Introduction to the Role of Information and Communication Technologies in Polarization

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1 Introduction

The year 2020 has been a testing ground for the progress towards a cohesive and sustainable future envisaged through the advancement in Information and Communication Technologies (ICTs) (UN ECOSOC 2021). In a time of uncertainty, helplessness, and growing frustrations, we, as a society, found that ICTs can be a mixed blessing. We witnessed the power of ICTs in connecting people across the globe in their collective trauma and desperation (Garfin 2020), forming online mutual aid groups to offer help and support to those in need (Knearem et al. 2021) and building solidarity, and increasing outreach of movements for social justice (Frankfurt 2020). However, these positive trends were marred by the increase in information chaos (Forum on Information and Democracy (2021), the formation of echo chambers (Boutyline and Willer 2017), and the consolidation of extreme views and ideologies (Zeller 2021). These polarizing forces threaten the development-oriented nature of information society and deteriorate social cohesion, which is composed of trust, sense of belonging, and participation in community life (Chan et al. 2006). Social cohesion is the glue that holds the community together and is necessary for collaborative problem solving (Friedkin 2004).

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For this reason, social cohesion has been at the centre of global policy as we transition towards a post-pandemic world, and was reflected in Davos agenda 2021 - A Great Reset (World Economic Forum 2021). It has also been acknowledged that ICT-based platforms increasingly shape how and with whom we interact, which has broader implications on social cohesion or lack thereof. ICTs facilitate or constrain our interactions with various socio-cultural groups and our access to various opinions; thus, they have the potential to exacerbates social divides. Therefore, we need a better understanding of the factors that drive polarization. One of our purposes in call for the book chapter was to initiate the process of developing scholarly insight to the causes and symptoms of ICTs induced polarization. We start the book chapter with an overview of the ICTs, its potential, and threat for developing an inclusive, people-centric, cohesive society.

In the modern era of technological advancement, the prime focus is on transformation facilitated by digital technologies (Lyytinen and Rose 2003; Yoo 2010). With the rise in the integration of technological artifacts into various socio-cultural domains such as education, politics, economics, healthcare, agriculture, entertainment, among others, more emphasis is placed on improving the efficient transfer of data and information to the end-user via various channels (Yoo 2010). This transformation requires governing and managing various technological and communication processes that leverage the internet, networks, computing devices, social networking applications, video conferencing, and other media applications and services collectively referred to as *Information and Communication Technology* (ICT) (Shachaf 2008). ICT facilitates accessibility, retrieval, transmission, and manipulation of information for various users in a digital format. In recent years, ICT is playing a significant role in disrupting and transforming socio-cultural environment and in shaping business and society (Kinuthia 2009; Odendaal 2003; Qureshi et al. 2021; Shirazi 2012). However, the impact of ICTs on these areas remains controversial (Qureshi et al. 2018a) and is described as a *double-edged sword* (Qureshi 2009; Qureshi et al. 2021).

It is difficult to deny that the socio, economic and cultural benefits of ICTs have been substantial. ICTs play a vital role in providing communication channels for most people worldwide and connecting government entities with citizens (Welch and Feeney 2014). It is increasingly becoming important even in the less economically developed contexts (Parthiban et al. 2020, 2021; Qureshi et al. 2018a; Riaz and Qureshi 2017; Shalini et al. 2021). ICT is also enabling citizens to raise social issues such as child hunger, women empowerment, mental health, and racial disparity and bringing issues of social cohesion, collective organizing to the forefront (Escobedo et al. 2021; Pillai et al. 2021a; Shirazi 2012; Torero and Von Braun 2006). Additionally, ICT-enabled feedback mechanisms are helping government and non-government organizations assess the need and efficacy of their schemes and policies around various socio-cultural issues (Hota et al. 2021; Jacobs and Weaver 2015). For instance, a social media campaign led by Marcus Rashford – a Manchester United football player, spurred the British government to take a political U-turn and continue its scheme of providing free meals to children (Moore 2021). ICTs provide the potential to bring about technology-based social change by

making important information available to the public and hence if used properly, reducing cultural stigma, bias, and ethnic prejudice (Shirazi 2012; Kinuthia 2009; Qureshi et al. 2020, 2021). The integration of ICTs in the transportation sector has opened up an enormous avenue for the public by making global travel affordable, quick, and hassle-free. This facilitates people's global movement, thus promoting the intermix of cultures, food, and art (Law et al. 2019), which has implications for increasing social cohesion.

Moreover, ICT platforms, such as YouTube – an online video-sharing and viewing platform, have provided an ecosystem for creating culture-based content that is made available to the public. Travel vlogs, cultural programs, cultural documentaries, and food vlogs help sensitizing viewers to different cultures (Park et al. 2017). In the same vein, to a large extent, socio-cultural aspects of the world are reflected through ICTs enabled transmission of movies, TV shows, and books (Gorbunova and Petrova 2019). The cable services provide more options to the viewers to look for channels that satisfy their cultural needs. This results in competition within the entertainment industry to provide global content to their viewers. Due to this transition, socio-cultural issues have taken center stage in content consumption by the general public around the globe.[1] Therefore, audio-visual content, such as movies, TV shows, documentaries, and eBooks, has become a powerful medium of engaging people and having a strong influence on shaping our society (Valkenburg and Piotrowski 2017). However, this can have a mixed effect on social cohesion. The choice of channels to find the content palatable to viewers' taste result in individuals globally connected but locally disengaged. For example, critics have argued that expatriates, migrants, and refugees use ICTs to remain connected with their native cultures and might find it difficult to integrate with their host cultures. In such situations, ICTs could increase the social cohesion within these diasporas but weakens the social cohesion within the (geographic) communities they live.

Development through ICT also promotes social innovation (Qureshi et al. 2021). Advances in ICT have led to innovations in a variety of services ranging from healthcare, market linkages to social intermediation (Andreassen et al. 2015; Ferro et al. 2013; Kistruck et al. 2013; Pillai et al. 2021b). In the healthcare system, ICT facilitates a transparent mechanism for accessibility, storage and transmission of vital individual health information such as blood group, medical conditions, allergies and so on. This facilitates a better identification and dispatching of the closest healthcare providers and telemedicine services to suffering individuals. Also, based on the personalized information of users' suitable eHealth and mHealth services could also be provided to them (Crean 2010). In the education system, ICT-enabled services have led to the transformation of the classroom environment,

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[1] Understanding Media and Culture: An Introduction to Mass Communication (2010). The eLearning Support Initiative. Creative Commons Attribution. Retrieved from https://open.lib.umn.edu/mediaandculture/chapter/9-2-the-relationship-between-television-and-culture/ (accessed on 12 May 2021).

