perceived ease of use (PEOU) on consumer attitude and willingness to get a first-hand implication of ICT devices [47]. This model of technology acceptance sheds light on three aspects. First, it signifies the direct relationship between attitude and willingness for use, whereas, second, the direct relationship between PEOU and PU is considered for individual behavior. Finally, in the third facet, this model explains the direct conjugal relationship between personal intention for an activity and the eagerness to act for selected devices. Here, PEOU stands for the individual perception for using a device that would be free of considerable effort, whereas PU explains consumer perception for using a particular device that would considerably enhance job performance [27,47]. It is important to remember that PEOU influences PU for the device or system that is not so usable and cannot be perceived as functional by the consumer [174]. Online gamers can play the game and get PEOU perception on usefulness and generate intention for sharing the knowledge with fellow gamers [93].

2.6. Flow state theory and gaming

Consumer behavior in activities hinges on intrinsic and extrinsic motivations [49]. Intrinsic drive stems from inner satisfaction, independent of external influence. Conversely, external motivation arises from recognition or rewards. In online gaming, intrinsic factors revolve around pleasure and knowledge sharing [53], while extrinsic motivators include rewards and recognition [207]. Gamers seek leisure and self-improvement, emphasizing intrinsic over extrinsic incentives, fostering engaging, self-fulfilling environments [32,86]. When driven by personal interest and enjoyment, gamers tend to sustain participation and knowledge exchange within the community [53].

Creating a fulfilling user experience involves inducing a Flow state in online settings [152,225]. This state is particularly apt for online gaming [206], believed by marketers to enhance online engagement and purchases [24]. Flow emerges when personal goals drive intense concentration, leading to immersive involvement [99]. It yields deep satisfaction, driving repeated actions [41,42,45], extensively studied in online activities [148], in computer-related human tasks [222], and notably in online gaming [93,167,212]. In the realm of gaming and knowledge sharing, Flow represents an intensely gratifying experience driven by involvement, happiness, and intrinsic motivations [67,93].

Online gaming companies aim to captivate users by fostering maximum engagement, enjoyment, and concentration throughout gameplay [63,93,155]. The Flow state, shaped by enjoyment, time distortion, and concentration, significantly impacts user activity [173]. Enjoyment, driven by intrinsic interest, influences frequent engagement [31], while engagement level dictates the user's enjoyment [7]. Intrinsic rewards within web environments and online games amplify this enjoyable experience [32,40]. Time distortion within Flow compresses external time, extending user engagement in online environments [43,174] Concentration, pivotal in Flow, engrosses individuals, heightening attention and interest in gameplay and knowledge sharing [133,170,180].

3. Theoretical model and hypothesis development

Online gaming companies rely on players' knowledge, experiences,

Fig. 2. Knowledge cycle for online gamers
Source: Authors' own creation.

and insights for their growth and innovation. To encourage knowledge sharing, these companies integrate features that attract and facilitate collaboration among players [162,186]. Research underscores that most gamers are primarily driven by intrinsic motivations, seeking entertainment [93,193]. Thus, effective game design emphasizing intrinsic motivators becomes crucial for companies [65,73]. The TAM model and Flow theory serve as the theoretical foundation, shaping gamers' attitudes and willingness to share knowledge [44,207,221]. Enhanced user experiences through PEOU, PU, and Flow positively impact engagement and knowledge sharing [86], fostering return usage and knowledge exchange tendencies [33,211,222]. The conceptual model presented in Fig. 3 encapsulates these dynamics in the online gaming environment.

3.1. Hypothesis development

Online gamers' attitudes towards knowledge sharing denote the degree of positive feelings towards knowledge sharing with peers [57]. TAM explains that consumers' mindset for a particular activity demonstrates an individual's behavioral willingness to do that or not go for it [211]. In other words, players in an online game environment with a positive attitude will have more intention towards sharing knowledge among themselves, which drives them to repeat the activity more often [183,215]. Accordingly, we predict that:

H_1: Higher levels of attitude towards knowledge sharing positively and strongly affect a higher level of intention towards knowledge sharing.

In the Technology Acceptance Model (TAM), the Perceived Usefulness (PU) component strongly influences user attitude and behavioral intention [191]. TAM has notably elucidated user behavior concerning IT-based products [118,203]. Davis [47] and Teo et al. [203] assert that PU positively correlates with both knowledge sharing and gamers' intentions in the context of online gaming. So, here for this study the researchers hypothesize in two hypotheses (H_2 and H_3) that PU may have a strong effect on both intention of communicating and attitude for knowledge sharing among gamers [11].

H_2: Higher levels of PU have a positive effect on a higher level of intention towards knowledge sharing.

H_3: Higher levels of PU have a positive effect on higher levels of attitude towards knowledge sharing.

Along similar lines, PEOU also has a positive impact on the perspective of gamers for knowledge sharing among their peers [224,227]. PEOU directly and indirectly (driven by PU) affects knowledge-sharing intention (Park & Ahn, 2001; [176]). As PU and PEOU have a combined effect on mutual knowledge sharing, the online game developing companies should give utmost care for having PEOU [46]. PU features embedded in games provide a prerequisite for consumer engagement in the online gaming community and encourage all to have knowledge sharing, ideas, and expertise [50]. So, PEOU has some interrelated effects on both intention and attitude, and researchers suggest H_4 to H_6 as follows:

H_4: Higher levels of PEOU have a positive effect on higher levels of intention towards knowledge sharing.

H_5: Higher levels of PEOU (via PU) positively affect more elevated levels of intention towards knowledge sharing.

H_6: Higher levels of PEOU have a positive effect on higher levels of attitude towards knowledge sharing.

"Customer experience" is one of the most critical factors in online environments [86]. Online gaming is very much experienced based, unlike customer engagements in online shopping and IT use in other activities, and intrinsic motivators play a significant role in players' attention. Self-pleasure-seeking action stands out among the inherent motivators and emotional responses to drive online gamers to play more [99,224]. Flow is identified as an enjoyable internal experience [115] and an essential predictor for explaining users' intention to use unique aspects of IT such as online games. According to previous research, flow experience can influence the users' preference for knowledge sharing [3,93,174]. Furthermore, flow is a significant force in driving online gamers to play for a longer time ([24]; Fan et al., 2012). Accordingly, the researchers propose the below hypothesis.

H_7: Higher levels of Flow have positively been related to higher levels of intention for knowledge sharing among the peers.

Besides affecting users' behavioral intention, flow experience also affects action [115,169]. According to flow theory in online gaming, flow experience positively affects gamers' attitude towards knowledge sharing among their peers [93]. Online gamers who perceive the gaming experience as enjoyable and pleasant are more prone to get self-satisfaction [102]. Thus, the self-satisfied gamers will have a favorable attitude for knowledge sharing among peers and the game developing company [127]. This assumption leads to the below hypothesis.

H_8: Higher levels of Flow are positively related to higher levels of attitude towards knowledge sharing.

TAM has two important PEOU and PU variables for explaining and predicting acceptance of information technology [143]. First, PEOU creates this feeling in the customers that using a particular website requires little effort [118,155]. Second, when PEOU is active, they can do their work more effectively and efficiently and save time and energy, influencing their PU [133]. Therefore, it is concluded that PEOU has a

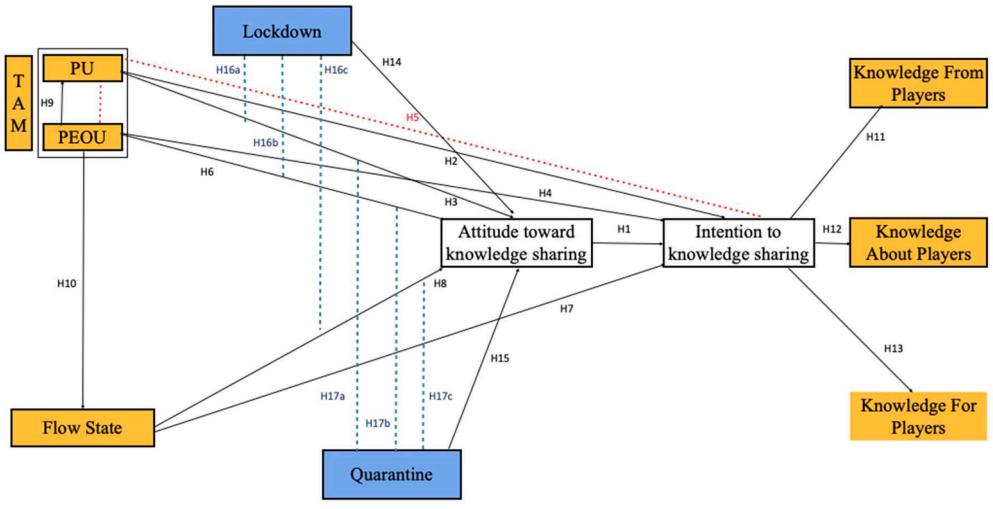


Fig. 3. The conceptual model. Source: Authors' own compilation
Source: Authors' own creation.

positive and direct effect on PU [170]. Furthermore, the easier the play of the online game, the more helpful the player finds it [113,118,209]. Based on the above debates, the ninth hypothesis, which refers to the direct effect of PEOU on PU, can be offered as follows:

H_9: Higher levels of PEOU are positively related to higher levels of PU in online games.

PEOU of TAM can be a good predictor for Flow [93,185,204]. PEOU in online games leads to more time, engagement, and a higher return of users [24]. If doing an activity is assumed to be simple, one will need less time and attempt to do it, and as a result, the perceived enjoyment increases [213]. Therefore, the easier the online game's play is, the more enjoyable the player finds it [174]. As the previous studies and models have referred to the relationship between PEOU and Flow, we can propose H_{10}:

H_{10}: Higher levels of PEOU are positively related to higher levels of Flow.

After reaching knowledge sharing, players will be willing to share their knowledge with others and get their required information [75]. Players explain their problems, solutions, and ideas and receive their required information from other players or gaming companies. The interaction process's enjoyable experience leads to internal excitement and increased satisfaction [33], which encourages players to continue knowledge sharing. Online players' knowledge involves three types: (1) knowledge from players, (2) knowledge about players, and (3) experience for players. Knowledge from players and experience about players is knowledge-sharing input, which is the injection by gamers to the online games' community [230]. Knowledge for players is a knowledge-sharing output, for players from the online games' community. The above discussion leads to H_{11} through H_{13}:

H_{11}: Higher levels of intention for knowledge sharing are positively related to higher levels of knowledge from players.

H_{12}: Higher levels of intention for knowledge sharing are positively related to higher levels of knowledge about the players.

H_{13}: Higher levels of intention for knowledge sharing are positively related to higher levels of knowledge for players.

Lockdown as a moderator

Lockdown is a situation where government authorities have imposed social restrictions on the free movement of consumers. The shutdown is the complete restriction of free movement. Lockdown is preferably a mixture of shutdown and partial allowance of consumer movement, which curbs the rapid spread of disease [76]. Lockdown has become the face of COVID-19 among all the activities. These lockdowns and quarantines mainly force the consumers to be inside the closed confinements of their living spaces. Thus, there is a restriction on free mobility that limits the direct face-to-face service instructions. As a part of the pandemic preventive measures, lockdown is the most prominent action that authorities undertake globally [56,87,126]. So, self-protection by being confined to household boundaries has become the norm [66]. During the COVID-19 pandemic, lockdown measures acted as a pivotal moderator influencing attitudes towards knowledge sharing among online gamers. At high levels of lockdown stringency, perceived usefulness (PU) in sharing knowledge intensified; gamers saw it as crucial amidst isolation, fostering stronger attitudes for knowledge exchange. Additionally, high lockdowns enhanced perceived ease of use (PEOU), as gaming became a primary accessible medium, reinforcing positive attitudes towards sharing. The flow state, heightened during strict lockdowns, further boosted attitudes, aligning them with increased immersion and focus on gaming, encouraging more proactive knowledge-sharing behavior. Conversely, at low lockdown levels, while PU and PEOU remained relevant, their impact on attitudes towards knowledge sharing lessened. Reduced lockdown stringency diminished the urgency for knowledge exchange, impacting attitudes. Moreover, the less immersive gaming environment during low lockdowns decreased the influence of the flow state on attitudes, resulting in less pronounced engagement in knowledge sharing among online gamers. Understanding these scenarios underscores the critical role of lockdowns as moderators shaping attitudes for knowledge sharing during the pandemic. So, here researchers assume lockdown may have some moderating effects for attitudes towards knowledge sharing from the PU, PEOU, and flow point of view. So here H_{14}, and H_{16} represent the two hypotheses related to lockdown and its effects.

H_{14}: Higher time of staying in lockdown is positively related to higher attitude for knowledge sharing

H_{16}: Lockdown acts as a moderator between the affecting factors of attitude for knowledge sharing a) PU, b) PEOU, c) Flow state

Quarantine as a moderator

Quarantine is the government-imposed situation where social interaction with people is not allowed. Quarantine curbs the spread of disease and limits direct encounters [87,126]. Authorities impose quarantine except for traveling to the home or for emergency and significant assignments. It aims to reduce social interaction with people for 7 to 21 days and targets the spread of disease [220]. Quarantine, serving as a moderator, significantly influenced attitudes towards knowledge sharing among online gamers during COVID-19. At high levels of quarantine enforcement, PU for sharing knowledge surged, driven by the isolation-induced necessity for connectivity, amplifying positive attitudes towards information exchange. Moreover, the PEOU was heightened during stringent quarantine, as gaming emerged as a readily accessible avenue, reinforcing favorable attitudes towards knowledge sharing. The Flow state, intensified during strict quarantine measures, further propelled positive attitudes, aligning with increased immersion and concentration in gaming, encouraging active knowledge-sharing behavior.

Conversely, during low quarantine periods, while PU and PEOU remained relevant, their impact on attitudes towards knowledge sharing was diminished. Reduced quarantine stringency lessened the urgency for information exchange, influencing attitudes accordingly. Additionally, the less immersive gaming atmosphere during low quarantine periods reduced the influence of the flow state on attitudes, leading to decreased engagement in knowledge sharing among online gamers. Understanding these scenarios illuminates the pivotal role of quarantine as a moderator in shaping attitudes for knowledge sharing during the pandemic.

Rigid quarantine is the stricter form of limiting any interaction, preferably the soft quarantine experience. Quarantine is the flagbearer term of COVID-19 misadventure. COVID-19 will not fizzle out anytime soon until a trustworthy vaccine arrives [76,77]. So, here in this study, researchers expect gamers' technological way of perceiving the use, the comfort of use, and flow state for the games may affect quarantine, affecting their attitude for knowledge sharing. Therefore, being in quarantine may affect gamer attitudes towards knowledge sharing directly. Here researchers assume that quarantine situations may have some moderation possibilities involving their attitude. So, here researchers assume that staying in quarantine or isolation may have some moderating effects for attitudes towards knowledge sharing from the PU, PEOU, and flow point of view. So here H_{15}, and H_{17} represent the two hypotheses related to quarantine and its effects.