thereby enabling engaging learning activities such as multimedia-based learning (Bhattacharjee and Deb 2016). Various synchronous and asynchronous online courses provide a platform for a more interactive exchange of learning between teacher and student. The penetration of ICT into governance processes provides a common ground where dialogues between citizens and local government authorities can be exchanged, ultimately leading to sustainable development (Qureshi et al. 2021) through two-way communication mechanisms such as e-voting and e-petition (Tomor et al. 2019). These examples illustrate the potential of ICTs in building vertical linages and facilitating trust and good governance.
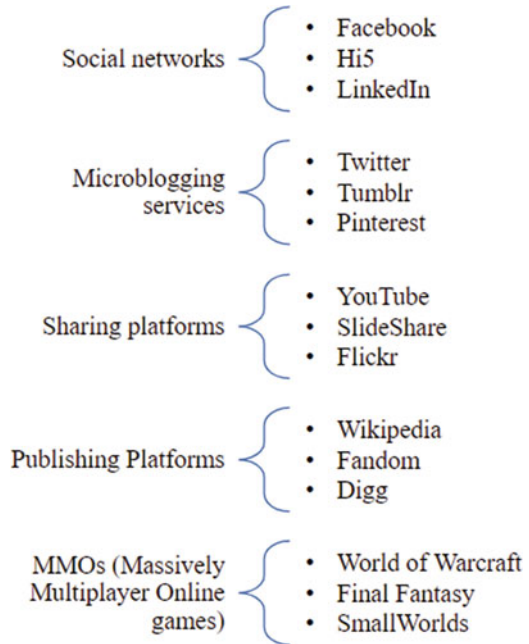
The foundation of ICT-enabled social interactions is *the* idea of *social platforms* (Escobedo et al. 2021; Kenney and Zysman 2016; Pandey et al. 2021; Pillai et al. 2021b). These ICT-*enabled platforms* leverage webservice and applications, which users can create, share and express a variety of content that enable social networking (Qureshi 2009; Qureshi et al. 2018b; Taprial and Kanwar 2012). The fundamental aspect of ICT-enabled platforms is to create a strong base of global connectivity amongst large user demographics, to provide a virtual podium where dialogues/viewpoints can be exchanged on a range of topics (Qiu et al. 2021; Qureshi et al. 2020). ICT-enabled platforms also open up avenues for businesses to have an open and direct relationship with their customers, thus facilitating improved business decisions and profitability (Setia et al. 2020). ICT-enabled platforms also help maximize public awareness with regards to health issues, emergency services, and disaster-related information, to name a few. Moreover, government bodies can leverage ICTs to have regular citizen engagement, thereby improving the transparency and efficiency of their operations (Bonsón et al. 2012; Qiu et al. 2021). There are various ICT-enabled platforms that serve a broad spectrum of user-defined needs, some of which are shown in Fig. 1.

As discussed above, ICT-enabled platforms have covered almost every aspect of today's societal and business world due to their unparalleled advantages. However, ICT-enabled platforms also have detrimental consequences for society, such as the spread of misinformation, cyberbullying, cybercrime, and the dark web, as described subsequently. In the next sections, we elaborate on these aspects of ICT-enabled platforms as they provide rich insights on the causes and symptoms of polarization in social media and could help in formulating solutions to mitigate excessive divisions.

1.1   Spread of Misinformation

Any false or inaccurate information that is broadcasted, posted, or relayed on social media is termed misinformation. Misinformation can be broadly classified into an unintentional spread of misinformation and an intentional spread of misinformation (Tandoc Jr et al. 2018; Wu et al. 2019). Unintentional spread of misinformation is defined as the type of information that gets disseminated on ICT-enabled platforms by users who trust their source, such as their family members, friends, colleagues,

Fig. 1 Various ICT-enabled
platforms

Social networks	• Facebook • Hi5 • LinkedIn
Microblogging services	• Twitter • Tumblr • Pinterest
Sharing platforms	• YouTube • SlideShare • Flickr
Publishing Platforms	• Wikipedia • Fandom • Digg
MMOs (Massively Multiplayer Online games)	• World of Warcraft • Final Fantasy • SmallWorlds

and or various social media influencers. Intentional spread of misinformation is a type of information that has premeditated intentions of deceiving the public. The intentional spread of misinformation has an adverse effect on society as it triggers hatred, conspiracy, and propaganda-based mentality in public. In the business sphere, misinformation promotes disseminating false, unverified information regarding a brand, business entity, or organization that aims to tarnish the brand or entity, leading to financial and reputational losses (Ryan et al. 2020). In recent years, many ICT-enabled platforms have come under scrutiny for spreading fake news and promoting certain political and religious propaganda (Farkas et al. 2018; Ghai et al. 2021; Tandoc Jr et al. 2018). Our aim in the call for book chapter was to develop more understanding of all types of misinformation, its role in exacerbating social divisions and mistrust, and the actions required to eradicate all types of misinformation.

1.2 Cyberbullying

Cyberbullying is electronic communication-based bullying targeted at individuals using e-mail services, ICT-enabled platforms, online gaming platforms, and other digital-based messaging applications (Kowalski et al. 2012). Today, ICT-enabled platforms are a breeding ground for numerous trolls - a person who intentionally wants to provoke an emotional response from others by posting messages on social

media is termed as a *troll*. Trolling has a negative impact on people's mental health and also increases the risk of worry and distress (Golf-Papez and Veer 2017). Due to increasing concern of mental health amongst the younger generation, ICT-enabled platforms are directing more resources towards AI-based (automated) intelligent systems to detect texts, pictures, and videos containing violent, harmful, hate-related messages (Van Hee et al. 2018). For instance, linear support vector machines are employed that automate cyberbully identification and make it feasible to clean up ICT-enabled platforms from such negative influences/intentions (Van Hee et al. 2018). Evidence shows that causing emotional distress and cyberbullying are the techniques through which Trolls engage in polarizing behavior (Tucker et al. 2018). Trolls are also producers of disinformation, and hence providing critical insights on the processes by which trolls create content and spread it on ICT-enabled platforms has been our goal in this call for book chapters.

1.3   Fraud and Cybercrime

Cyberattacks have taken the highest priority with respect to the national security agenda worldwide and are now treated as a criminal offense, thus leading to a term known as *cybercrime* (Wall and Williams 2017). Cybercrime can be classified into type I cybercrimes and type II cybercrimes (Gordon and Ford 2006). Type I cybercrimes are technology-based such as phishing, hidden Uniform Resource Locators (URLs), and hidden charges. For instance, phishing-related issues on these platforms involve a link that looks very similar to the page an individual wants to visit but actually, the landing page is fake (Chiew et al. 2018). So, once personal details are entered on such dubious websites, the cybercriminals have access to the personal email address, password, and other personal or financial details. Also, these morphed URLs have the potential to install malware on computers/smartphones once they are visited by any user.[2] On the other hand, type II cybercrimes relate more to human-based involvement such as identity theft, and tailgating to name a few (Gordon and Ford 2006). Identity theft is a cybercrime that involves gaining personal information such as tax numbers, health insurance, and other banking-related information so that the criminal can open other bank accounts with such details and use these fake accounts to divert funds and other resources (van de Weijer et al. 2019). Tailgating is a social engineering-based attack wherein cyber threat actor(s) trick employees to gain software-controlled access into company premises (Gordon and Ford 2006). Deibert (2019) notes how polarizing leaders or leaders with authoritarian tendencies have used cheap yet effective digital social-engineering campaigns to shape public opinions and advanced their divisive agenda.