H_{15}: Higher time of staying in quarantine is positively related to higher attitude for knowledge sharing

H_{17}: Quarantine acts as a moderator between the affecting factors of attitude for knowledge sharing a) PU, b) PEOU, c) Flow state

4. Research methods

4.1. Procedural design and sample participants

The researchers of this study employed a self-administered web-powered Qualtrics survey questionnaire. They used the questionnaire for collecting nonprobability, convenience sampling-based data as the sample size is not adequately defined (researchers were unable to get the exact number of gamers who play Travian games). This study uses online data collection methods to collect responses from geo-demographically

diverse online gamers in Iran, India, Vietnam, and Germany. The Travian game is popular during the pandemic primarily due to support from the game's Facebook page. The loyal gamers prefer to call themselves ***Travian.***

The data collection phase from March to July 2020 in countries such as Iran, India, Vietnam, and Germany provided a crucial snapshot of knowledge sharing among online gamers during the peak period of COVID-19 restrictions. This timeframe encapsulated the varying intensities of lockdowns and quarantine measures across these nations, offering a comprehensive understanding of how these moderators influenced attitudes towards knowledge sharing among gamers. In Iran, India, and Germany, this period witnessed fluctuating degrees of lockdowns, transitioning from strict to gradual relaxations, impacting gaming behaviors and community engagement. Vietnam, known for stringent quarantine measures, showcased a unique landscape for knowledge exchange within the gaming community during these months. Analyzing data from this timeframe allowed for a nuanced exploration of the diverse impacts of lockdown and quarantine as moderators of attitudes towards knowledge sharing among online gamers amidst the unprecedented challenges posed by the pandemic.

Researchers provide monetary incentives to the respondents for expediting the process. Researchers also explained the research objective to the respondents. Primarily, the survey targets those gamers who have played for a minimum of six months. Screening questions before the actual data collection helps in establishing proper compliance with the objective for collecting relevant data. Such questions are essential to ensure that respondents are familiar with the research. Questions like (1) how many days are you playing the game, (2) how long do you try to use all features, and (3) how doyou prefer to play with other Travian. Only those who successfully fit into the prescribed criteria are encouraged to finish the survey. Researchers want to get rid of missing data, so they used this approach. After eliminating all incomplete or missing , researchers considered 496 respondents for this research at a 95 % confidence level.

4.2. Measures

Researchers analyze and measure the primary data quantitatively for this research using existing scales from available relevant pieces of literature. However, customer knowledge flows are an exception to this way of scale measurement as there is no standard questionnaire available for this. So, researchers here used a scale based on the interpretation of previous relevant literature. Researchers use the Likert-type scale to gather data for Travian games, where "1″ denotes disagree, and "5″ stands for agree.

4.3. Common method bias

The researchers used common method bias for arranging the items, reverse coding them, and explaining the built-in purpose and association between constructs to decrease the common method bias (CMB) [160]. Here researchers employed Harman's single factor method for dealing with CMB as the first factor showed 39.2 % variance below the acceptable threshold of 50 %. So, here researchers ruled out CMB [144].

Here also researchers employed the orthogonal rotation method within structural equation modeling, which can discern common method bias [114]. By applying rotation techniques like varimax or quartimax, factors representing knowledge sharing, engagement, lockdown, and quarantine can be disentangled. This process separates common method effects from genuine relationships, unveiling distinct contributions of each variable. Postrotation factor loadings elucidate how lockdown and quarantine, as moderators, uniquely impact knowledge sharing and engagement, effectively addressing common method bias and ensuring a clearer understanding of their nuanced influences in the context of online gaming during the pandemic.

5. Results

5.1. Demographic profile analysis

In recent years, fierce competition between online gaming companies has propelled them towards the customers and their knowledge. Therefore, in this paper, by surveying 496 users of the Travian online game, it is attempted to confirm the proposed conceptual model and, as a result, help the Travian game company in supplying the games by users' requests and needs. Table 1 summarizes the respondents' profiles. Among the respondents, females accounted for 44.6 %, while males constituted 55.4 % of the sample. Moreover, individuals aged between 25 and 30 years comprised 40 % of the total number of respondents, with a notable majority holding bachelor's degrees (33.9 %). Additionally, the data indicated that the majority of respondents (40.5 %) possessed more than three years of experience with the Travian game. Table 1 shows the demographic analysis of all the respondents.

5.2. Research model assessment: reliability and validity

The research model has an acceptable fit index ($x^2/df = 2.225$, $p < 0.001$, RMSEA = 0.035, GFI = 0.93, AGFI = 0.91, CFI = 0.98) as per the comparison with the recommended threshold values of Hair et al. [81] as shown in Table 2.

Table 3 depicts the detailed factor analysis with factor loadings of items that are more than 0.50. The reliability and AVE scores represent internal consistency which is more than the acceptable values of 0.7 and 0.5. These values indicate the study's scales followed criterion norms [81]. For factor loadings of each item exceeding 0.5, the convergent validity is established [188]. The indicator loadings for the observed variables, including PEOU (0.74), PU (0.67), FLOW (0.61), AKS (0.58), IKS (0.71), ABOUT (0.64), FROM (0.56), FOR (0.72), LOCK (0.67), and QUART (0.66), collectively exhibit substantial associations with the latent construct. Complementing these loadings, the corresponding t-values, notably PEOU (5.22), PU (4.11), FLOW (3.54), AKS (3.29), IKS (4.71), ABOUT (4.22), FROM (3.31), FOR (4.25), LOCK (4.31), and QUART (4.32), signify a robust statistical significance for these relationships. The observed high loadings (exceeding the commonly accepted threshold of 0.5) combined with t-values surpassing the conventional critical threshold of 2.0 collectively affirm the strong convergent validity of these indicators, indicating their reliable

Table 1
Demographic profile of sample respondents.

Characteristics	Percentage	Frequency
Gender:	44.6	221
Female		
Male	55.4	275
Total		496
Age	16.1	80
>20yrs		
20–25yrs	36.7	182
25–30yrs	40.3	200
>30yrs	6.9	34
Total		496
Education:	17.7	88
Diploma		
Associated Diploma	21	104
Bachelor	33.9	168
Master ≥	27.4	136
Total		496
Travian game experience	16.5	82
|>1yr		
1–2 yrs	20.2	100
2–3 yrs	22.8	113
3>	40.5	201
Total		496

Source: Authors' survey data.

Table 2
Model fit criteria and acceptable fit interpretation.

Model fit Criterion	Acceptable Level	Actual Value In this Analysis	Interpretation	Reference
Chi-square	2.0 to 5.0	2.225	Accepted	[197, 218]
Goodness of fit index (GFI)	0.90 - 0.95	0.93	Accepted	[181]
Adjusted Goodness of fit index (AGFI	0.90- 0.95	0.91	Accepted	[197]
Comparative Fit Index (CFI)	>= 0.95 or Closure to 1	0.98	Accepted	[97]
Root mean square error of approximation (RMSEA)	0 to 0.08	0.035	Accepted	

representation of the underlying construct under investigation [29].

So, researchers tested the conceptual structural model after confirming the model fit which shows an acceptable fit for the data in the model ($x^2/df = 2.212$, $p < 0.001$, RMSEA = 0.032, GFI = 0.92, AGFI = 0.89, CFI = 0.98). Table 3 shows the internal reliability in all acceptance range as all alpha values are above the cut-off value of 0.7 [149]. The researchers also employ the heterotrait-monotrait ratio of correlations (HTMT) to test the discriminant validity as it is stronger than cross-loadings criterion analysis [4]. The HTMT analysis shows values below 0.85 which signifies the discriminant validity is intact for the variables (refer to Table 4).

6. Results

6.1. Structural model evaluation & hypothesis testing

Researchers test the hypotheses after evaluating structural model fitness and use Bayesian estimation to explore the assumptions, which is notably known as Bayesian structural equations modelling (SEM). Bayesian analysis synthesizes data for any prior distribution that the analyst believes or has knowledge about model parameters to achieve a posterior distribution that summarizes the parameters' information. The Bayesian estimation has some advantages over structural equation modelling, including (1) explicit adjunction of preliminary data with current data about the model parameters, (2) excellent performance for small samples, (3) testing hypothesis and estimation with any function of the model parameters [12]. Table 5 shows the direct relationships of hypotheses 1–15 with their standard regression coefficients. With standard regression coefficients less than 0.05, the hypothesis is accepted, and more than 0.05, it is rejected. Table 5 represents the hypothesis results, and Fig. 4 shows the tested structural model for H16a. Table 5 depicts the confidence interval for each hypothesis. The confidence intervals for all hypotheses except the eighth suggest not containing zero. It illustrates that all the hypotheses are supported. Fig. 5 represents the moderation effect of lockdown towards PEOU for H16b. Fig. 6 showsthe moderation effect of lockdown on the FLOW state (H16c). Fig. 7 represents quarantine moderation effects on PU (H17a). Fig. 8 shows the quarantine moderation on PEOU (H17b). Fig. 9 represents the moderation effects of quarantine for the FLOW state.

6.2. Moderation effect of lockdown and quarantine by regression analysis

The moderation effect of lockdown and quarantine is represented by the regression analysis [5], as shown in Table 6. The moderated regression analysis studies the impact of moderating study variables on the PEOU, PU, Flow state relationship with the attitude towards knowledge sharing by the online gamers. Here, in this study, researchers enter PEOU in the first step followed by lockdown (LOCK), and finally, in the third step, they employ the interaction of PEOU with LOCK. This whole process is now repeated for PU and FLOW, respectively, with LOCK. Table 6 shows LOCK's strong moderation effect on PEOU, PU, and FLOW with the attitude towards online gamers' knowledge sharing. Hypotheses H_{16a}, H_{16b}, and H_{16c} explain LOCK's significant moderating effect on Attitude for PEOU, PU, and FLOW. Similarly, hypotheses H_{17a}, H_{17b}, and H_{17c} of this study illustrate a significant moderation effect of Quarantine (QUART) on the relationship of PEOU, PU, and FLOW in online gamers' attitude towards knowledge sharing.

If the individual moderating effect of LOCK and QUART is considered, then the results signify a more substantial moderating effect of QUART on online gamers' attitude towards knowledge sharing than that of LOCK.

7. Discussion of results

The study reveals a strong link: positive attitudes towards knowledge sharing among Travian gamers significantly impact their actual knowledge sharing behavior. This game-induced positivity drives users' intent to share knowledge, facilitating greater interaction and knowledge exchange [103]. Furthermore, the research supported the effects of perceived usefulness (PU) on both individual knowledge sharing (IKS) and aggregate knowledge sharing (AKS). Notably, the impact of PU on attitude towards knowledge sharing was more pronounced ($0.54 > 0.44$), indicating that elevating PU leads to a greater increase in AKS compared to IKS. The study underscores how active gaming engagement during COVID-19 enhances users' perception of the user-friendly game interface, promoting meaningful social interactions and knowledge exchange among addicted gamers. This research adds to the literature on gaming websites' role in enhancing sociability among users, emphasizing the impact of game features on fostering interactive and engaging social environments [107].

The study investigated relationships between perceived ease of use (PEOU), flow, and knowledge sharing among Travian game users. PEOU demonstrated a nonsignificant yet influential role in both individual (IKS) and aggregate (AKS) knowledge sharing, with perceived usefulness (PU) mediating its impact on IKS. This emphasizes that enhancing PEOU indirectly boosts PU ($0.22 > 0.18$), fostering knowledge exchange intentions among users during COVID-19. However, while flow positively influenced individual knowledge-sharing intentions (IKS), it did not significantly impact aggregate knowledge sharing (AKS) [39]. Users' immersion in the flow state provided mental respite amidst the pandemic, fostering an intent for knowledge sharing but not significantly altering attitudes. This reveals how engagement in the flow state contributes to the intention, not the attitude, for knowledge sharing among gamers during challenging times [228].

The study explored the impact of PEOU on PU and Flow state among multiplayer game users. The findings revealed a substantial positive influence, with a regression coefficient of 0.3 for PU (H_9) and 0.46 for flow (H_{10}). This implies that a one-unit increase in PEOU's standard deviation leads to significant 30 % and 46 % increases in PU and flow, respectively. The user-friendly nature of multiplayer gaming websites notably influences gamers' perceptions of usefulness and their immersive flow experiences. This underscores how perceived ease of use fosters perceived usefulness and flow, influencing users' intentions and attitudes towards knowledge sharing within gaming communities [110].

H_{11}, H_{12}, and H_{13} investigated the influence of intention to knowledge sharing (IKS) on customer knowledge flows among multiplayer game users. All three hypotheses were supported, showcasing the impact of IKS on various facets of knowledge exchange. Notably, the effect of IKS is more pronounced on knowledge about and for the customer, with 29 % and 23 % increases, respectively. Sharing knowledge emerges as pivotal in multiplayer gaming, particularly in relation to customer-related knowledge. The study highlights a stronger association between IKS and knowledge for/about customers than with knowledge acquired from fellow gamers, emphasizing how understanding fellow

Table 3
Research model assessment: factor loading, variance inflation factor (VIF), average variance extracted (AVE), constructed reliability (CR) and alpha.

Construct & Codes	Measurement items sources	Factor Loading	VIF	AVE	CR	Cronbach alpha
Perceived ease-of-use	Adopted from Hsu and Lu, [93]		3.852	0.751	0.928	0.831
PEOU						
PEOU1	Learning to participate in the online game community is easy for me	0.786				
PEOU2	It is easy for me to become skillful at participating in online game community	0.817				
PEOU3	**I think it is easy to participate in the online game community**	0.742				
Perceived usefulness	Adopted from Hsu and Lu, [93]		3.205	0.772	0.956	0.852
PU	Instructions: The purpose of playing online games includes relaxation, playfulness, fun.					
PU1	It enables me to accomplish the purpose of playing the game more quickly	0.778				
PU2	It enables me to fulfill the purpose of playing the game effectively	0.793				
PU3	It enables me to satisfy the purpose of playing the game easier	0.797				
Flow state	Adopted from Hsu and Lu, [93]		4.025	0.763	0.953	0.829
FLOW	Instructions: The word ‘‘flow’’ describes a state of mind sometimes experienced by people involved in some activity. One example of flow is when a user is playing exceptionally well and achieves a state of mind where nothing else matters but the online game: you engage in an online game with total involvement, concentration, and					
FLOW1	Do you think you have ever experienced flow in playing the online game	0.836				
FLOW2	In general, how frequently would you say you have experienced flow when you play online game	0.817				
FLOW3	Most of the time, I play online game and feel that I am in flow	0.821				
Attitude toward knowledge sharing	Adopted from Hau and Kim, [82]		3.473	0.713	0.945	0.926
AKS						
AKS1	My knowledge sharing is good to me	0.792				
AKS2	My knowledge sharing is a wise move	0.798				
AKS3	I like knowledge sharing	0.768				
AKS4	My knowledge sharing is valuable to me	0.781				
Intention to knowledge sharing	Adopted from Hau and Kim, [82]		4.125	0.679	0.937	0.908
IKS						
IKS1	I will share innovation-conducive knowledge.	0.773				
IKS2	I will share innovation-conducive knowledge at the request of other players in my community	0.779				
IKS3	I intend to share innovation-conducive knowledge more frequently in the future.	0.793				
IKS4	I will try to share innovation-conducive knowledge more effectively.	0.695				
Knowledge about customer	Adopted from Garcia-Murillo and Annabi, [68]; Desouza and Awazu, (2005); Rowley, (2005); Salomann et al., [173]		3.576	0.778	0.916	0.925
ABOUT						
ABOUT1	I tell the Travian gamers about my age.	0.765				
ABOUT2	I tell the Travian gamers about my gender.	0.759				
ABOUT3	I tell the Travian gamers about the background of playing online games.	0.753				
ABOUT4	I tell the Travian gamers about my satisfaction with its game.	0.784				
ABOUT5	I tell the Travian gamers about my education status.	0.764				
Knowledge from customer	Adopted from Gibbert et al. [73]; Bose and Sugumaran, (2003); Smith and McKeen, (2005)		3.472	0.743	0.953	0.917
FROM						
FROM1	I have enough information about other similar games.	0.787				
FROM2	I tell the Travian gamers about how to play similar games.	0.789				
FROM3	I tell the Travian gamers about the advantages and disadvantages of other online games.	0.799				
FROM4	I tell the Travian gamers about the newest online games and ideas for improvement as I get encouragement.	0.802				
FROM5	I will suggest constructive comments for making the Travian game interesting.	0.789				
Knowledge for customer	Adopted from Gibbert et al. [73]; Gebert et al. [69]; Salomann et al. [173]		3.307	0.732	0.954	0.949
FOR						
FOR1	The Travian game provides enough information about how to play for me.	0.774				
FOR2	The Travian game provides enough information about other similar games for me.	0.758				
FOR3	The Travian game provides enough information about the disadvantage of playing more than usual for me	0.782				
Lockdown	Adopted from Dryhurst et al. [56]; Floyd et al. [66]		3.787	0.871	0.921	0.979
LOCK						
LOCK1	I have played online games while on lockdown to avoid boredom.	0.769				
LOCK2	I follow lockdown rules and avoid physical interaction with peer gamers.	0.721				
LOCK3	I always want to interact digitally with fellow gamers to avoid loneliness.	0.743				
LOCK4	I feel motivated to play online games and share my experience with peers.	0.778				
Quarantine	Adopted from Grenfell & Drew, [77]		2.892	0.751	0.982	0.982
QUART						
QUART1	I have played online games while being in quarantine at some stage of traveling.	0.809				
QUART2	I try to share my experience of gaming with peers while in quarantine.	0.763				
QUART3	I am connecting with peers through various digital platforms.	0.791				
QUART4	I feel satisfied by playing online games while in quarantine.	0.757				

Source: Authors’ survey data.

Table 4
HTMT analysis.

Study Variables	Mean	Standard Deviation	PEOU	PU	FLOW	ABOUT	FROM	FOR	LOCK	QUART	IKS	AKS
PEOU	3.312	0.912	1									
PU	2.637	0.861	0.079**	1								
FLOW	3.121	0.831	0.061**	0.082	1							
ABOUT	4.543	0.712	0.078	0.069	0.036	1						
FROM	4.432	0.783	0.114	0.048	0.073	0.331**	1					
FOR	4.129	0.742	0.027	0.056	0.001	0.141**	0.161**	1				
LOCK	4.778	0.673	0.056	0.038	0.033	0.241**	0.201**	0.281**	1			
QUART	4.028	0.687	0.047	0.041	0.003	0.341**	0.272**	0.195**	0.325**	1		
IKS	3.012	0.799	0.078	0.035	0.046	0.418**	0.381**	0.307**	0.305**	0.406**	1	
AKS	4.916	0.928	0.089	0.041	0.031	0.039**	0.329**	0.141**	0.409**	0.326**	0.416**	1

Source: Authors' analysis on Survey Data:.
** $p < 0.01$, $N = 496$.

Table 5
Hypothesis outcome after testing.

Hypotheses	standard regression coefficient	standard error	standard deviation	lower limit	upper	outcome limit
H_1	0.508**	0.000	0.022	0.746	0.832	supported
H_2	0.439**	0.002	0.044	0.351	0.525	supported
H_3	0.501**	0.002	0.039	0.462	0.615	supported
H_4	0.183**	0.002	0.051	0.084	0.285	supported
H_5	0.223**	0.001	0.034	0.159	0.292	supported
H_6	0.138**	0.002	0.051	0.042	0.237	supported
H_7	0.198**	0.002	0.056	0.09	0.306	supported
H_8	0.060**	0.003	0.057	−0.053	0.174	Not supported
H_9	0.299**	0.002	0.048	0.201	0.39	supported
H_{10}	0.465**	0.002	0.049	0.368	0.56	supported
H_{11}	0.157**	0.001	0.02	0.267	0.548	supported
H_{12}	0.288**	0.000	0.012	0.378	0.578	supported
H_{13}	0.233**	0.000	0.015	0.321	0.527	supported
H_{14}	0.391**	0.001	0.047	0.322	0.539	supported
H_{15}	0.479**	0.002	0.046	0.331	0.511	supported

Source: Authors' survey data analysis.
** $p < 0.05$.

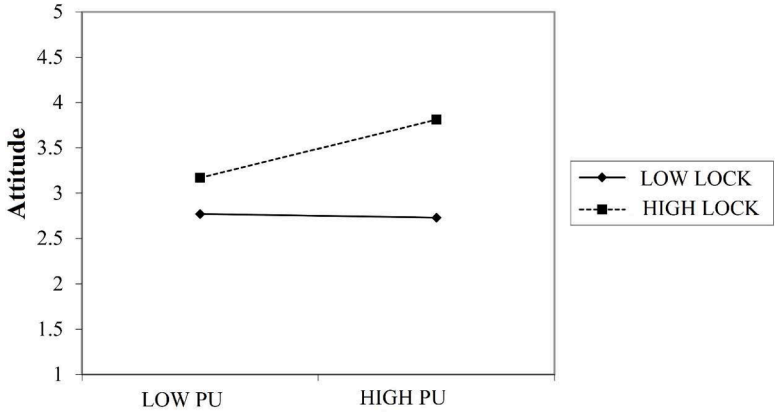


Fig. 4. Moderation effect of lockdown on PU
Source: Authors' survey data analysis.

players motivates robust information sharing, significantly benefiting other players' knowledge [60].

H_{14} and H_{15} examined how lockdown and quarantine influence online gamers' attitudes towards knowledge sharing. Amidst the pandemic, gamers found increased time for regular engagement with the Travian game. New players, drawn into gaming due to COVID-19, express happiness in sharing their experiences [151]. Both new and existing gamers emphasize the significance of shared knowledge for engaging gameplay [216]. Lockdown and quarantine serve as moderators, enhancing gaming time and fostering knowledge exchange among gamers [18]. Gamers perceive gaming activities as avenues for socialization and time utilization during these restrictive periods.

Lockdown and quarantine serve as pivotal moderators influencing gamers' attitudes towards knowledge sharing, primarily through perceived comfort and ease facilitated by gaming websites, alongside the induced flow state during gameplay. Amidst stay-at-home mandates, gaming activities play a crucial role in mitigating the adverse effects of social isolation. By fostering interactive gaming experiences, these practices not only decrease potential conflicts among players but also alleviate COVID-19-induced stress, particularly among vulnerable

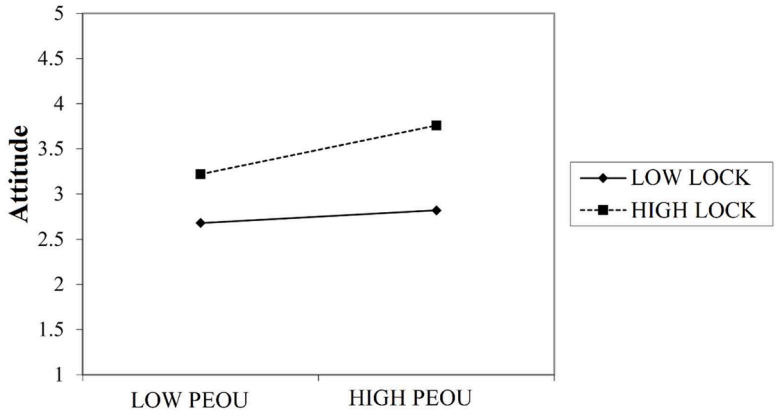


Fig. 5. Moderation effect of lockdown on PEOU
Source: Authors' survey data analysis.

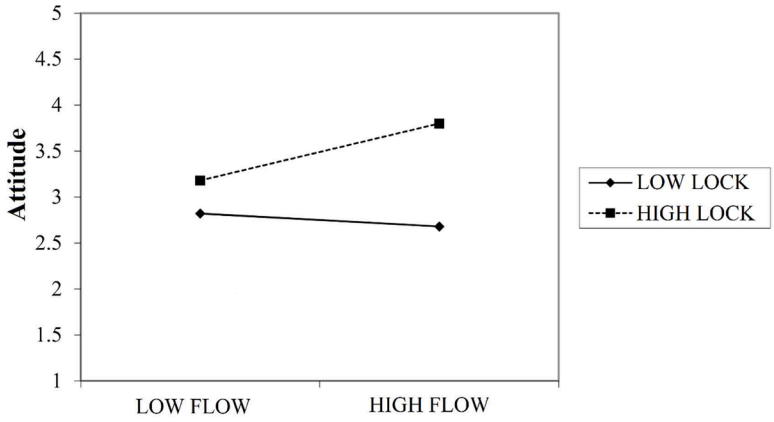


Fig. 6. Moderation effect of lockdown on flow
Source: Authors' survey data analysis.

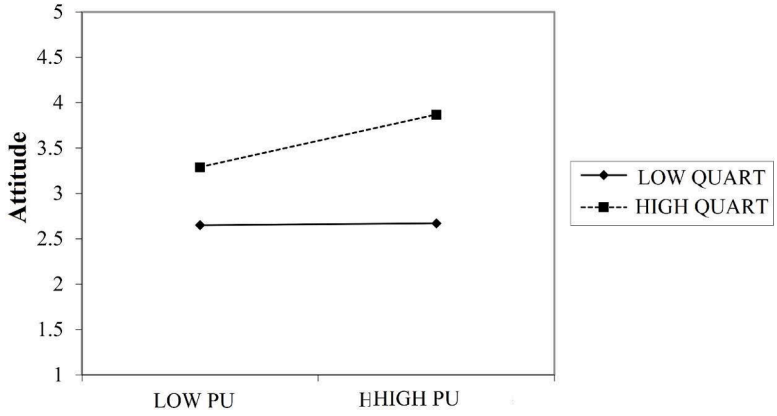


Fig. 7. Moderation effect of quarantine on PU
Source: Authors' survey data analysis.

individuals within gaming communities [231]. The comfort and ease provided by gaming platforms, coupled with the immersive flow state, offer a refuge from isolation, fostering a sense of engagement and connectivity. Consequently, these moderators amplify gamers' attitudes towards knowledge sharing, contributing to a harmonious and supportive environment within the gaming sphere, particularly during times of widespread restrictions and uncertainties. Fig. 10 represents all the path analyses of all the hypotheses for the new structural equation model of this study.

8. Implications

a. Theoretical implications

The study aims to examine intrinsic motivators (PU, PEOU, Flow state) driving gamers to freely share knowledge. Using an integrated model based on TAM and Flow theory, it explores these motivators' impact on gamers' knowledge-sharing activities. Findings confirm TAM relationships: PU and PEOU significantly influence gamers' knowledge-

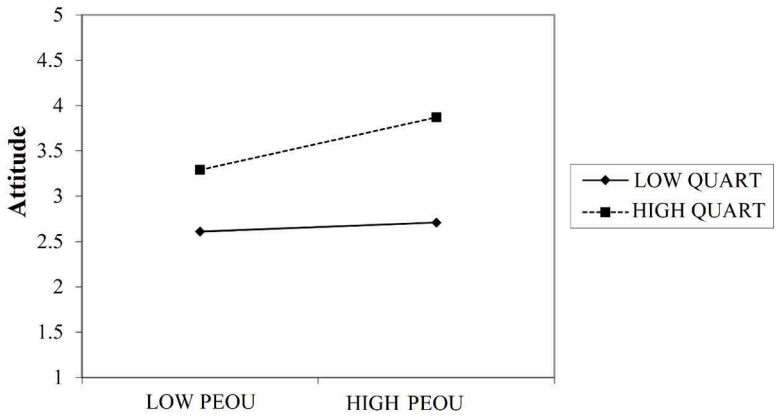


Fig. 8. Moderation effect of quarantine on PEOU
Source: Authors' survey data analysis.

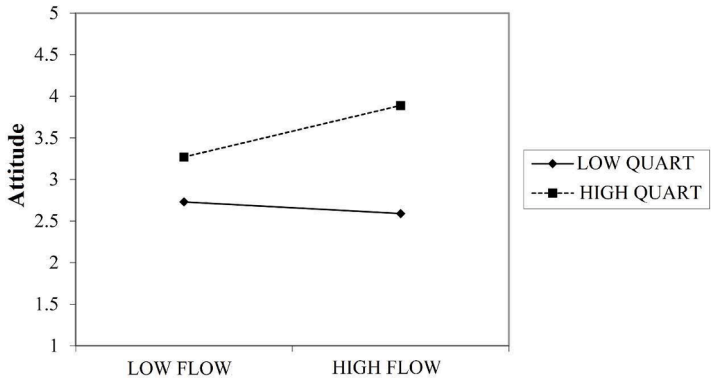


Fig. 9. Moderation effect of quarantine on FLOW
Source: Authors' survey data analysis.

Table 6
Moderating effect of lockdown (LOCK) and quarantine (QUART) on attitude toward knowledge sharing (AKS).