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[2] Top 5 social media scams (April 24, 2019), NortonLifeLock, retrieved from https://us.norton.com/internetsecurity-online-scams-top-5-social-media-scams.html?aid=social_media_scams

Consequently, in our call for chapters, we sought to bring attention to the actors and the processes of socio-cultural polarization.

1.4 Dark Web

The dark web is defined as a world wide web in which the client and user communication channels are initiated via unique, customized communications protocols, specific software, configurations, and authorization (Weimann 2016). The dark web facilitates the concealment of critical user information such as geographic location and IP identification. This is made possible because the dark web is a subset of the unindexed part of the worldwide web, generally referred to as the deep web (Chertoff and Simon 2015). Today, the rise of social media popularity has indirectly attracted the penetration of dark web members to provide Crimeware-as-a-Service, which allows renting goods or services from other cybercriminals as needed (Sood and Enbody 2013). Thus, ICT-enabled platforms have brought the dark web services closer than ever before to cybercriminals. The anonymity aspect of social media has led to an increase in dark web activities. It is surprising to note that approximately $3.25 billion was generated by the cybercrime economy worldwide in 2018, out of which illegal pharmaceutical trading, stolen data sales, and financial crimes accounted for nearly 78.5% of the total annual cybercrime economy (McGuire 2019). The dark web shows the growing vulnerability of contemporary institutions to online crime and manipulation.

Social media is in a perilous state today not only because of all the aforementioned concerns but also how they have given rise to the phenomenon known as *polarization* (Prasetya and Murata 2020). The unparalleled access to information and diversity of discourse that social media provides engender partisan news and polarized debates amongst the users (Qureshi et al. 2020). For instance, today's environment of growing civil wars, military coup, corruption, and highly unstable state of governance in multiple countries has led to an influx of immigrants in various countries wherein different political parties are contradicting each other on the issue of accepting these immigrants (Van der Brug and Van Spanje 2009). These contradicting opinions have spilled onto mainstream ICT-enabled platforms where citizens with different political ideologies are partaking in such debates, thus polarizing the sentiments around the issue (Ekman 2019; Ohme 2020).

2 Polarization

Polarization refers to a phenomenon in which "a small number of groups become highly homogenized internally, but increasingly different and opposed to each other externally" (Lucas and Warman 2018, p 988). It amplifies intra-community viewpoints, exacerbates prejudices and grievances, and divides society into two
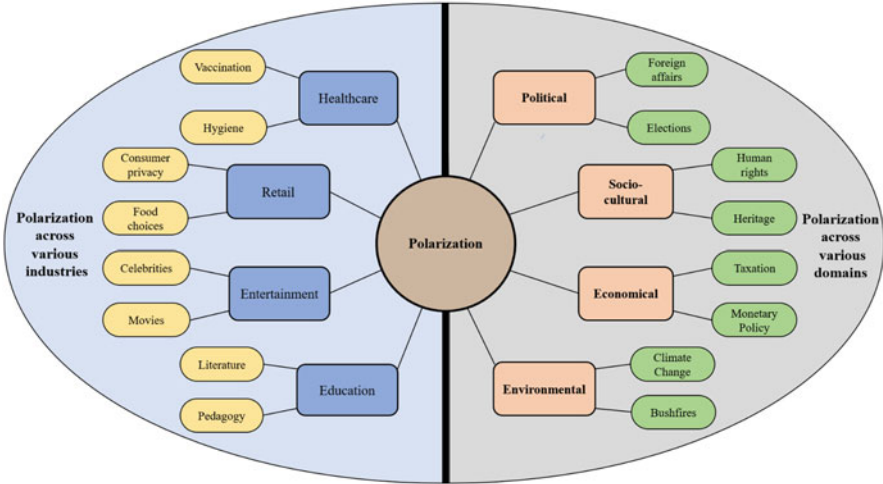
Fig. 2 Representation of polarization in various industries and domains

(bipolar) or more (multipolar) opposing extremes (Grover et al. 2019; O'Hara and Stevens 2015). As such, polarization is a threat to democracy and democratic values (Deibert 2019). Well-functioning democracies thrive on public participation, and independent news channels and media platforms that keep powerful entities accountable and create spaces for expressing differences of opinions (Grover et al. 2019). However, these spaces become a cause of concern when like-minded users get entrapped in their own informational bubble around the topics of critical concerns such as gun laws, societal inequality, and immigration. Figure 2 depicts an overview of polarization across different industries and domains.

2.1 Polarization in Different Domains and Industries

A major cause of polarization in contemporary society is news media (Bolsen and Shapiro 2018). The agenda of a media outlet may be aligned with the ideology of an influential figure in a particular domain, which might result in reporting partisan news (Stroud and Curry 2015). As a result, the news broadcasted to the public through print and social media may be biased (Shultziner and Stukalin 2019). The synergistic effect of homophilic structures on social media-enabled social networks and partisan news leads to the formation of *echo chambers* wherein individuals are largely exposed to conforming opinions (Flaxman et al. 2016). Therefore, individuals with a set of beliefs harbor a high affinity to an agenda that aligns with their views and builds up a no-compromise mentality towards any kind of opposing information.

In the field of politics, polarization stems mainly from the ideological divides between various political parties (Druckman and Levendusky 2019). In a multi-party system, political polarization is highly evident due to the ideological identity. On the one hand, political polarization is associated with some positive benefits, such as keeping the party accountable and using party affiliations to gain support for an agenda that might align with the overall national benefits, such as economic benefits and job creation.[3] On the other hand, political polarization has adversely affected policymaking by creating an environment where negotiation and compromise with other parties are seen as a betrayal of the party's identity.

For instance, following the aftermath of one of the deadliest mass shootings in Las Vegas, the USA, in 2017, the debate on gun laws in the senate and the public eye has ever been more polarized. Gun ownership in the USA has now become a representation of one's political affiliation. In a poll conducted by Pew research center on various topics, gun laws took center stage with a 54-point gap that was deemed as the largest gap witnessed with respect to various other societal issues.[4]

In the healthcare field, polarization can lead to severe adverse effects. For instance, the global COVID-19 vaccine acceptance rates are heavily skewed, with Ecuador having an acceptance rate of 97% while the acceptance rate of Kuwait is only 23.60% (Sallam 2020). There may be several reasons for varying vaccine acceptance rates across nations, but one of the major reasons is ICTs-induced polarization which provides a platform for anti-vaxxers to continue their efforts to hinder the national vaccination program by spreading misinformation (Ashton 2021).

Climate change and environmental sustainability have been a growing concern among scientists and environmental activists due to the depletion of polar ice caps and the rise in sea levels causing severe atmospheric conditions. However, debates in various parliaments around the world have shown polarizing opinions wherein some politicians deem climate change as a hoax created by other countries to derail political agendas (Hoffarth and Hodson 2016). Such polarizing opinions on climate change have spilled over onto social media and have resulted in the formation of echo chambers that insulate people from opposing views (Williams et al. 2015). For instance, 13 federal agencies published a volume on National Climate Assessment and clearly indicated a rise of 7–8 inches of global sea level due to various factors.