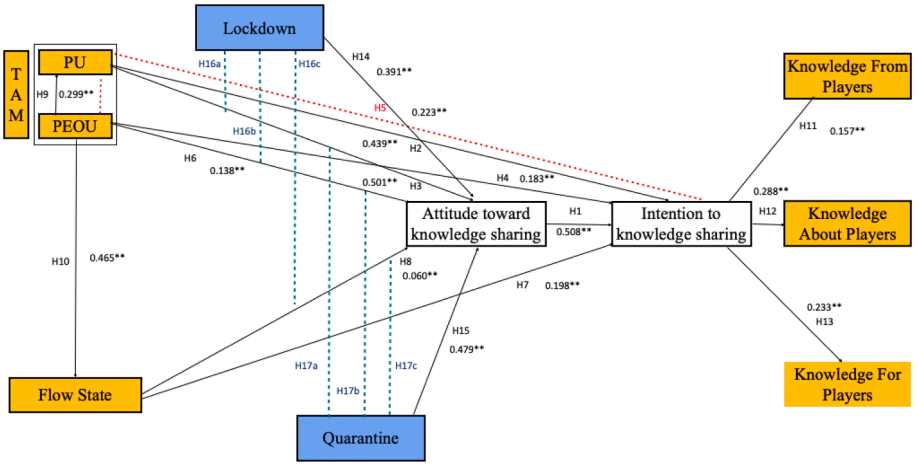
Study variables		β	t	F	R^2	Adjusted R^2
Step 1				32.283**	0.361	0.352
	PEOU	0.265	3.262**			
	PU	0.257	3.851**			
	FLOW	0.248	3.292**			
Step 2				38.864**	0.417	0.408
	LOCK	0.487	9.523**			
	QUART	0.351	8.164**			
Step 3				43.289**	0.537	0.528
	PEOU * LOCK	0.274	3.564**			
	PU* LOCK	0.269	3.345**			
	FLOW*LOCK	0.294	3.227**			
Step 4				48.652**	0.612	0.563
PEOU * QUART		0.236	3.424**			
PU*QUART		0.209	3.985**			
FLOW* QUART		0.218	3.215**			

Source: Authors' survey data analysis.
** $p < 0.01$.

sharing attitude and intention. Higher utility and lower complexity heighten sharing inclination. This aligns with the model of Schepers and Wetzels [176], yet here, PU notably influences attitude more than intention, while PEOU affects intention more than perspective. Players perceiving more utility increase sharing attitude; reduced complexity boosts sharing intention. Contrary to Park [154], PU and PEOU do not directly impact intention, but they affect attitude. The study's theoretical contribution extends to how gamers share knowledge amidst COVID-19, examining moderating factors shaping their attitude.

The study underscores quarantine's substantial moderating impact over lockdown on online gamers, an area overlooked in prior research [17]. Introducing a model encompassing gaming, knowledge sharing, and personal engagement during stay-at-home periods, this study fills a research gap [16]. Games, fostering frequent interaction amidst the pandemic, diminish psychological distance among gamers. This study pioneers the structural modeling use of lockdown and quarantine as moderators, extending prior work [19]. While lockdown is integrated into gamers' lives, quarantine prompts a desire for connection and sharing, affecting PU, PEOU, and Flow for online gamers amidst uncertain networks.

This study delved into the nuanced relationships among PEOU, PU, flow state, and knowledge-sharing intention. It revealed that PEOU's influence on knowledge-sharing intention, mediated via PU (H_6), held more weight than its direct impact, offering deeper insights. Consistent with King and He [111], PU exerts a profound influence on intention, capturing much of PEOU's impact. While PEOU significantly bolsters knowledge-sharing intention (H_4, H_5), its direct impact is less crucial, supported despite mixed prior findings ([117]; Ma et al., 2005; [195]). The logical link suggests that users' perception of knowledge-sharing ease might be influenced by game usability. Additionally, flow state emerges as a crucial predictor for knowledge-sharing intention (H_7, H_8), aligning with Hsu and Lu's model [93], emphasizing the need for games to fulfill individual leisure desires for enhanced flow experiences.



$H_{16a} = 0.269$, $H_{16b} = 0.274$, $H_{16c} = 0.294$

$H_{17a} = 0.209$, $H_{17b} = 0.236$, $H_{17c} = 0.218$

Fig. 10. The structural equation model.
Source: Authors' survey data analysis.

Notably, PEOU significantly and robustly influences PU (H_9), supporting Davis [47] and Adams et al. [2]. Moreover, the study uncovers a significant relation between PEOU and flow state (H_{10}), expanding on Liao and Huang's work [130], indicating flow state as a supportive factor in engaging customers through social media channels.

This analysis synthesizes diverse findings on PEOU and PU relationships in gaming contexts. Notably, several studies [61,119,120] affirm a positive association between PEOU and PU. If an online game lacks perceived usability, it risks user abandonment, as contrary findings by Chen et al. (2007) suggest in the e-CRM context, where PEOU does not significantly influence PU. Exploring H_{11}, H_{12}, and H_{13}, this study indicates knowledge-sharing intention's substantial impact on different facets of customer knowledge, crucial for firms. Positive product image enhances word-of-mouth sharing [214], accelerating positive brand perception. Petter et al. [159] and Suh and Han [194] highlight PU's role in user satisfaction, trust, and subsequent knowledge sharing. Lynn et al. [136] stress PEOU and PU as pivotal in website effectiveness, crucial for gathering customer-related information. In the gaming sphere, features of online games, critical for user engagement [26], strongly influence gamers' association and commitment.

b. Practical managerial implications

The managerial implication underscores the importance of understanding these factors' nuanced impacts. This approach allows for a tailored game development strategy, emphasizing features that promote knowledge sharing and engagement. Developers can leverage insights from the model to design online gaming experiences that adapt to varying pandemic conditions, fostering stronger user engagement by integrating features sensitive to the influences of lockdowns and quarantines. Consequently, this tailored approach ensures more captivating and adaptable gaming experiences for users during unprecedented times.

The practical implication explores crafting adaptable gaming experiences. For instance, game developers can utilize this model to design in-game mechanisms sensitive to lockdown severity—introducing collaborative challenges or virtual events during strict lockdowns. Similarly, during quarantine periods, fostering knowledge exchange through interactive tutorials or forums can enhance user engagement. This approach enables developers to tailor gaming experiences, introducing features aligning with pandemic restrictions, ensuring sustained user involvement despite varying lockdown and quarantine conditions.

Employing a model with lockdown and quarantine as moderators in the online gaming sector offers practical insights. Game developers can adapt gameplay during stringent lockdowns by introducing collaborative challenges or virtual events, fostering engagement. Quarantine periods can be utilized for knowledge exchange through interactive tutorials or forums, enhancing user involvement. This model enables tailored gaming experiences aligned with pandemic restrictions, ensuring sustained engagement despite varying lockdown and quarantine conditions. Moreover, it informs strategies for platform enhancements, such as user-friendly interfaces or community-building features, optimizing gaming experiences during challenging periods.

The study's outcomes yield crucial managerial implications, particularly in the realm of online gaming development. First, developers should acknowledge that gamers predominantly share experiences related to quarantine rather than lockdown situations. This insight informs the creation of more compelling game features, capitalizing on users' intrinsic motivations, especially considering potential future pandemics. Elements such as perceived ease of use (PEOU), perceived usefulness (PU), and the flow state hold sway in gamers' enjoyment and engagement during pandemics, underscoring their importance in game development [226]. This insight also extends to over-the-top channels, suggesting potential for unexplored popularity in gaming.

Second, the robust exchange of ideas among gamers, evident even during the pandemic, emphasizes the significance of understanding gamers' attitudes and philosophy. Developers must not overlook this inherent tendency but instead leverage and cater to gamers' penchant for sharing knowledge and intentions, integrating their insights into game design philosophies [178].

Third, the study highlights online gaming's impact on the social ecosystem during COVID-19, offering a window for developers to mitigate gamers' stress and boredom through game engagement strategies [175]. This understanding paves the way for stress-alleviating features in future game development, targeting intrinsic satisfaction and fostering a sense of belongingness among gamer communities.

Moreover, amidst uncertainty, proactive game development strategies should target fulfilling gamers' needs, leveraging online gaming's potential to alleviate mental distress amidst isolation and uncertainty. Understanding gamers' daily lives and their inclination towards online gaming during stressful times is pivotal for future game development [182]. Addressing intrinsic motivators through thoughtful incentives can enhance engagement during similar stressful events in the future. Recognizing the intricacies of human sensitivity in game development,

particularly in incentivization strategies, will be crucial for engaging gamers during challenging times [58,208]. Identifying and incorporating intrinsic behavioral motivators into game design, amidst conditions akin to COVID-19, remains paramount [96].

Measuring human sensitivity within online gaming contexts involves understanding player behaviors, motivations, and responses to incentives. Incentives in gaming can be diverse, ranging from in-game rewards to social recognition or competitive rankings. To gauge human sensitivity, researchers can focus on:

a. Behavioral Analysis: Observing how players respond to different incentives offers insights. Tracking in-game actions, preferences, and interactions helps discern sensitivities to various incentives.
b. Surveys and Questionnaires: Gathering player feedback on incentive structures reveals preferences and sensitivities. Questions on preferred rewards, motivators, or reactions to different incentives offer valuable data.
c. Neuroscientific Methods: Employing neuroscience tools like EEG or fMRI during gameplay helps measure cognitive and emotional responses, providing insights into sensitivities to incentives at a neurological level.
d. Player Engagement Metrics: Analyzing player retention rates, session duration, or participation in incentive-based activities helps assess the impact of incentives on human sensitivity and engagement.

By amalgamating these approaches, game developers can grasp how players respond to incentives, tailor them effectively, and enhance gaming experiences, ultimately tapping into and understanding human sensitivities within online gaming environments. In online gaming, technology plays a crucial role in controlling the flow of communication, ensuring efficient and engaging interactions among players in the following ways:

a. Real-time Chat Systems: Integrated chat features enable instantaneous communication among players during gameplay. Games like MMORPGs (Massively Multiplayer Online Role-Playing Games) use chat systems allowing players to strategize, socialize, or seek assistance in real time, enhancing coordination and teamwork.
b. Voice Chat Applications: Dedicated voice chat platforms or in-game voice communication tools optimize coordination in team-based games. For instance, titles like "Fortnite" or "Call of Duty" leverage voice chat, enabling seamless communication and strategizing among teammates.
c. Integrated Communication Tools: Platforms offering integrated communication tools, such as in-game mail or notification systems, streamline interactions. For instance, notifications for quest updates or in-game events maintain player engagement and facilitate timely communication.
d. Social Media Integration: Linking games with social media platforms allows players to share achievements, invite friends, or discuss gameplay. This integration enhances the flow of communication, extending the gaming experience beyond the game itself. These examples highlight how technology-driven communication tools in online gaming facilitate smoother, more coordinated, and engaging interactions among players, ultimately enhancing the overall gaming experience.

Therefore, understanding the interplay of social ecosystems and individual behavior during stressful times guides the identification of intrinsic motivators for future game development, steering attention towards user engagement and digital ecosystem dynamics. Finally, leveraging technology to analyze online gamers' attitudes and knowledge-sharing intentions provides valuable insights into user behavior [146,158]. This amalgamation of social and technological understanding offers a deeper comprehension of user engagement within the digital realm, guiding more insightful game development practices centered around fostering communication flow and understanding users' behavior.

c. Limitations and future research direction

Like all research, this study has its shortcomings. The first limitation indicates having a possibility of cross-sectional variables regarding data collection as data are collected from March to July 2020. Since respondents' behavior may differ from that in other online games, future researchers can attempt to collect data for more than one online game. This practice can be tested for a better understanding of comparable study analysis. As data are from Iran, India, Vietnam, and Germany, where lockdown and quarantine regulations differ from time to time, future researchers can have a broad timeline for data collection where post-COVID-19 online gamers' attitudes can be studied. Also, to get more generalized data, in the future, researchers can include more countries in the study. Other antecedents of online gaming, like expertise and experience, may be considered while designing future research.

One potential limitation of this research lies in the sampling methodology and sample size definition. The utilization of a nonprobability convenience sampling approach alongside the lack of a precisely defined sample size might limit the generalizability of findings. Future researchers can acknowledge context-specific insights and recommend future research employing more robust sampling techniques for broader generalizability. The reliance on self-administered, web-powered Qualtrics surveys could have introduced some methodology-related limitations to the accessibility of online platforms, potentially excluding certain segments of the gaming population. Additionally, the inability to ascertain the exact number of gamers engaging in Travian games could affect the representativeness of the sample. Future studies could address this limitation by employing more robust sampling methods, such as random sampling techniques, to ensure a more diverse and representative participant pool. Furthermore, supplementing quantitative approaches with qualitative studies or experiments could provide richer insights into the nuances of attitudes and behaviors related to knowledge sharing among online gamers in different sociocultural contexts during the pandemic. Future researchers can emphasize contextual relevance and caution in broad applicability for analysis.

The study cannot reveal much of online gamers' profiles based on their social position, for example the local impact on middle-aged adult gamers who are away from their families in either lockdown or quarantine. This gerontological inclusion of online game studies is not addressed here. The use of technology in older online gamers is overlooked here. More in-depth studies can target social belongingness and loneliness on the experience of gaming in the future. Future researchers can explore information flow patterns and neurological aspects of understanding for fellow peer communities.

More studies can explore COVID-19 post-traumatic stress disorder and its effect on gamers' mental health. Future researchers can work on the co-design and co-production of better online games. More psychological parameters can be included for a future scope of research. This research attempts to study the effect of all these machines on the social ecosystem and the process of online gamers' features.

9. Conclusion

This study explores TAM and Flow's impact on knowledge sharing in the Travian game, uncovering insights crucial for enhancing customer engagement and innovation in online gaming management. This study highlights the influential factors shaping knowledge sharing in the Travian game. Findings indicate that perceived Flow directly impacts users' enjoyment and time perception, influencing knowledge-sharing intention. Both PU and PEOU significantly affect this intention, with PU exerting a more pronounced influence. Furthermore, PEOU positively influences Flow and PU, consistent with prior research by Sanchez-Franco and Roldan [174]. PEOU's role in creating an enjoyable

user experience fosters Flow and PU, encouraging knowledge sharing, in line with prior studies. The study highlights PU's dominant impact (0.439) on knowledge-sharing intention compared to Flow (0.198). Similarly, PU (0.501) holds a more substantial sway on attitudes towards knowledge sharing than Flow (0.060). It advises Travian managers to prioritize PU to engage users in knowledge sharing, followed by focusing on enhancing Flow. Emphasizing PEOU is crucial as it influences users' perception of game validity and fosters Flow, aligning with prior research suggesting that meeting user needs and providing information aid in creating a conducive Flow state.

The study's final hypotheses highlight the pivotal role of an engaging game environment in fostering player involvement, leading to increased participation in game improvement. This aligns with Fan et al. (2012), emphasizing user engagement and loyalty through shared experiences. Establishing initial relationships, as proposed by Sue et al. [192], facilitates gathering user data and knowledge, aiding the Travian game company in tailoring innovations to meet player needs and gain a competitive edge. The study suggests leveraging player knowledge during the pandemic by enhancing player engagement in the company's processes. Limitations include sole focus on Travian game users, warranting exploration in diverse game contexts. Future studies could delve into additional variables like designer reality, trust, and usage, impacting user attraction in online games. Utilizing e-CKM tools in game environments deserves exploration, and longitudinal data collection can offer deeper insights into knowledge-sharing dynamics among players.