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[3] Rettig, J. (May 27, 2010). Why Political Polarization Might be Good for America: Author Alan Abramowitz discusses why polarization can be healthy for democracy. US NEWS. Retrieved from https://www.usnews.com/opinion/articles/2010/05/27/why-political-polarization-might-be-good-for-america

[4] Harry Enten, Harry (Oct 4, 2017). The U.S. Has Never Been So Polarized On Guns. FiveThirtyEight. Retrieved from https://fivethirtyeight.com/features/the-u-s-has-never-been-so-polarized-on-guns/

However, the former U.S president Donald Trump denied all findings and said, "I don't believe it. No, no, I don't believe it".[5]

Global entertainment industry has also fallen prey to polarization, especially when it comes to the topic surrounding books, cultural festivals, celebrities, and censorship (Matakos et al. 2017; Wojcieszak 2011; Baum and Groeling 2008). The dissemination of misinformation by various media outlets has led to convoluted stories about the events, content, and figures that attract significant attention from the youth (Kahne and Bowyer 2017). Social media enabled thriving online communities wherein individuals interact with other like-minded users lead to reinforcement of users' existing viewpoints. The political ideologies also influence film censorship boards, thus indirectly controlling the representation of critical issues communicated through movies and television serials (Pang 2011).

3   Processes That Lead to Polarization

In order to make sense of the root causes of polarization in various aspects of society, it is essential to understand the processes that lead to polarizing opinions around a certain topic. These processes can be categorized as sociological, psychological, communication, selection and ICT induced processes. We also give specific attention to ICTs induced processes. Although ICTs induced processes of polarization have socio-psychological roots, they also have distinct characteristics. In subsequent subsections, we elaborate on each of these processes by highlighting their theoretical underpinnings:

3.1   Sociological Process

Game theory helps to understand the divergence in policy-motivated voter groups and exhibit out-of-equilibrium belief (Woon 2018). Therefore, behavioral game theory establishes a relation between voter behavior and strategic expectations. Game theory also sheds light on the polarizing standpoint/position of a candidate (Woon 2018).

Muted group theory refers to the lack of ability exhibited by a group to express themselves due to inequity in the language (Korn 2016). The muted group theory is categorized as a communication theory that emphasizes how a group is muted/excluded based on the usage of a particular language resulting in loss of information and thus polarization (Korn 2016).

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[5] Sangomla, A. (03 November 2020) . US Elections 2020: A history of Trump's climate change denial. Down to Earth. Retrieved from https://www.downtoearth.org.in/news/climate-change/us-elections-2020-a-history-of-trump-s-climate-change-denial-74075

Social identity theory focuses on intergroup behavior and social attachment (Iyengar et al. 2012). This intergroup behavior has a lasting effect on an individual, which shapes one's identity. Therefore, a strong attachment to a group inflicts a strong group's philosophy and ideology on a group member (Wojcieszak and Garrett 2018).

Protracted social conflict refers to interactions among communal groups based on sensitive topics such as religion, race, ethnicity, and culture (Azar and Moon 1986). These communities are plagued with deep-rooted mindsets that have generally existed over a long period of time. These types of communal interactions are polarized to such an extent that they tend to spread violence, hatred, and fear in society (Azar and Moon 1986).

3.2   *Psychological Process*

Cognitive dissonance is a phenomenon that explains how those individuals who have negative feelings about themselves experience opinion-reinforcing information (Mullainathan and Washington 2009). These individuals seek opinion reinforcement to overcome feelings such as diminishing self-esteem and self-value, leading to polarized opinions/polarization.

Confirmation bias is another approach that explains how individuals search and favor selective information that tends to support their preconceived notions or beliefs (Westerwick et al. 2017). This selective information-seeking process exhibits a high level of bias in opinion formation as they are interpreted and tailored towards solidifying one's thought process resulting in polarized viewpoints.

Skepticism is defined as an individual attitude that is predominantly based upon the doubting of knowledge, system or a process (Han and Federico 2018). In terms of understanding the polarization process, motivated skepticism is the combination of an individual's tendency to cast doubts over selective information which does not align with their ideology and at the same time reinforcing their preconceived beliefs by accepting only certain information (McCright 2016).

Motivated reasoning is a phenomenon in which individuals indulge in biased reasoning to make decisions that are consistent with their preferred outcomes rather than making decisions based on objective evidence (Taber and Lodge 2006).

3.3   *Communication Process*

Agenda setting theory refers to a phenomenon adopted by the media industry to manipulate public opinions and concerns about certain issues leading to polarized opinion formation (Hyun and Moon 2016).

Cultivation theory describes how society is influenced by the social reality portrayed on television and media (Shanahan and morgan 1999). Thus, the over-

exposure to media shapes the perception of reality and influences one's ability to raise questions on certain issues.

Flaming refers to the hostile online communication and exchange of ideas on various social media-enabled artifacts such as community chat rooms and forums, leading to polarized beliefs between people of different cultures (Cho and Kwon 2015).

Spiral of silence refers to self-censoring of views in a disagreeable opinions climate. This phenomenon is common in political and mass communication spheres (Clemente and Roulet 2015). The fear of isolation silences individuals having opposing views, thus resulting in limitation of the range of public opinions (Kushin et al. 2019).

3.4 Selection Process

Homophily refers to the tendency of certain individuals to form strong bonds with other like-minded individuals on social networks (McPherson et al. 2001). Homophily contributes towards the formation of echo chambers, thus leading to polarized individual opinion (Boutyline and Willer 2017).

Selective exposure refers to biased consumption, retention, and perception of media content (Arceneaux et al. 2013). According to this theory, individuals consume specific content that reinforces their preconceived viewpoint while avoiding contradictory content.

Groupthink is a phenomenon that sheds light on individual behavior and how it affects the group decision-making process (Baron 2005). According to groupthink, individuals confirm to each other as they don't have any exposure to critical evaluation around a certain topic or issue. This leads to minimum conflict within the group as they always arrive at a consensus irrespective of the topic of discussion (Janis 2008).

Herd behavior helps in understanding how individuals act together in a group without any planned direction (Hamilton 1964). Herd behavior is common in strikes, riots and mob violence.

3.5 ICTs Induced Process

Echo chambers refer to information bubbles wherein individuals hear similar voices to their own (Flaxman et al. 2016). Echo Chambers on ICT-enabled platforms may coarsen the online debate, thus distorting the psychosocial lives of individuals (O'Hara and Stevens 2015).

Cyberbalkanization, also known as splinternet, refers to the fragmentation of the internet into various sub-groups or sub-sections based on shared interests (Van

Alstyne and Brynjolfsson 2005). The process of cyberbalkanization is common across nations wherein the web is fenced off into a series of national internets.

Filter bubbles refer to a phenomenon wherein ICT-enabled platforms algorithmically process individual search history, cookies, and location to provide the preferred information to the users (Pariser 2011). Therefore, algorithms inadvertently amplify ideological segregation by automatically recommending agreeable content to users, thus leading to polarization (Flaxman et al. 2016).

Ghettoization is the process of segregation of members of a particular community that has underprivileged social status and a position of lesser power to a restricted area (Wright and Jacobs 1994). In social media ghettos, freedom of speech is curtailed, and only the topics that align with ghetto philosophy are encouraged, thus leading to polarization (Bright 2018).

4 Polarization Due to ICT-Enabled Platformization

The presence of various ICT-enabled platforms has broadened the scope of content creation and consumption. The unique principles of various ICT-enabled platforms allow individuals to engage in a particular forum depending on mood, interest, and requirements. Social media employs algorithms for populating user's feeds wherein user's search history, time spent on each topic, interaction with other users and communities are some of the algorithmic input parameters (Eslami et al. 2015). These parameters support more user engagement as they help in featuring the interest of users (Kumar et al. 2019).

Generally, the use of ICT-enabled platforms has two objectives. The first one lies with how an individual uses ICT-enabled platforms for his/her own benefits, such as receiving news feeds, the latest information on a plethora of products and services, and growing one's social network connections (Baumöl et al. 2016; Warner-Søderholm et al. 2018). The second objective lies in using ICT-enabled platforms by businesses, political parties, and other such entities to influence individuals' decisions such as voting, purchasing, and vaccination (Kushin and Yamamoto 2010; Cao et al. 2014; Ortiz et al. 2019). ICT-enabled platforms exert user influence by employing persuasive algorithms (Beck 2016). A persuasive algorithm is defined as a technology that is based on the idea of modifying an individual's behavior, attitude, or socio-psychological beliefs (Stibe 2015).

Facebook uses a persuasive algorithm with numerous data points as input parameters to analyze the user behavior based on their preferences such as *like and comment* feature on pages, time spent on a particular page, and *reaction* feature as it has more weightage in comparison to *like* feature (Kaur et al. 2019).

Twitter also uses a technique based on the philosophy of a persuasive algorithm (Young 2010). The input parameters to analyze user preferences and behavior are different on Twitter because of the nature of the platform. Twitter is a social networking, micro-blogging platform that allows users to send a 140-character based message, also known as a tweet. As a result, the user interface on Twitter

mainly revolves around *retweets* and mentions (Conover et al. 2011). Retweets are ways of endorsing tweets posted by other users, whereas mentions allow the user to direct the conversation to a specific user or community.

Instagram is an ICT-enabled platform that works on the principle of sharing pictures and videos through a mobile application. Instagram employs a machine learning algorithm based on a ranking system that has the ability to customize the users' feed based on factors such as user's interest, timestamp of posts, frequency of usage of an application, and followership as input parameters (Giannoulakis and Tsapatsoulis 2016).

YouTube facilitates video promotion via *watch time* which implies that YouTube algorithm prioritizes videos with longer total viewing sessions over the number of clicks received (Bessi et al. 2016). In the case of YouTube, the algorithm is based on interest-agnostic content discovery, which refers to the means through which highly active users get highly-tailored content (Sun et al. 2016). YouTube engages its users through algorithms based on the *ranking system* and recommendation system (Fyfield et al. 2020; Zhou et al. 2010). Ranking based system determines how a video is performing based on various performance analytics such as the number of clicks, watch time, likes, dislikes, comments, and the upload schedule by content creators. Recommendation system profiles users based on their content history, interaction with a content creators' channel, and genre preference. Therefore, similar profiles are grouped under different categories, and then individual users get video recommendations based on videos watched by similar profiles (Toderici et al. 2010). Since the video recommendations are based on several dependent factors, there are high chances of engaging a user into one particular genre or content (Bessi et al. 2016). Therefore, when liked-minded users get similar recommendations, the process of communication amongst them via the help of the videos can result in the formation of echo chambers.

LinkedIn, a professional social networking platform, segregates news feeds, updates, and posts based on a coupled-system of ranks, interest, timestamp, and user interactions such as likes and comments (Gerard 2012). Various artifacts of LinkedIn encourage users, influencers, public figures, and government officials to participate in exchanging dialogues over numerous topics. As news around work, vacancies, and business are highly tailored to an individual's profile, it influences user's viewpoints (Lee et al. 2014).

In conjunction with algorithmic input parameters on various ICT-enabled platforms, another important factor that affects what a user sees in their feed is a hashtag. As hashtag(s) are attached with social media content, individuals make use of hashtags as search parameters to view and categorize posts. The most trending hashtag in the realm of user's interest shows up first as a result influencing a user's feed.

Therefore, content promotion on ICT-enabled platforms generally follows a broad philosophy of persuasive algorithm and is narrowed down by the implementation of respective features of platforms. Also, such type of algorithm-based content promotion is the leading cause of ICT induced polarization and eventually leads to polarized communities in the socio-cultural realm (Cohen 2018).

During the recent years, research on polarization with a particular focus on social media data has gained traction (Grover et al. 2019; O'Hara and Stevens 2015; Qureshi et al. 2020). Some methodological attempts have also been made to detect fake news, communities and quantify polarization in social networks (Gupta and Deodhar 2021; Gupta and Kumar 2016, 2020, 2021; Gupta et al. 2016; Gupta et al. 2019; Guerra et al. 2013; Kumar et al. 2017; Yang et al. 2019). However, understanding the role of ICTs in causing socio-cultural polarization and symptoms of socio-cultural polarization due to ICTs largely remains underexplored. In our views, understanding these technological aspects, their theoretical underpinnings and their impact on social cultural polarization holds great relevance particularly when technology enabled social media usage has increased exponentially. We believe that processes such as the proliferation of extreme views around socio-cultural activities through cyberbalkanization, and their reinforcement through echo chambers need further investigation so as to evaluate their impact on society at large. Consequently, in our call for papers, we sought to advance the systematic knowledge in ICT induced polarization and to facilitate a meaningful conversation to counteract such polarization.

5 Overview of the Book Chapters

In line with the above argument, we see the chapters in this book as an effort to investigate the causes and symptoms of socio-cultural polarization in the context of Information and Communication Technology. In addition to the overview and concluding chapters, this book is organized into four sections consisting of ten chapters. These chapters have been written by scholars from various countries such as Argentina, Australia, India, Netherlands, and the USA. The first section consists of three chapters related to methods that can be used to model and analyze the processes related to polarization. The second section which is about social aspects of polarization, consists of two chapters covering issues such as bushfires and reservations policy. The third section is related to cultural aspects of polarization such as literary censorship, national education policy, and media bias in Bollywood. Finally, the fourth section of this book discusses aspects related to polarization in information ethics and dealing with misinformation on ICT-enabled platforms. The book concludes with trends and future research issues in the field of socio-cultural polarization.