CRediT authorship contribution statement

Justin Paul: Visualization, Validation, Supervision, Resources. **Mohsen Akbari:** Writing – original draft, Methodology, Investigation, Conceptualization. **Subhra Mondal:** Writing – review & editing, Visualization, Investigation, Formal analysis. **Subhankar Das:** Writing – original draft, Writing – review & editing, Data curation, Formal analysis, Methodology, Visualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

References

[1] T. Abel, D. McQueen, The COVID-19 pandemic calls for spatial distancing and social closeness: not for social distancing!, Int. J. Public Health 65 (3) (2020) 231, https://doi.org/10.1007/s00038-020-01366-7.

[2] D.A. Adams, R.R. Nelson, P.A. Todd, Perceived usefulness, ease of use, and usage of information technology: a replication, MIS Q. 16 (2) (1992) 227, https://doi.org/10.2307/249577.

[3] R. Agarwal, E. Karahanna, Time flies when you're having fun: cognitive absorption and beliefs about information technology usage, MIS Q. 24 (4) (2000) 665, https://doi.org/10.2307/3250951.

[4] D.C. Ahrholdt, S.P. Gudergan, C.M. Ringle, Enhancing service loyalty, J. Travel. Res. 56 (4) (2016) 436–450, https://doi.org/10.1177/0047287516649058.

[5] L.S. Aiken, S.G. West, R.R. Reno, Multiple Regression: Testing and Interpreting Interactions, Sage Publications, Newbury Park, 1991.

[6] I. Ajzen, The theory of planned behavior, Organ. Behav. Hum. Decis. Process. 50 (2) (1991) 179–211, https://doi.org/10.1016/0749-5978(91)90020-t.

[7] J.W. Alba, E.F. Williams, Pleasure principles: a review of research on hedonic consumption, J. Consum. Psychol. 23 (1) (2013) 2–18, https://doi.org/10.1016/j.jcps.2012.07.003.

[8] K. Alha, E. Koskinen, J. Paavilainen, J. Hamari, Critical acclaim and commercial success in mobile free-to-play games, in: *DiGRA/FDG'16-Proceedings of the First International Joint Conference of DiGRA and FDG*. Digital Games Research Association and Society for the Advancement of the Science of Digital Games, 2016.

[9] A.G. Amorim, L. Jeon, Y. Abel, S.J. Pape, E.X. Albuquerque, M. Soares, V.C. Silva, D. Aguiar, J.R.O. Neto, C. Costin, R.L. Rodrigues, M. León, C.A. De Paula, J. Lopes, M.S. Silva, M.V.D. Nascimento, G.A. Patricio, V.F. Da Silva, R. Florentino, Exploring the use of Escribo Play mobile learning games to foster early mathematics for Low-Income First-Grade children, Comput. Educ. 199 (2023) 104759, https://doi.org/10.1016/j.compedu.2023.104759.

[10] D. Andrade, A. Ferreira, Fortnite" and new kids' sociabilities, Eur. J. Soc. Sci. 4 (1) (2021) 41, https://doi.org/10.26417/273vgt97c.

[11] S. Antons, M. Liebherr, M. Brand, A. Brandtner, From game engagement to craving responses – the role of gratification and compensation experiences during video-gaming in casual and at-risk gamers, Addict. Behav. Rep. (2023) 100520, https://doi.org/10.1016/j.abrep.2023.100520.

[12] J.L. Arbuckle, Amos™ 16.0 User's Guide, SPSS, Chicago, 2008.

[13] G.A. Athaide, P.W. Meyers, D.L. Wilemon, Seller-buyer interactions during the commercialization of technological process innovations, J. Prod. Innov. Manage. 13 (5) (1996) 406–421, https://doi.org/10.1016/0737-6782(96)00038-0.

[14] A. Bajaj, S.R. Nidumolu, A feedback model to understand information system usage, Inf. Manage. 33 (4) (1998) 213–224, https://doi.org/10.1016/s0378-7206(98)00026-3.

[15] J. Balakrishnan, M.D. Griffiths, Loyalty towards online games, gaming addiction, and purchase intention towards online mobile in-game features, Comput. Human. Behav. 87 (2018) 238–246, https://doi.org/10.1016/j.chb.2018.06.002.

[16] R.J. Bandara, M. Fernando, S. Akter, Construing online consumers' information privacy decisions: the impact of psychological distance, Inf. Manage. 58 (7) (2021) 103497, https://doi.org/10.1016/j.im.2021.103497.

[17] M. Barr, A. Copeland-Stewart, Playing video games during the COVID-19 pandemic and effects on players' well-being, Games Cult. 17 (1) (2021) 122–139, https://doi.org/10.1177/15554120211017036.

[18] T.T. Bengtsson, L.H. Bom, L. Fynbo, Playing apart together: young people's online gaming during the COVID-19 lockdown, Young 29 (4_suppl) (2021) S65–S80, https://doi.org/10.1177/11033088211032018.

[19] J. Benitez, J. Henseler, A. Castillo, F. Schuberth, How to perform and report an impactful analysis using partial least squares: guidelines for confirmatory and explanatory IS research, Inf. Manage. 57 (2) (2020) 103168, https://doi.org/10.1016/j.im.2019.05.003.

[20] L. Bizzi, Why to gamify performance management? Consequences of user engagement in gamification, Inf. Manage. 60 (3) (2023) 103762, https://doi.org/10.1016/j.im.2023.103762.

[21] I. Bogost, Play Anything: The Pleasure of Limits, the Uses of Boredom, and the Secret of Games, 1st ed., Basic Books, 2016.

[22] R. Bolton, S. Saxena-Iyer, Interactive services: a framework, synthesis and research directions, J. Interact. Market. 23 (1) (2009) 91–104, https://doi.org/10.1016/j.intmar.2008.11.002.

[23] S. Brambilla Hall, COVID-19 is taking gaming and esports to the next level, World Econ. Forum (2020). Retrieved November 20, 2023, from, https://www.weforum.org/agenda/2020/05/covid-19-taking-gaming-and-esports-next-level/.

[24] E. Bridges, R. Florsheim, Hedonic and utilitarian shopping goals: the online experience, J. Bus. Res. 61 (4) (2008) 309–314, https://doi.org/10.1016/j.jbusres.2007.06.017.

[25] A. Bueren, R. Schierholz, L. Kolbe, W. Brenner, Customer knowledge management-improving performance of customer relationship management with knowledge management, in: *37th Annual Hawaii International Conference on System Sciences, 2004. Proceedings of the*, Big Island, HI, IEEE, 2004, https://doi.org/10.1109/HICSS.2004.1265416, pp. 10-pp.

[26] S. Burgess, S. Bingley, C.M. Parker, The value of local sporting clubs' websites, Inf. Manage. 58 (8) (2021) 103531, https://doi.org/10.1016/j.im.2021.103531.

[27] F. Calisir, F. Calisir, The relation of interface usability characteristics, perceived usefulness, and perceived ease of use to end-user satisfaction with enterprise resource planning (ERP) systems, Comput. Human. Behav. 20 (4) (2004) 505–515, https://doi.org/10.1016/j.chb.2003.10.004.

[28] R.L. Celsi, R.L. Rose, T.W. Leigh, An exploration of high-risk leisure consumption through skydiving, J. Consum. Res. 20 (1) (1993) 1–23, https://doi.org/10.1086/209330.

[29] J. Cheah, M. Sarstedt, C.M. Ringle, T. Ramayah, H. Ting, Convergent validity assessment of formatively measured constructs in PLS-SEM, Int. J. Contempor. Hosp. Manage. 30 (11) (2018) 3192–3210, https://doi.org/10.1108/ijchm-10-2017-0649.

[30] C. Chen, K.Z. Zhang, X. Gong, M.K. Lee, Y. Wang, Decreasing the problematic use of an information system: an empirical investigation of smartphone game players, Inf. Syst. J. 30 (3) (2019) 492–534, https://doi.org/10.1111/isj.12264.

[31] C.-F. Chen, C.-W. Chen, Speeding for fun? Exploring the speeding behavior of riders of heavy motorcycles using the theory of planned behavior and psychological flow theory, Accident Anal. Prevent. 43 (3) (2011) 983–990, https://doi.org/10.1016/j.aap.2010.11.025.

[32] H. Chen, R.T. Wigand, M. Nilan, Exploring Web users' optimal flow experiences, Inf. Technol. People 13 (4) (2000) 263–281, https://doi.org/10.1108/09593840010359473.

[33] D.H. Choi, J. Kim, S.H. Kim, ERP training with a web-based electronic learning system: the flow theory perspective, Int. J. Hum. Comput. Stud. 65 (3) (2007) 223–243, https://doi.org/10.1016/j.ijhcs.2006.10.002.

[34] D. Choi, J. Kim, Why people continue to play online games: in search of critical design factors to increase customer loyalty to online contents, CyberPsychol. Behav. 7 (1) (2004) 11–24, https://doi.org/10.1089/109493104322820066.

[35] A. Chua, Knowledge sharing: a game people play, in: Aslib Proceedings, 55, MCB UP Ltd., 2003, pp. 117–129.

[36] J. Chuan-Chuan Lin, H. Lu, Towards an understanding of the behavioural intention to use a web site, Int. J. Inf. Manage 20 (3) (2000) 197–208, https://doi.org/10.1016/s0268-4012(00)00005-0.

[37] Chubb, H. (2020). Stuck at home? You can visit these 56 world-famous sites, museums, zoos, and more for free from your couch. Accessed: www.people.com/travel/stuck-at-home-you-can-visit-these-world-famous-sites-from-your-couch-for-free/(accessed 3 January 2021).

[38] M. Connell, K. Dunlap, You are the one foretold; finding yourself through the journey, Video Games Well-Being (2019) 125–140, https://doi.org/10.1007/978-3-030-32770-5_9.

[39] M. Coward-Gibbs, Why don't we play pandemic? Analog gaming communities in lockdown, Leis. Sci. 43 (1–2) (2020) 78–84, https://doi.org/10.1080/01490400.2020.1773986.

[40] M. Csikszentmihalyi, Beyond Boredom and anxiety: Experiencing flow in Work and Play, Jossey-Bass, San Francisco, 1975.

[41] M. Csikszentmihalyi, Towards a psychology of optimal experience, in: L. Wheeler (Ed.), Towards a psychology of optimal experience, Annual Review of Personality and Social Psychology 3 (1982) 13–36.

[42] M. Csikszentmihalyi, The flow experience and human psychology, in: M. Csikszentmihalyi, I.S. Csikszentmihalyi (Eds.), Optimal Experience: Psychological Studies of Flow in Consciousness, Cambridge University Press, New York, 1988, pp. 15–35.

[43] M. Csikszentmihalyi, Flow and the Psychology of Discovery and Invention, HarperPerennial, New York, 1997, p. 39.

[44] M. Csikszentmihalyi, M. Csikzentmihaly, Flow: The psychology of Optimal Experience, 1990, Harper & Row, New York, 1990.

[45] M. Csikszentmihalyi, J. LeFevre, Optimal experience in work and leisure, J. Pers. Soc. Psychol. 56 (5) (1989) 815–822, https://doi.org/10.1037/0022-3514.56.5.815.

[46] Y.H. Cui, J. Li, Y. Zhang, The impacts of game experience and fanwork creation on game loyalty: mediation effect of perceived value, Technol. Forecast. Soc. Change 176 (2022) 121495, https://doi.org/10.1016/j.techfore.2022.121495.

[47] F. Davis, Perceived usefulness, perceived ease of use, and user acceptance of information technology, MIS Q. 13 (1989) 319–340, https://doi.org/10.2307/249008.

[48] F.D. Davis, V. Venkatesh, A critical assessment of potential measurement biases in the technology acceptance model: three experiments, Int. J. Hum. Comput. Stud. 45 (1) (1996) 19–45, https://doi.org/10.1006/ijhc.1996.0040.

[49] F.D. Davis, R.P. Bagozzi, P.R. Warshaw, Extrinsic and intrinsic motivation to use computers in the workplace 1, J. Appl. Soc. Psychol. 22 (14) (1992) 1111–1132, https://doi.org/10.1111/j.1559-1816.1992.tb00945.x.

[50] R. Davis, B. Lang, Modeling game usage, purchase behavior and ease of use, Entertain. Comput. 3 (2) (2012) 27–36, https://doi.org/10.1016/j.entcom.2011.11.001.

[51] T. De la Hera, E. Loos, M. Simons, J. Blom, Benefits and factors influencing the design of intergenerational digital games: a systematic literature review, Societies 7 (3) (2017) 18, https://doi.org/10.3390/soc7030018.

[52] M.T. Dishaw, D.M. Strong, Extending the technology acceptance model with task–technology fit constructs, Inf. Manage. 36 (1) (1999) 9–21, https://doi.org/10.1016/s0378-7206(98)00101-3.

[53] J. Doll, I. Ajzen, Accessibility and stability of predictors in the theory of planned behavior, J. Pers. Soc. Psychol. 63 (5) (1992) 754–765, https://doi.org/10.1037/0022-3514.63.5.754.

[54] E. Dong, H. Du, L. Gardner, An interactive web-based dashboard to track COVID-19 in real-time, Lancet Infect. Dis. 20 (5) (2020) 533–534, https://doi.org/10.1016/s1473-3099(20)30120-1.

[55] J. Drennan, M. Treacy, M. Butler, A. Byrne, G. Fealy, K. Frazer, K. Irving, The experience of social and emotional loneliness among older people in Ireland, Aging Soc. 28 (8) (2008) 1113–1132, https://doi.org/10.1017/s0144686×08007526.

[56] S. Dryhurst, C.R. Schneider, J. Kerr, A.L.J. Freeman, G. Recchia, A.M. van der Bles, D. Spiegelhalter, S. van der Linden, Risk perceptions of COVID-19 around the world, J. Risk. Res. 23 (7–8) (2020) 994–1006, https://doi.org/10.1080/13669877.2020.1758193.

[57] C.D. Duong, T.N. Vu, T.V.N. Ngo, Applying a modified technology acceptance model to explain higher education students' usage of ChatGPT: a serial multiple mediation model with knowledge sharing as a moderator, Int. J. Manage. Educ. 21 (3) (2023) 100883, https://doi.org/10.1016/j.ijme.2023.100883.

[58] N.T. Duy, S.R. Mondal, N.T.T. Van, P.T. Dzung, D.X.H. Minh, S. Das, A study on the role of web 4.0 and 5.0 in the sustainable tourism ecosystem of Ho Chi Minh City, Vietnam, Sustainability. 12 (17) (2020) 7140, https://doi.org/10.3390/su12177140.

[59] L. Ejlskov, H. Bøggild, D. Kuh, M. Stafford, Social relationship adversities throughout the lifecourse and risk of loneliness in later life, Ageing Soc. 40 (8) (2019) 1718–1734, https://doi.org/10.1017/s0144686×19000345.

[60] G.R. el Said, Understanding knowledge management system antecedents of performance impact: extending the task-technology fit model with intention to share knowledge construct, Future Bus. J. 1 (1–2) (2015) 75–87, https://doi.org/10.1016/j.fbj.2015.11.003.

[61] H. El-Gohary, Factors affecting E-Marketing adoption and implementation in tourism firms: an empirical investigation of Egyptian small tourism organisations, Tour. Manage 33 (5) (2012) 1256–1269, https://doi.org/10.1016/j.tourman.2011.10.013.

[62] A.E.O. Etzioni, Face-to-face and computer-mediated communities, a comparative analysis, Inf. Soc. 15 (4) (1999) 241–248, https://doi.org/10.1080/019722499128402.

[63] K. Fang, The construction of online game teaching intelligence platform based on DQN algorithm, Entertain. Comput. 46 (2023) 100573, https://doi.org/10.1016/j.entcom.2023.100573.

[64] A.L. Fayard, G. DeSanctis, Enacting language games: the development of a sense of 'we-ness' in online forums, Inf. Syst. J. 20 (4) (2009) 383–416, https://doi.org/10.1111/j.1365-2575.2009.00335.x.

[65] C.M. Finneran, P. Zhang, A person–artefact–task (PAT) model of flow antecedents in computer-mediated environments, Int. J. Hum. Comput. Stud. 59 (4) (2003) 475–496, https://doi.org/10.1016/s1071-5819(03)00112-5.

[66] D. Floyd, S. Prentice-Dunn, R. Rogers, A meta-analysis of research on protection motivation theory, J. Appl. Soc. Psychol. 30 (2) (2000) 407–429, https://doi.org/10.1111/j.1559-1816.2000.tb02323.x.

[67] N. Gao, Y. Gao, M.N.A. Khalid, H. Iida, A computational game experience analysis via game refinement theory, Telemat. Inform. Rep. 9 (2023) 100039, https://doi.org/10.1016/j.teler.2022.100039.

[68] M. García-Murillo, H. Annabi, Customer knowledge management, J. Oper. Res. Soc. 53 (8) (2002) 875–884, https://doi.org/10.1057/palgrave.jors.2601365.

[69] H. Gebert, M. Geib, L. Kolbe, W. Brenner, Knowledge-enabled customer relationship management: integrating customer relationship management and knowledge management concepts[1], J. Knowl. Manage. 7 (5) (2003) 107–123, https://doi.org/10.1108/13673270310505421.

[70] D. Gefen, D.W. Straub, Gender differences in the perception and use of E-mail: an extension to the technology acceptance model, MIS Q. 21 (4) (1997) 389–400, https://doi.org/10.2307/249720.

[71] Ghebreyesus, T.A. (2020). Thank you@ RaymondChambers for mobilizing the gaming industry to feature@ WHO advice on# COVID19 to their users. *We must all# PlayApartTogether to beat the# coronavirus*, 9, 29am.

[72] T. Ghosh, S., S, Y.K Dwivedi, Examining the deferred effects of gaming platform and game speed of advergames on memory, attitude, and purchase intention, J. Interact. Market. 55 (2021) 52–66, https://doi.org/10.1016/j.intmar.2021.01.002.

[73] M. Gibbert, M. Leibold, G. Probst, Five styles of customer knowledge management, and how smart companies use them to create value, Eur. Manage. J. 20 (5) (2002) 459–469, https://doi.org/10.1016/s0263-2373(02)00101-9.

[74] J.J. Gierveld, A review of loneliness: concept and definitions, determinants and consequences, Rev. Clin. Gerontol. 8 (1) (1998) 73–80, https://doi.org/10.1017/s0959259898008090.

[75] L. Gopali, R. Dhital, R. Koirala, T. Shrestha, S. Bhusal, R. Rimal, C. Shrestha, R. Shah, Effect of COVID-19 pandemic on internet gaming disorder among general population: a systematic review and meta-analysis, PLOS. Glob. Public Health 3 (4) (2023) e0001783, https://doi.org/10.1371/journal.pgph.0001783.

[76] M. Greenstone, V. Nigam, Does social distancing matter? SSRN Electron. J. (2020) 1–19, https://doi.org/10.2139/ssrn.3561244.

[77] Grenfell, R., & Drew, T. (2020). Here's why it's taking so long to develop a vaccine for the new coronavirus. Accessed: www.sciencealert.com/who-says-a-coronavirus-vaccine-is-18-months-awayScienceAlert. Archived from the original on 28 February 2020 (accessed on 5 January 2021).

[78] I. Ha, Y. Yoon, M. Choi, Determinants of adoption of mobile games under mobile broadband wireless access environment, Inf. Manage. 44 (3) (2007) 276–286, https://doi.org/10.1016/j.im.2007.01.001.

[79] R.A. Hadley, Men and me(n), Method Innov. 13 (2) (2020) 205979912091833, https://doi.org/10.1177/2059799120918336.

[80] J. Hagel, A.G. Armstrong, The real value of online communities, Harv. Bus. Rev. 74 (3) (1996) 134–141.

[81] J. Hair, T.G.M. Hult, C.M. Ringle, M. Sarstedt, A Primer on Partial Least Squares Structural Equation Modeling (PLS-SEM), 2nd ed., SAGE Publications, Inc, 2016.

[82] Y.S. Hau, Y.-G. Kim, Why would online gamers share their innovation-conducive knowledge in the online game user community? Integrating individual motivations and social capital perspectives, Comput. Human. Behav. 27 (2) (2011) 956–970, https://doi.org/10.1016/j.chb.2010.11.022.

[83] L. Heylen, The older, the lonelier? Risk factors for social loneliness in old age, Aging Soc. 30 (7) (2010) 1177–1196, https://doi.org/10.1017/s0144686×10000292.

[84] E. Hippel, User toolkits for innovation, J. Prod. Innov. Manage. 18 (4) (2001) 247–257, https://doi.org/10.1111/1540-5885.1840247.

[85] C.F. Hofacker, K. de Ruyter, N.H. Lurie, P. Manchanda, J. Donaldson, Gamification and mobile marketing effectiveness, J. Interact. Market. 34 (2016) 25–36, https://doi.org/10.1016/j.intmar.2016.03.001.

[86] D.L. Hoffman, T.P. Novak, Flow online: lessons learned and future prospects, J. Interact. Market. 23 (1) (2009) 23–34, https://doi.org/10.1016/j.intmar.2008.10.003.

[87] L.D. Hollebeek, D.L.G. Smith, E. Kasabov, W. Hammedi, A. Warlow, M.K. Clark, Customer brand engagement during service lockdown, J. Serv. Market. (2020) 1–24, https://doi.org/10.1108/jsm-05-2020-0199. Ahead-of(ahead-of-print).

[88] H. Holmström, Community-based customer involvement for improving packaged software development, Rapport NR.: Gothenburg Stud. Inform. 31 (2004) 45–48.

[89] D.L. Hope, G. Grant, G.D. Rogers, M.A. King, Impact of a gamified simulation on pharmacy students' self-assessed competencies, Curr. Pharm. Teach. Learn. 14 (8) (2022) 990–997, https://doi.org/10.1016/j.cptl.2022.07.020.

[90] W.D. Hoyer, R. Chandy, M. Dorotic, M. Krafft, S.S. Singh, Consumer Cocreation in New Product Development, J. Serv. Res. 13 (3) (2010) 283–296, https://doi.org/10.1177/1094670510375604.

[91] C.-C. Hsiao, J.-S. Chiou, The impact of online community position on online game continuance intention: do game knowledge and community size matter? Inf. Manage. 49 (6) (2012) 292–300, https://doi.org/10.1016/j.im.2012.09.002.

[92] K.-L. Hsiao, C.-C. Chen, What drives in-app purchase intention for mobile games? An examination of perceived values and loyalty, Electron. Commer. Res. Appl. 16 (2016) 18–29, https://doi.org/10.1016/j.elerap.2016.01.001.

[93] C.L. Hsu, H.P. Lu, Why do people play online games? An extended TAM with social influences and flow experience, Inf. Manage. 41 (7) (2004) 853–868, https://doi.org/10.1016/j.im.2003.08.014.

[94] C.L. Hsu, J.C.C. Lin, What drives purchase intention for paid mobile apps? – an expectation confirmation model with perceived value, Electron. Commer. Res. Appl. 14 (1) (2015) 46–57, https://doi.org/10.1016/j.elerap.2014.11.003.

[95] C.L. Hsu, H.P. Lu, Consumer behavior in online game communities: a motivational factor perspective, Comput. Human. Behav. 23 (3) (2007) 1642–1659, https://doi.org/10.1016/j.chb.2005.09.001.

[96] E. Hu, V. Stavropoulos, A. Anderson, M. Scerri, J. Collard, Internet gaming disorder: feeling the flow of social games, Addict. Behav. Rep. 9 (2019) 100140, https://doi.org/10.1016/j.abrep.2018.10.004.

[97] L.T. Hu, P.M. Bentler, Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives, Struct. Equ. Model.: Multidiscip. J. 6 (1) (1999) 1–55.

[98] M. Huang, A. Bhattacherjee, C. Wong, Gatekeepers' innovative use of IT: an absorptive capacity model at the unit level, Inf. Manage. 55 (2) (2018) 235–244, https://doi.org/10.1016/j.im.2017.06.001.

[99] T. Huang, G. Liao, T. Cheng, W. Chen, C. Teng, Tomorrow will be better: gamers' expectation and game usage, Comput. Human. Behav. (2023) 108021, https://doi.org/10.1016/j.chb.2023.108021.

[100] T. Huang, C. Teng, S. Tai, H. Chen, A.R. Dennis, Power structure builds gamer loyalty, Decis. Support. Syst. 154 (2022) 113696, https://doi.org/10.1016/j.dss.2021.113696.

[101] T. Huang, C. Wu, M. Chang, G. Liao, C. Teng, From skill growth expectancy to online game commitment, Comput. Human. Behav. 137 (2022) 107422, https://doi.org/10.1016/j.chb.2022.107422.

[102] S. Huber, R. Cortez, K. Kiili, A. Lindstedt, M. Ninaus, Game elements enhance engagement and mitigate attrition in online learning tasks, Comput. Human. Behav. 149 (2023) 107948, https://doi.org/10.1016/j.chb.2023.107948.

[103] S. Hyysalo, Shove, Pantzar and Watson. The dynamics of social practice: everyday life and how it changes, Nord. J. Sci. Technol. Stud. 1 (1) (2016) 41, https://doi.org/10.5324/njsts.v1i1.2125.

[104] Jain, R. (2020, May 28). *Impact of COVID-19 on online gaming industry in India*. Retrieved November 20, 2023, from https://www.linkedin.com/pulse/impact-covid-19-online-gaming-industry-india-riddhi-jain/.

[105] L.B. Jeppesen, M.J. Molin, Consumers as co-developers: learning and innovation outside the firm, Technol. Anal. Strateg. Manage 15 (3) (2003) 363–383, https://doi.org/10.1080/0953732031000160153 1.

[106] A.W. Joshi, S. Sharma, Customer knowledge development: antecedents and impact on new product performance, J. Mark. 68 (4) (2004) 47–59, https://doi.org/10.1509/jmkg.68.4.47.42722.

[107] J. Kahila, M. Tedre, S. Kahila, H. Vartiainen, T. Valtonen, K. Mäkitalo, Children's gaming involves much more than the gaming itself: a study of the metagame among 12- to 15-year-old children, Convergence: Int. J. Res. New Media Technol. 27 (3) (2020) 768–786, https://doi.org/10.1177/1354856520979482.

[108] H. Khang, J.K. Kim, Y. Kim, Self-traits and motivations as antecedents of digital media flow and addiction: the Internet, mobile phones, and video games, Comput. Human. Behav. 29 (6) (2013) 2416–2424, https://doi.org/10.1016/j.chb.2013.05.027.

[109] M. Kim, H. Kim, What online game spectators want from their twitch streamers: flow and well-being perspectives, J. Retail. Consum. Serv. 66 (2022) 102951, https://doi.org/10.1016/j.jretconser.2022.102951.

[110] D.L. King, P.H. Delfabbro, J. Billieux, M.N. Potenza, Problematic online gaming and the COVID-19 pandemic, J. Behav. Addict. 9 (2) (2020) 184–186, https://doi.org/10.1556/2006.2020.00016.

[111] W.R. King, J. He, A meta-analysis of the technology acceptance model, Inf. Manage. 43 (6) (2006) 740–755, https://doi.org/10.1016/j.im.2006.05.003.

[112] M. Kleijnen, K. de Ruyter, M. Wetzels, Consumer adoption of wireless services: discovering the rules, while playing the game, J. Interact. Market. 18 (2) (2004) 51–61, https://doi.org/10.1002/dir.20002.

[113] I.M. Klopping, E. McKinney, Extending the technology acceptance model and the task-technology fit model to consumer e-commerce, Inf. Technol., Learn. Perform. J. 22 (1) (2004) 35–48, 10.1.1.121.3397.

[114] F. Köck, A. Berbekova, A.G. Assaf, Understanding and managing the threat of common method bias: detection, prevention and control, Tour. Manage 86 (2021) 104330, https://doi.org/10.1016/j.tourman.2021.104330.

[115] M. Koufaris, Applying the technology acceptance model and flow theory to online consumer behavior, Inf. Syst. Res. 13 (2) (2002) 205–223, https://doi.org/10.1287/isre.13.2.205.83.

[116] R. Kowert, Video Games and Social Competence (Routledge Advances in Game Studies), 1st ed., 1, Routledge, 2018 https://doi.org/10.4324/9781315753133.

[117] V.S. Lai, H. Li, Technology acceptance model for Internet banking: an invariance analysis, Inf. Manage. 42 (2) (2005) 373–386, https://doi.org/10.1016/j.im.2004.01.007.

[118] A.L. Lederer, D.J. Maupin, M.P. Sena, Y. Zhuang, The technology acceptance model and the World Wide Web, Decis. Support. Syst. 29 (3) (2000) 269–282, https://doi.org/10.1016/s0167-9236(00)00076-2.

[119] B.-C. Lee, J.-O. Yoon, I. Lee, Learners' acceptance of e-learning in South Korea: theories and results, Comput. Educ. 53 (4) (2009) 1320–1329, https://doi.org/10.1016/j.compedu.2009.06.014.

[120] M.K.O. Lee, C.M.K. Cheung, Z. Chen, Acceptance of Internet-based learning medium: the role of extrinsic and intrinsic motivation, Inf. Manage. 42 (8) (2005) 1095–1104, https://doi.org/10.1016/j.im.2003.10.007.

[121] M.-C. Lee, T.-R. Tsai, What drives people to continue to play online games? an extension of technology model and theory of planned behavior, Int. J. Hum. Comput. Interact. 26 (6) (2010) 601–620, https://doi.org/10.1080/10447311003781318.

[122] S.C. Lee, Y.H. Suh, J.K. Kim, K.J. Lee, A cross-national market segmentation of online game industry using SOM, Expert. Syst. Appl. 27 (4) (2004) 559–570, https://doi.org/10.1016/j.eswa.2004.06.001.