Chapter 2 deals with the modification of the Schelling opinion model for residential segregation. The chapter describes how the addition of opinion states gives rise to a variant that allows us to combine social influence and mobility dynamics. The proposed model imitates the movement of agents and change of opinion by modelling the behavior of their neighbors. The chapter provides insights into how these mechanisms are responsible for the creation and sustenance of segregation and polarization.

Chapter 3 focuses on ICTs induced polarization which is a result of the widespread misinformation on vaccine inefficacy and the side effects of the COVID-19 vaccine. The chapter explains how, due to the misinformation spread on the Covid-19 vaccines, a section of the society exhibited hesitancy towards vaccines. This chapter employs simulation-based model of dynamical co-evolution in adaptive networks to explain polarization around vaccination. The opinion formation on social media is modelled on comments posted under COVID-19 related YouTube videos. The experiments reveal that the degree of polarization on online discourse increases with recency in time.

Chapter 4 demonstrates the rise and propagation of fake news by various YouTube channel owners with a complete focus on the materialistic goals of increasing viewership and subscribers. An increase in fake news viewership results in the emergence of polarizing opinions amongst viewers and subscriber base. This chapter helps to understand the behavior of users (viewers and subscribers) by employing epidemiological modeling.

Chapter 5 uses the Australian bushfire (2019–2020) as a case study to demonstrates the social and environmental cost of political polarization. This chapter brings attention to social media echo-chambers in reinforcing and perpetuating extreme political positions on the causes and mitigation of bushfires. The chapter uses narrative analysis and identifies polarization rooted in economic vs environment logic and short terms vs long term time horizon. The paper proposes a hybrid logic to address polarization around environmental issues.

Chapter 6 aims to understand how ICTs have been responsible for the formation of public opinion around the issue of Indian reservation policies and the affirmative action policies in the U.S. The central argument of this paper is that even though ICT facilitated idea mediation with respect to equality and justice, it failed in recognition of racial and caste oppression over centuries (cf. Bhardwaj et al. 2021; Bhatt et al. 2022; Sutter et al. 2022).

Chapter 7 sheds light on literary censorship in modern India. The first part of the chapter investigates fundamental reasons behind the cyber-attacks on literary authors and texts. The second part of the chapter deals with understanding the role of ICT that shapes the modern trends of literary censorship in India. The insights gained from this chapter reveal that among various socio-cultural issues, literary censorship is also one of the major issues that leads to polarization.

Chapter 8 aims at understanding the reasons for social media-induced polarization and opinion formation on the National Education Policy (NEP) 2020 in India. The outcome of this chapter consisting of a two-step process of data acquisition and data monitoring reveals an increased use of phrases about NEP 2020 on Twitter while indicating an existence of attitudinal change by social media users towards NEP 2020.

Chapter 9 pertains to media bias in Bollywood- an Indian film industry based in Mumbai. This chapter identifies main controversial topics and key media outlets publishing about them on their online portals. Based on the sentiment score, percentages of negative and positive words of each of the controversies, media outlets were found to be belonging to two clusters exhibiting opposing bias.

Chapter 10 discusses the ethical aspects of big data and the increasing polarization in information ethics. It employs two ethical approaches, the common good approach and the individual liberty approach to conceptualize two extreme views on big data uses. Using the Chinese social credit system (CSC) as a case study, this chapter demonstrates how big data is either seen as an innovation to promote the common good (i.e., good governance, fairness, and social harmony) or as a tool to increase surveillance and control in society. The paper proposes contextual integrity theory as a theoretical concept to bridge these opposing views.

Chapter 11 discusses how online social media has become a vehicle for spreading rumors and demonstrates its implications on individuals, organizations, and social institutions. This chapter designs a systematic framework to address the spread of rumors on social media. The chapter identifies various forms of false and unverified information, such as, gossip, legends, propaganda, conspiracy theory, fake news, pseudoscience, and misinformation, and discusses their relevance and impact on multiple stakeholders. This chapter also provides insights on various perspectives that enable the exploration of epidemic management and their role in addressing rumors.

Chapter 12 provides insights on the current status of the research in polarization and discusses avenues for future research.

Overall, the breadth and depth of the topics on polarization explored in these book chapters, the methodological diversity employed to examine the phenomena, and the solutions proposed to bridge division and extremism make the book a timely scholarly contribution. It is our hope that this book will bring more awareness to the causes, symptoms, and consequences of ICT-induced polarization and will create a dialogue among multiple stakeholders to build digital social infrastructure for promoting cross-cutting ties and social cohesion.

References

Andreassen HK, Kjekshus LE, Tjora A (2015) Survival of the project: a case study of ICT innovation in health care. Soc Sci Med 132:62–69

Arceneaux K, Johnson M, Cryderman J (2013) Communication, persuasion, and the conditioning value of selective exposure: like minds may unite and divide but they mostly tune out. Polit Commun:213–231

Ashton J (2021) COVID-19 and the anti-vaxxers. J R Soc Med 114(1):42–43

Azar EE, Moon CI (1986) Managing protracted social conflicts in the third world: facilitation and development diplomacy. Millennium 15(3):393–406

Baron RS (2005) So right it's wrong: groupthink and the ubiquitous nature of polarized group decision making. In: Advances in experimental social psychology, pp 219–253

Baum MA, Groeling T (2008) New media and the polarization of American political discourse. Polit Commun 25(4):345–365

Baumöl U, Hollebeek L, Jung R (2016) Dynamics of customer interaction on social media platforms. Electron Mark 26(3):199–202

Beck E (2016) A theory of persuasive computer algorithms for rhetorical code studies. Enculturation 23

Bessi A, Zollo F, Del Vicario M, Puliga M, Scala A, Caldarelli G, Uzzi B, Quattrociocchi W (2016) Users polarization on Facebook and Youtube. PLoS One 11(8):e0159641

Bhardwaj A, Mishra SK, Qureshi I, Kumar KK, Konrad AM, Seidel MDL, Bhatt B (2021) Bridging caste divides: middle-status ambivalence, elite closure, and lower-status social withdrawal. J Manag Stud 58(8):2111–2136

Bhatt B, Qureshi I, Sutter C (2022) How do intermediaries build inclusive markets? The role of the social context. J Manag Stud

Bhattacharjee B, Deb K (2016) Role of ICT in 21st century's teacher education. Int J Edu Inf Stud 6:1–6

Bolsen T, Shapiro MA (2018) The US news media, polarization on climate change, and pathways to effective communication. Environ Commun 12(2):149–163

Bonsón E, Torres L, Royo S, Flores F (2012) Local e-government 2.0: social media and corporate transparency in municipalities. Gov Inf Q 29(2):123–132

Boutyline A, Willer R (2017) The social structure of political echo chambers: variation in ideological homophily in online networks. Polit Psychol:551–569

Bright J (2018) Explaining the emergence of political fragmentation on social media: the role of ideology and extremism. J Comput-Mediat Commun 23(1):17–33

Cao P, Meister S, Klante O (2014) How social media influence apparel purchasing behavior. Mark Rev St Gallen 31(6):77–86

Chan J, To, H. P, Chan E (2006) Reconsidering social cohesion: developing a definition and analytical framework for empirical research. Soc Indic Res 75(2):273–302

Chertoff M, Simon T (2015) The impact of the dark web on internet governance and cyber security.