[123] S. Lee, J. Park, S. Bryan Lee, The interplay of Internet addiction and compulsive shopping behaviors, Soc. Behav. Person.: Int. J. 44 (11) (2016) 1901–1912, https://doi.org/10.2224/sbp.2016.44.11.1901.

[124] Z.W.Y. Lee, C.M.K. Cheung, T.K.H. Chan, Understanding massively multiplayer online role-playing game addiction: a hedonic management perspective, Inf. Syst. J. 31 (1) (2020) 33–61, https://doi.org/10.1111/isj.12292.

[125] P. Legris, J. Ingham, P. Collerette, Why do people use information technology? A critical review of the technology acceptance model, Inf. Manage. 40 (3) (2003) 191–204, https://doi.org/10.1016/s0378-7206(01)00143-4.

[126] K.J. Li, X. Li, COVID-19 pandemic: social distancing, public policy, and market response, SSRN Electron. J. (2020) 1–19, https://doi.org/10.2139/ssrn.3593813.

[127] M. Li, Z. Jiang, G. Ma, The puzzle of experience vs. memory: peak-end theory and strategic gamification design in M-commerce, Inf. Manage. 60 (2) (2023) 103749, https://doi.org/10.1016/j.im.2022.103749.

[128] W. Li, Y. Lu, J. Ma, B. Wang, Users' subsequent innovation after organizational adoption: evidence from an online game user innovation community, Internet Res. 33 (4) (2022) 1446–1472, https://doi.org/10.1108/intr-08-2021-0578.

[129] G. Liao, T. Huang, A.R. Dennis, C. Teng, The influence of media capabilities on knowledge contribution in online communities, Inf. Syst. Res. (2023), https://doi.org/10.1287/isre.2023.1225.

[130] L. Liao, T. Huang, The effect of different social media marketing channels and events on movie box office: an elaboration likelihood model perspective, Inf. Manage. 58 (7) (2021) 103481, https://doi.org/10.1016/j.im.2021.103481.

[131] S.S. Liaw, H.-M. Huang, An investigation of user attitudes toward search engines as an information retrieval tool, Comput. Human. Behav. 19 (6) (2003) 751–765, https://doi.org/10.1016/s0747-5632(03)00009-8.

[132] J.C. Linder, S. Jarvenpaa, T.H. Davenport, Toward an innovation sourcing strategy, MIT. Sloan. Manage Rev. 44 (4) (2003) 43–49. Retrieved from, https://search.proquest.com/scholarly-journals/toward-innovation-sourcing-strategy/docview/224976853/se-2?accountid=34304.

[133] S.H. Liu, H.L. Liao, C.-J. Peng, Applying the technology acceptance model, Issues Inf. Syst. 6 (2) (2005) 175–181.

[134] H.P. Lu, S. Wang, The role of Internet addiction in online game loyalty: an exploratory study, Internet Res. 18 (5) (2008) 499–519, https://doi.org/10.1108/10662240810912756.

[135] P. Luarn, H.-H. Lin, Toward an understanding of the behavioral intention to use mobile banking, Comput. Human. Behav. 21 (6) (2005) 873–891, https://doi.org/10.1016/j.chb.2004.03.003.

[136] G.S. Lynn, S.M. Lipp, A.E. Akgün, A. Cortez, Factors impacting the adoption and effectiveness of the world wide web in marketing, Ind. Market. Manage. 31 (1) (2002) 35–49, https://doi.org/10.1016/s0019-8501(00)00104-8.

[137] Madan, A. (2020, March 29). *World Health Organization Encourages People to Game During Coronavirus Outbreak*. Windows Central. Retrieved November 26, 2021, from https://www.windowscentral.com/world-health-organization-encourages-people-game-during-coronavirus-outbreak.

[138] A. Marchand, T. Hennig-Thurau, Value creation in the video game industry: industry economics, consumer benefits, and research opportunities, J. Interact. Market. 27 (3) (2013) 141–157, https://doi.org/10.1016/j.intmar.2013.05.001.

[139] H.R. Marston, A. Azadvar, Defeating the boss level … exploring inter-and-multigenerational gaming experiences, Comput. Games J. 9 (2) (2020) 121–126, https://doi.org/10.1007/s40869-020-00098-1.

[140] H.R. Marston, R. Kowert, What role can videogames play in the COVID-19 pandemic? Emerald Open Res. 2 (2020) 34, https://doi.org/10.35241/emeraldopenres.13727.2.

[141] H.R. Marston, R. Kowert, What role can videogames play in the COVID-19 pandemic? Emerald Open Res. 2 (2020) 34, https://doi.org/10.35241/emeraldopenres.13727.1.

[142] A.H. Maslow, A dynamic theory of human motivation, Understanding Hum. Motivat. (1958) 26–47, https://doi.org/10.1037/11305-004.

[143] A. Mehra, J. Paul, R. Kaurav, Determinants of mobile apps adoption among young adults: theoretical extension and analysis, J. Market. Commun. (2020) 1–29, https://doi.org/10.1080/13527266.2020.1725780.

[144] H. Min, J. Park, H.J. Kim, Common method bias in hospitality research: a critical review of literature and an empirical study, Int. J. Hosp. Manage 56 (2016) 126–135, https://doi.org/10.1016/j.ijhm.2016.04.010.

[145] E. Mogaji, J. Wirtz, R.W. Belk, Y.K. Dwivedi, Immersive time (ImT): conceptualizing time spent in the metaverse, Int. J. Inf. Manage 72 (2023) 102659, https://doi.org/10.1016/j.ijinfomgt.2023.102659.

[146] A. Morgan-Thomas, L. Dessart, C. Veloutsou, Digital ecosystem and consumer engagement: a socio-technical perspective, J. Bus. Res. 121 (2020) 713–723, https://doi.org/10.1016/j.jbusres.2020.03.042.

[147] M. Nicola, Z. Alsafi, C. Sohrabi, A. Kerwan, A. Al-Jabir, C. Iosifidis, M. Agha, R. Agha, The socio-economic implications of the coronavirus pandemic (COVID-19): a review, Int. J. Surg. 78 (2020) 185–193, https://doi.org/10.1016/j.ijsu.2020.04.018.

[148] T.P. Novak, D.L. Hoffman, A. Duhachek, The influence of goal-directed and experiential activities on online flow experiences, J. Consum. Psychol. 13 (1–2) (2003) 3–16, https://doi.org/10.1207/S15327663JCP13-1&2_01.

[149] J. Nunnly, I. Bernstein, Psychometric Theory, 3rd ed., McGraw-Hill, New York, NY, 1994.

[150] S. Okazaki, Exploring experiential value in online mobile gaming adoption, CyberPsychol. Behav. 11 (5) (2008) 619–622, https://doi.org/10.1089/cpb.2007.0202.

[151] Online Gaming And Urban School Children During Lockdown - A Survey, Int. J. Pharmaceut. Res. 12 (sp2) (2020), https://doi.org/10.31838/ijpr/2020.sp2.188.
[152] A. Oyedele, M.S. Minor, Customer typology: 3D virtual world, J. Res. Interact. Market. 5 (1) (2011) 29–49, https://doi.org/10.1108/17505931111121516.
[153] S.C. Park, S.C. Lee, L. Fan, J.C. Gu, Y.H. Suh, How to attract Chinese online game users, Asian J. Qual. 13 (1) (2012) 7–21.
[154] S.Y. Park, An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning, J. Educ. Techno Soc. 12 (3) (2009) 150–162. https://www.learntechlib.org/p/75428/.
[155] T. Perea y Monsuwé, B.G.C. Dellaert, K. de Ruyter, What drives consumers to shop online? A literature review, Int. J. Serv. Ind. Manage. 15 (1) (2004) 102–121, https://doi.org/10.1108/09564230410523358.
[156] Perez, M. (2020, March 16). *Video games are being played at record levels as the coronavirus keeps people indoors*. Forbes. Retrieved November 26, 2021, from https://www.forbes.com/sites/mattperez/2020/03/16/video-games-are-being-played-at-record-levels-as-the-coronavirus-keeps-people-indoors/?sh=2c69782557ba.
[157] W.D.D. Perez, Y.T. Prasetyo, M.M.L. Cahigas, S.F. Persada, M.N. Young, R. Nadlifatin, Factors Influencing Non-Fungible Tokens (NFT) game engagement during the COVID-19 pandemic: the Theory of Planned Behavior (TPB) and Hedonic Motivation System Adoption Model (HMSAM) approach, Heliyon 9 (9) (2023) e19847, https://doi.org/10.1016/j.heliyon.2023.e19847.
[158] S. Petter, E.R. McLean, A meta-analytic assessment of the DeLone and McLean IS success model: an examination of IS success at the individual level, Inf. Manage. 46 (3) (2009) 159–166, https://doi.org/10.1016/j.im.2008.12.006.
[159] S. Petter, D. Barber, S. Barber, C, A. Berkley, R, Using online gaming experience to expand the digital workforce talent pool, MIS Q. Executive 2018 (4) (2018) 315–332, https://doi.org/10.17705/2msqe.00004.
[160] P.M. Podsakoff, S.B. MacKenzie, N.P. Podsakoff, Sources of method bias in social science research and recommendations on how to control it, Annu. Rev. Psychol. 63 (1) (2012) 539–569, https://doi.org/10.1146/annurev-psych-120710-100452.
[161] C.K. Prahalad, V. Ramaswamy, Co-opting customer competence, Harv. Bus. Rev. 78 (1) (2000) 79–90.
[162] J. Preece, J. Preece, Online Communities: Designing Usability, Supporting Sociability, Wiley, Chichester, UK, 2000.
[163] L. Qiu, D. Li, Applying TAM in B2C E-commerce research: an extended model, Tsinghua Sci. Technol. 13 (3) (2008) 265–272, https://doi.org/10.1016/s1007-0214(08)70043-9.
[164] A. Rangaswamy, N. Moch, C. Felten, G. van Bruggen, J.E. Wieringa, J. Wirtz, The role of marketing in digital business platforms, J. Interact. Market. 51 (2020) 72–90, https://doi.org/10.1016/j.intmar.2020.04.006.
[165] A. Rapp, Time, engagement and video games: how game design elements shape the temporalities of play in massively multiplayer online role-playing games, Inf. Syst. J. (2021), https://doi.org/10.1111/isj.12328.
[166] J. Ratcliffe, A. Wigfield, S. Alden, 'A lonely old man': empirical investigations of older men and loneliness, and the ramifications for policy and practice, Ageing Soc. (2019) 1–21, https://doi.org/10.1017/s0144686×19001387.
[167] P.-L.P. Rau, S.Y. Peng, C.-C. Yang, Time distortion for expert and novice online game players, CyberPsychol. Behav. 9 (4) (2006) 396–403, https://doi.org/10.1089/cpb.2006.9.396.
[168] ReportLinker, Global MMOG (Massively Multiplayer Online Games) Industry, September 4, GlobeNewswire News Room, 2020. Retrieved April 26, 2021, from, https://www.globenewswire.com/news-release/2020/09/04/2089172/0/en/Global-MMOG-Massively-Multiplayer-Online-Games-Industry.html.
[169] R. Rettie, An exploration of flow during Internet use, Internet Res. 11 (2) (2001) 103–113, https://doi.org/10.1108/10662240110695070.
[170] M.M. Rezapour, A. Fatemi, M.A. Nematbakhsh, Learning experience assessment through players chat content in multiplayer online games, Comput. Human. Behav. 151 (2024) 108003, https://doi.org/10.1016/j.chb.2023.108003.
[171] C.K. Riemenschneider, D.A. Harrison, P.P. Mykytyn, Understanding it adoption decisions in small business: integrating current theories, Inf. Manage. 40 (4) (2003) 269–285, https://doi.org/10.1016/s0378-7206(02)00010-1.
[172] Robinson, L., Smith, M., Segal, J. (2019). *The benefits of play for adults - HelpGuide.org*. Helpguide. *The benefits of play for adults - HelpGuide.org*. Helpguide. https://www.helpguide.org/articles/mental-health/benefits-of-play-for-adults.htm (Retrieved on November 20, 2020).
[173] H. Salomann, M. Dous, L. Kolbe, W. Brenner, Rejuvenating customer management, Eur. Manage. J. 23 (4) (2005) 392–403, https://doi.org/10.1016/j.emj.2005.06.009.
[174] M.J. Sánchez-Franco, J.L. Roldán, Web acceptance and usage model, Internet Res. 15 (1) (2005) 21–48, https://doi.org/10.1108/10662240510577059.
[175] M. Scerri, A. Anderson, V. Stavropoulos, E. Hu, Need fulfilment and Internet gaming disorder: a preliminary integrative model, Addict. Behav. Rep. 9 (2019) 100144, https://doi.org/10.1016/j.abrep.2018.100144.
[176] J. Schepers, M. Wetzels, A meta-analysis of the technology acceptance model: investigating subjective norm and moderation effects, Inf. Manage. 44 (1) (2007) 90–103, https://doi.org/10.1016/j.im.2006.10.007.
[177] M. Seraj, We create, we connect, we respect, therefore we are: intellectual, social, and cultural value in online communities, J. Interact. Market. 26 (4) (2012) 209–222, https://doi.org/10.1016/j.intmar.2012.03.002.
[178] M.A. Shareef, Y.K. Dwivedi, A. Wright, V. Kumar, S.K. Sharma, N.P. Rana, Lockdown and sustainability: an effective model of information and communication technology, Technol. Forecast. Soc. Change 165 (2021) 120531, https://doi.org/10.1016/j.techfore.2020.120531.
[179] L. Sheerman, H.R. Marston, C. Musselwhite, D. Morgan, COVID-19 and the secret virtual assistants: the social weapons for a state of emergency, Emerald. Open. Res. 2 (2020) 19, https://doi.org/10.35241/emeraldopenres.13571.1.
[180] J.J. Sheu, K.T. Chu, S.M. Wang, The associate impact of individual internal experiences and reference groups on buying behavior: a case study of animations, comics, and games consumers, Telemat. Inform. 34 (4) (2017) 314–325, https://doi.org/10.1016/j.tele.2016.08.013.
[181] M. Shevlin, J.N. Miles, Effects of sample size, model specification and factor loadings on the GFI in confirmatory factor analysis, Pers. Individ. Dif. 25 (1) (1998) 85–90.
[182] J. Shi, R. Renwick, N.E. Turner, B. Kirsh, Understanding the lives of problem gamers: the meaning, purpose, and influences of video gaming, Comput. Human. Behav. 97 (2019) 291–303, https://doi.org/10.1016/j.chb.2019.03.023.
[183] D.-H. Shin, Y.-J. Shin, Why do people play social network games? Comput. Human. Behav. 27 (2) (2011) 852–861, https://doi.org/10.1016/j.chb.2010.11.010.
[184] J.C. Siemens, S. Smith, D. Fisher, A. Thyroff, G. Killian, Level up! the role of progress feedback type for encouraging intrinsic motivation and positive brand attitudes in public versus private gaming contexts, J. Interact. Market. 32 (2015) 1–12, https://doi.org/10.1016/j.intmar.2015.07.001.
[185] Y.X. Skadberg, J.R. Kimmel, Visitors' flow experience while browsing a Web site: its measurement, contributing factors and consequences, Comput. Human. Behav. 20 (3) (2004) 403–422, https://doi.org/10.1016/s0747-5632(03)00050-5.
[186] D.N. Smith, K. Sivakumar, Flow and Internet shopping behavior, J. Bus. Res. 57 (10) (2004) 1199–1208, https://doi.org/10.1016/s0148-2963(02)00330-2.
[187] H.A. Smith, J.D. McKeen, Developments in practice XVIII-customer knowledge management: adding value for our customers, Commun. Assoc. Inf. Syst. 16 (2005) 744–755, https://doi.org/10.17705/1cais.01636.
[188] J.-B.E.M. Steenkamp, H.C.M. van Trijp, The use of lisrel in validating marketing constructs, Int. J. Res. Market. 8 (4) (1991) 283–299, https://doi.org/10.1016/0167-8116(91)90027-5.
[189] D.M. Steininger, Linking information systems and entrepreneurship: a review and agenda for IT-associated and digital entrepreneurship research, Inf. Syst. J. 29 (2) (2018) 363–407, https://doi.org/10.1111/isj.12206.
[190] Stephen, B. (2020, March 18). *Twitch viewership is up because of global coronavirus lockdowns*. The Verge. Retrieved November 26, 2021, from https://www.theverge.com/2020/3/18/21185114/twitch-youtube-livestreaming-streamelements-coronavirus-quarantine-viewership-numbers.
[191] D. Straub, M. Limayem, E. Karahanna-Evaristo, Measuring system usage: implications for is theory testing, Manage Sci. 41 (8) (1995) 1328–1342, https://doi.org/10.1287/mnsc.41.8.1328.
[192] C.-T. Su, Y.-H. Chen, D.Y. Sha, Linking innovative product development with customer knowledge: a data-mining approach, Technovation 26 (7) (2006) 784–795, https://doi.org/10.1016/j.technovation.2005.05.005.
[193] Y.-S. Su, W.-L. Chiang, C.-T. James Lee, H.-C. Chang, The effect of flow experience on player loyalty in mobile game application, Comput. Human. Behav. 63 (2016) 240–248, https://doi.org/10.1016/j.chb.2016.05.049.
[194] B. Suh, I. Han, Effect of trust on customer acceptance of Internet banking, Electron. Commer. Res. Appl. 1 (3–4) (2002) 247–263, https://doi.org/10.1016/s1567-4223(02)00017-0.
[195] B. Šumak, M. Heričko, M. Pušnik, G. Polančič, Factors affecting acceptance and use of Moodle: an empirical study based on TAM, Informatica 35 (1) (2011) 91–100.
[196] Sun, H. (2010). CKM-embedded innovation marketing as success driver for product innovation: theoretical framework and empirical research. urn:nbn:en:kobv:83-opus-27894 10.14279/depositonce-2569.
[197] B.G. Tabachnick, L.S. Fidell, Using Multivariate Statistics, Allyn &Bacon. Pearson Education, Boston, MA, 2007.
[198] N. Taherparvar, R. Esmaeilpour, M. Dostar, Customer knowledge management, innovation capability and business performance: a case study of the banking industry, J. Knowl. Manage. 18 (3) (2014) 591–610, https://doi.org/10.1108/jkm-11-2013-0446.
[199] Takahashi, D. (2020, March 30). *WHO and game companies launch #PlayApartTogether to promote physical distancing*. VentureBeat. Retrieved November 24, 2021, from https://venturebeat.com/2020/03/28/who-and-game-companies-launch-playaparttogether-to-promote-physical-distancing/.
[200] C. Teng, T. Huang, G. Huang, C. Wu, T. Cheng, G. Liao, Creatability, achievability, and immersibility: new game design elements that increase online game usage, Int. J. Inf. Manage 75 (2024) 102732, https://doi.org/10.1016/j.ijinfomgt.2023.102732.
[201] C. Teng, T. Huang, G. Liao, A.R. Dennis, Administrator-users contribute more to online communities, Inf. Manage. 59 (8) (2022) 103717, https://doi.org/10.1016/j.im.2022.103717.
[202] C. Teng, T. Huang, Z. Yang, W. Wu, G. Liao, How strategic, offensive, and defensive engagement impact gamers' need satisfaction, loyalty, and game usage, Int. J. Inf. Manage 66 (2022) 102515, https://doi.org/10.1016/j.ijinfomgt.2022.102515.
[203] T.S.H. Teo, V.K.G. Lim, R.Y.C. Lai, Intrinsic and extrinsic motivation in Internet usage, Omega 27 (1) (1999) 25–37, https://doi.org/10.1016/s0305-0483(98)00028-0.
[204] L.K. Trevino, J. Webster, Flow in computer-mediated communication: electronic mail and voice mail evaluation and impacts, Commun. Res. 19 (5) (1992) 539–573, https://doi.org/10.1177/009365092019005001.
[205] Vadehra, S. (2022, February 23). *COVID-19 and online gaming in India*. Gaming - India. Retrieved November 20, 2023, from https://www.mondaq.com/india/gaming/1164726/covid-19-and-online-gaming-in-india.

[206] M. Valinatajbahnamiri, V. Siahtiri, Flow in computer-mediated environments: a systematic literature review, Int. J. Consum. Stud. (2021), https://doi.org/10.1111/ijcs.12640.
[207] R.J. Vallerand, Toward a hierarchical model of intrinsic and extrinsic motivation, Adv. Exp. Soc. Psychol. (1997) 271–360, https://doi.org/10.1016/s0065-2601(08)60019-2.
[208] N.T.T. Van, V. Vrana, N.T. Duy, D.X.H. Minh, P.T. Dzung, S.R. Mondal, S. Das, The role of human–machine interactive devices for post-COVID-19 innovative sustainable tourism in Ho Chi Minh City, Vietnam, Sustainability 12 (22) (2020) 9523, https://doi.org/10.3390/su12229523.
[209] Morris Venkatesh, Davis, Davis, User acceptance of information technology: toward a unified view, MIS Q. 27 (3) (2003) 425–478, https://doi.org/10.2307/30036540.
[210] A. Voida, S. Greenberg, Console gaming across generations: exploring intergenerational interactions in collocated console gaming, Univ. Access. Inf. Soc. 11 (1) (2011) 45–56, https://doi.org/10.1007/s10209-011-0232-1.
[211] C. Vollmer, C. Randler, M.B.ı.ş. Horzum, T. Ayas, Computer game addiction in adolescents and its relationship to chronotype and personality, Sage Open 4 (1) (2014) 215824401351805, https://doi.org/10.1177/2158244013518054.
[212] C.-S. Wan, W.-B. Chiou, Psychological motives and online games addiction: a test of flow theory and humanistic needs theory for Taiwanese adolescents, CyberPsychol. Behav. 9 (3) (2006) 317–324, https://doi.org/10.1089/cpb.2006.9.317.
[213] L. Wang, P.B. Lowry, X. Luo, H. Li, Moving consumers from free to fee in platform-based markets: an empirical study of multiplayer online battle arena games, Inf. Syst. Res. 34 (1) (2023) 275–296, https://doi.org/10.1287/isre.2022.1127.
[214] M. Wang, X. Li, P.Y.K. Chau, Leveraging image-processing techniques for empirical research: feasibility and reliability in online shopping context, Inf. Syst. Front. 23 (3) (2020) 607–626, https://doi.org/10.1007/s10796-020-09981-8.
[215] A. Weinstein, A. Maraz, M.D. Griffiths, M. Lejoyeux, Z. Demetrovics, Compulsive buying—features and characteristics of addiction, Neuropathol. Drug Addict. Substance Misuse (2016) 993–1007, https://doi.org/10.1016/b978-0-12-800634-4.00098-6.
[216] F.L. Weisstein, M. Kukar-Kinney, K.B. Monroe, Determinants of consumers' response to pay-what-you-want pricing strategy on the Internet, J. Bus. Res. 69 (10) (2016) 4313–4320, https://doi.org/10.1016/j.jbusres.2016.04.005.
[217] G.C. Wenger, V. Burholt, Changes in levels of social isolation and loneliness among older people in a rural area: a twenty–year longitudinal study, Canadian J. Aging /La Revue Canadienne Du Vieillissement 23 (2) (2004) 115–127, https://doi.org/10.1353/cja.2004.0028.
[218] B. Wheaton, B. Muthen, D.F. Alwin, G.F. Summers, Assessing reliability and stability in panel models, Sociol. Methodol. 8 (1977) 84–136.
[219] P.J. White, H.R. Marston, L. Shore, R. Turner, Learning from COVID-19: design, age-friendly technology, hacking and mental models, Emerald. Open. Res. 2 (2020) 21, https://doi.org/10.35241/emeraldopenres.13599.1.
[220] A. Wilder-Smith, D.O. Freedman, Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak, J. Travel. Med. 27 (2) (2020) 1–4, https://doi.org/10.1093/jtm/taaa020.
[221] M. Wolfinbarger, M.C. Gilly, Shopping online for freedom, control, and fun, Calif. Manage. Rev. 43 (2) (2001) 34–55, https://doi.org/10.2307/41166074.
[222] A.B. Woszczynski, P.L. Roth, A.H. Segars, Exploring the theoretical foundations of playfulness in computer interactions, Comput. Human. Behav. 18 (4) (2002) 369–388, https://doi.org/10.1016/s0747-5632(01)00058-9.
[223] J.H. Wu, S.C. Wang, What drives mobile commerce?: an empirical evaluation of the revised technology acceptance model, Inf. Manage. 42 (5) (2005) 719–729, https://doi.org/10.1016/j.im.2004.07.001.
[224] J. Wu, D. Liu, The effects of trust and enjoyment on intention to play online games, J. Electron. Commerce Res. 8 (2) (2007) 128–140.
[225] V. Yılmaz, B. Tunca, Structural model proposal to explain online game addiction, Entertain. Comput. 48 (2024) 100611, https://doi.org/10.1016/j.entcom.2023.100611.
[226] A. Yousaf, A. Mishra, B. Taheri, M. Kesgin, A cross-country analysis of the determinants of customer recommendation intentions for over-the-top (OTT) platforms, Inf. Manage. 58 (8) (2021) 103543, https://doi.org/10.1016/j.im.2021.103543.
[227] S. Yousafzai, Z. Hussain, M. Griffiths, Social responsibility in online videogaming: what should the videogame industry do? Addict. Res. Theory 22 (3) (2013) 181–185, https://doi.org/10.3109/16066359.2013.812203.
[228] F. Yuen, If we're lost, we are lost together": leisure and relationality, Leis. Sci. 43 (1–2) (2020) 90–96, https://doi.org/10.1080/01490400.2020.1773988.
[229] S. Zenker, F. Kock, The coronavirus pandemic – a critical discussion of a tourism research agenda, Tour. Manage 81 (2020) 104164, https://doi.org/10.1016/j.tourman.2020.104164.
[230] Y. Zheng, J. Zhang, Y. Li, X. Wu, R. Ding, X. Luo, P. Li, J. Huang, Effects of digital game-based learning on students' digital etiquette literacy, learning motivations, and engagement, Heliyon (2023) e23490, https://doi.org/10.1016/j.heliyon.2023.e23490.
[231] L. Zhu, The psychology behind video games during COVID -19 pandemic: a case study of animal crossing: new horizons, Hum. Behav. Emerg. Technol. 3 (1) (2020) 157–159, https://doi.org/10.1002/hbe2.221.

Dr. **Justin Paul** serves as Editor-in-chief of A ranked International Journal of Consumer studies. A former faculty member with the University of Washington, he is a Full Professor of Ph.D. & MBA programs, University of Puerto Rico, USA. Recently, he was appointed as visiting professor at Henley Business School in the University of Reading, UK. He holds three honorary titles as 'Distinguished Professor' with three reputed universities including the Indian Institute of Management (IIM-K), and SIBM, Pune. He is known as an author/co-author of best-selling books such as Business Environment, International Marketing, Services Marketing, Export-Import Management, Management of Banking & Financial Services by McGraw-Hill, Oxford University Press & Pearson, respectively. Dr. Paul introduced the Masstige model and measure for brand management, CPP Model for internationalization, SCOPE framework for small firms and 7-P Framework for International Marketing. His articles have been downloaded over 800,000 times. An author of over 120 research papers in SSCI journals, Justin has over 70 papers in A or A star journals. He has also served as an associate professor at Nagoya University, Japan, and as Department Chair at IIM. He has been a visiting professor at Aarhus University - Denmark, Grenoble Eco le de Management & University of Versailles - France, University - Lithuania, Warsaw - Poland, Austria, Spain, Croatia, China, Chicago - USA, Barcelona, and Madrid (Spain) and has published three best-selling case studies with Ivey & Harvard.

Dr. Mohsen Akbari is an associate professor teaching marketing and consumer behavior studies at the University of Guilan. He has published some papers in international prestigious journals (like European Management Review, Expert Systems with Applications, Small Group Research and ...) and many other Iranian prestigious journals. He is currently a member of editorial boards of some prestigious journals (like Journal of Consumer Marketing,and Interdisciplinary Journal of Management Studies). His main research interests are behavioral strategic marketing, consumer behavior and consumer psychology.

Dr. Subhra R Mondal is a researcher and associate professor in south star management institute at Duy Tan University, Da Nang, Vietnam.. She received her Ph.D. from the faculty of management, IBCS, SoA University. Her research interests are concerned with brand management, brand equity with innovative tools, smart tourism, destination marketing, social media marketing, AI & Web 5.0 and digital recruitment. She has published around 31 Web of Science and Scopus indexed research papers. She also edited 2 books with Springer, Palgrave and IGI publications on digital entertainment, HR analytics, and content marketing. She has 15+ years of experience in research and teaching. She is associated with different collaborative projects with European, Vietnamese organizations.

Dr. Subhankar Das is working as associate professor in south star management institute at Duy Tan University, Da Nang, Vietnam. He received his Ph.D. in Social Media Advertisement & Media Planning. He is a Certified professional from Google, Manipal in digital marketing, IIM Lucknow, IIM Bangalore for Media planning & the University of British Columbia for Advertisement along with 15+ other Globally Recognized Professional Certifications. He has 15+ Years of Teaching and Research Experience.. He has published 54+ Research Papers in various International Referred Journals (Scopus, Thomson Reuters, SSCI, SCIE). He is acting as Program Committee/Organizing Committee/Advisory Committee/Reviewer Committee Member for various International Conferences across the globe. He is a member of more than 10 International & National Research Societies and 10+ Research Organizations in the grade of Senior/Life. He has been awarded 5 International Awards for Teaching & Research. He is editor of 4 books published under Springer, Palgrave, CRC & IGI publications.