Chiew KL, Yong KSC, Tan CL (2018) A survey of phishing attacks: their types, vectors and technical approaches. Expert Syst Appl 106:1–20

Cho D, Kwon KH (2015) The impacts of identity verification and disclosure of social cues on flaming in online user comments. Comput Hum Behav 51:363–372

Clemente M, Roulet TJ (2015) Public opinion as a source of deinstitutionalization: a "spiral of silence" approach. Acad Manag Rev 40(1):96–114

Cohen JN (2018) Exploring echo-systems: how algorithms shape immersive media environments. J Media Lit Educ 10(2):139–151

Conover MD, Ratkiewicz J, Francisco M, Gonçalves B, Menczer F, Flammini A (2011) Political polarization on twitter. In: Fifth international AAAI conference on weblogs and social media. ICWSM, Barcelona

Crean KW (2010) Accelerating innovation in information and communication technology for health. Health Aff 29(2):278–283

Deibert RJ (2019) The road to digital unfreedom: three painful truths about social media. J Democr 30(1):25–39

Druckman JN, Levendusky MS (2019) What do we measure when we measure affective polarization? Public Opin Q 83(1):114–122

Ekman M (2019) Anti-immigration and racist discourse in social media. Eur J Commun 34(6):606–618

Escobedo M, Zheng Z, Bhatt B (2021) Socially oriented sharing economy platform in regional Australia: a Polanyian analysis. In: Edited volume: sharing economy at the base of the pyramid: opportunities and challenges. Springer. eBook ISBN 978-981-16-2414-8, Singapore. https://doi.org/10.1007/978-981-16-2414-8

Eslami M, Aleyasen A, Karahalios K, Hamilton K, Sandvig C (2015, February) Feedvis: a path for exploring news feed curation algorithms. In: Proceedings of the 18th ACM conference companion on Computer Supported Cooperative Work & Social Computing, pp 65–68

Farkas J, Schou J, Neumayer C (2018) Cloaked Facebook pages: exploring fake Islamist propaganda in social media. New Media Soc 20(5):1850–1867

Ferro E, Caroleo B, Leo M, Osella M, Pautasso E (2013, May) The role of ICT in smart cities governance. In: Proceedings of 13th international conference for E-democracy and open government. Donau-Universität Krems, pp 133–145

Flaxman S, Goel S, Rao JM (2016) Filter bubbles, echo chambers, and online news consumption. Public Opin Q 80(S1):298–320

Forum on Information and Democracy (2021) Working group on infodemics: policy framework, November 2020. ForumID_Report-on-infodemics_101120.pdf (informationdemocracy.org)

Frankfurt T 2020 How technology is fueling social justice during a pandemic, Forbers (Aug 20, 2020). https://www.forbes.com/sites/forbestechcouncil/2020/08/20/how-technology-is-fueling-social-justice-during-a-pandemic/?sh=2cdc6d564c18

Friedkin NE (2004) Social cohesion. Annu Rev Sociol 30(1):409–425. https://doi.org/10.1146/annurev.soc.30.012703.110625

Fyfield M, Henderson M, Phillips M (2020) Navigating four billion videos: teacher search strategies and the YouTube algorithm. Learn Media Technol 46:1–13

Garfin DR (2020) Technology as a coping tool during the coronavirus disease 2019 (COVID-19) pandemic: implications and recommendations. Stress Health 36(4):555–559

Gerard JG (2012) Linking in with LinkedIn®: three exercises that enhance professional social networking and career building. J Manag Educ 36(6):866–897

Ghai A, Kumar P, Gupta S (2021) A deep-learning-based image forgery detection framework for controlling the spread of misinformation. Inf Technol People.

Giannoulakis S, Tsapatsoulis N (2016) Evaluating the descriptive power of Instagram hashtags. J Innov Digit Ecosyst 3(2):114–129

Golf-Papez M, Veer E (2017) Don't feed the trolling: rethinking how online trolling is being defined and combated. J Mark Manag 33(15–16):1336–1354

Gorbunova IB, Petrova NN (2019) Music computer technologies, supply chain strategy and transformation processes in socio-cultural paradigm of performing art: using digital button accordion. Int J Supply Chain Manag 8(6):436–445

Gordon S, Ford R (2006) On the definition and classification of cybercrime. J Comput Virol 2(1):13–20

Grover P, Kar AK, Dwivedi YK, Janssen M (2019) Polarization and acculturation in US election 2016 outcomes–can twitter analytics predict changes in voting preferences. Technol Forecast Soc Chang 145:438–460

Guerra P, Meira Jr W, Cardie C, Kleinberg R (2013, June) A measure of polarization on social media networks based on community boundaries. In: Proceedings of the international AAAI conference on web and social media, vol 7, no. 1

Gupta S, Deodhar S (2021) Understanding digitally enabled complex networks: a plural granulation based hybrid community detection approach. Inf Technol People

Gupta S, Kumar P (2016, August) Community detection in heterogenous networks using incremental seed expansion. In: 2016 international conference on data science and engineering (ICDSE), pp 1–5. IEEE

Gupta S, Kumar P (2020) An overlapping community detection algorithm based on rough clustering of links. Data Knowl Eng 125:101777

Gupta S, Kumar P (2021) A constrained agglomerative clustering approach for unipartite and bipartite networks with application to credit networks. Inf Sci 557:332–354

Gupta S, Kumar P, Bhasker B (2016, September) A rough connectedness algorithm for mining communities in complex networks. In: International conference on big data analytics and knowledge discovery. Springer, Cham, pp 34–48

Gupta S, Kumar P, Perfilieva I (2019) A community detection algorithm based on granulation of links. ALLDATA 2019:41

Hamilton W (1964) The genetical evolution of social behaviour. J Theor Biol:17–52

Han J, Federico CM (2018) The polarizing effect of news framing: comparing the mediating roles of motivated reasoning, self-stereotyping, and intergroup animus. J Commun 68(4):685–711

Hoffarth MR, Hodson G (2016) Green on the outside, red on the inside: perceived environmentalist threat as a factor explaining political polarization of climate change. J Environ Psychol 45:40–49

Hota PK, Qiu S, Bhatt B (2021) Ethitrade: countering challenges of sharing economy at the base of the pyramid using technology. In: Qureshi I, Bhatt B, Shukla DM (eds) Sharing economy at the base of the pyramid: opportunity and challenges. Springer, Singapore

Hyun KD, Moon SJ (2016) Agenda setting in the partisan TV news context: attribute agenda setting and polarized evaluation of presidential candidates among viewers of NBC, CNN, and Fox News. J Mass Commun Q 93(3):509–529

Iyengar S, Sood G, Lelkes Y (2012) Affect, not ideology a social identity perspective on polarization. Public Opin Q 76(3):405–431

Jacobs AM, Weaver RK (2015) When policies undo themselves: self-undermining feedback as a source of policy change. Governance 28(4):441–457

Janis IL (2008) Groupthink. IEEE Eng Manag Rev 36(1):36

Kahne J, Bowyer B (2017) Educating for democracy in a partisan age: confronting the challenges of motivated reasoning and misinformation. Am Educ Res J 54(1):3–34

Kaur W, Balakrishnan V, Rana O, Sinniah A (2019) Liking, sharing, commenting and reacting on Facebook: user behaviors' impact on sentiment intensity. Telematics Inform 39:25–36

Kenney M, Zysman J (2016) The rise of the platform economy. Iss Sci Technol 32(3):61

Kinuthia W (2009) Educational development in Kenya and the role of information and communication technology. Int J Edu Dev Using ICT 5(2)

Kistruck GM, Beamish PW, Qureshi I, Sutter CJ (2013) Social intermediation in base-of-the-pyramid markets. J Manag Stud 50(1):31–66

Knearem T, Jo J, Tsai C, Carroll J (2021) Making space for support: an exploratory analysis of pandemic-response mutual aid platforms. In: C&T '21: Proceedings of the 10th international conference on Communities & Technologies – wicked problems in the age of tech (C&T '21), June 20–25, 2021, Seattle, WA, USA. ACM, New York, NY, USA 6 pages

Korn JU (2016) 'Genderless' online discourse in the 1970s: muted group theory in early social computing. Morgan & Claypool Publishers, New York, NY, pp 213–230

Kowalski RM, Giumetti GW, Schroeder AN, Reese HH (2012) Cyber bullying among college students: evidence from multiple domains of college life. In: Misbehavior online in higher education. Emerald Group Publishing Limited

Kumar P, Gupta S, Bhasker B (2017) An upper approximation based community detection algorithm for complex networks. Decis Support Syst 96:103–118

Kumar A, Salo J, Li H (2019) Stages of user engagement on social commerce platforms: analysis with the navigational clickstream data. Int J Electron Commer 23(2):179–211

Kushin MJ, Yamamoto M (2010) Did social media really matter? College students' use of online media and political decision making in the 2008 election. Mass Commun Soc 13(5):608–630

Kushin MJ, Yamamoto M, Dalisay F (2019) Societal majority, Facebook, and the spiral of silence in the 2016 US presidential election. Social Media+Society 5(2):1–11

Law R, Leung D, Chan ICC (2019) Progression and development of information and communication technology research in hospitality and tourism. Int J Contem Hosp Manag

Lee JK, Choi J, Kim C, Kim Y (2014) Social media, network heterogeneity, and opinion polarization. J Commun 64(4):702–722

Lucas C, Warman R (2018) Disrupting polarized discourses: can we get out of the ruts of environmental conflicts? Environ Plan C: Politics Space 36(6):987–1005

Lyytinen K, Rose GM (2003) The disruptive nature of information technology innovations: the case of internet computing in systems development organizations. MIS Q:557–596

Matakos A, Terzi E, Tsaparas P (2017) Measuring and moderating opinion polarization in social networks. Data Min Knowl Disc 31(5):1480–1505

McCright AM (2016) Anti-reflexivity and climate change skepticism in the US general public. Hum Ecol Rev 22(2):77–108

McGuire M (2019) Social media platforms and the cybercrime economy: the next chapter of into the web of profit. Bromium Report

McPherson M, Smith-Lovin L, Cook JM (2001) Birds of a feather: homophily in social networks. Annu Rev Sociol 27(1):415–444

Moore K (2021) Football is not 'a matter of life and death'. It is far less important than that. Football and the COVID-19 pandemic in England. Soccer Soc 22(1–2):43–57

Mullainathan S, Washington E (2009) Sticking with your vote: cognitive dissonance and political attitudes. Am Econ J Appl Econ 1(1):86–111

O'Hara K, Stevens D (2015) Echo chambers and online radicalism: assessing the Internet's complicity in violent extremism. Policy Internet 7(4):401–422

Odendaal N (2003) Information and communication technology and local governance: understanding the difference between cities in developed and emerging economies. Comput Environ Urban Syst 27(6):585–607

Ohme J (2020) Algorithmic social media use and its relationship to attitude reinforcement and issue-specific political participation–the case of the 2015 European immigration movements. J Inf Technol Politics:1–19

Ortiz RR, Smith A, Coyne-Beasley T (2019) A systematic literature review to examine the potential for social media to impact HPV vaccine uptake and awareness, knowledge, and attitudes about HPV and HPV vaccination. Hum Vaccines Immunother 15(7–8):1465–1475

Pandey M, Bhati M, Shukla DM, Qureshi I (2021) Resourcing and value creation: a case of sharing economy model at the base of the pyramid. In: Qureshi I, Bhatt B, Shukla DM (eds) Sharing economy at the base of the pyramid: opportunity and challenges. Springer, Singapore

Pang L (2011) The state against ghosts: a genealogy of China's film censorship policy. Screen 52(4):461–476

Pariser E (2011) The filter bubble: what the internet is hiding from you. Penguin UK

Park M, Park J, Baek YM, Macy M (2017) Cultural values and cross-cultural video consumption on YouTube. PLoS One 12(5):e0177865

Parthiban R, Qureshi I, Bandyopadhyay S, Bhatt B, Jaikumar S (2020) Leveraging ICT to overcome complementary institutional voids: insights from institutional work by a social enterprise to help marginalized. Inf Syst Front:1–21

Parthiban R, Qureshi I, Bandyopadhyay S, Jaikumar S (2021) Digitally mediated value creation for non-commodity base of the pyramid producers. Int J Inf Manag 56:102256

Pillai V, Pandey M, Bhatt B (2021a) Social sustainability at the BOP through building inclusive social capital: a case study of Drishtee. In: Edited volume: sharing economy at the base of the pyramid: Opportunities and challenges. Springer, Singapore. eBook ISBN 978-981-16-2414-8. https://doi.org/10.1007/978-981-16-2414-8.

Pillai V, Shukla DM, Qureshi I (2021b) Social intermediation using sharing economy in India: A case study of Farmizen. In: Qureshi I, Bhatt B, Shukla DM (eds) Sharing economy at the base of the pyramid: opportunity and challenges. Springer, Singapore

Prasetya HA, Murata T (2020) A model of opinion and propagation structure polarization in social media. Comput Soc Netw 7(1):1–35

Qiu S, Xu Z, Bhatt B (2021) The sharing economy platforms in rural China: bridging institutional voids through institutional entrepreneurship. In: Sharing economy at the base of the pyramid. Springer, Singapore, pp 75–99

Qureshi I (2009) Influence of computer mediated communication on social capital: a disaggregated approach (Doctoral Dissertation University of Western Ontario, London, Canada)

Qureshi I, Sutter C, Bhatt B (2018a) The transformative power of knowledge sharing in settings of poverty and social inequality. Organ Stud 39(11):1575–1599

Qureshi I, Fang Y, Haggerty N, Compeau DR, Zhang X (2018b) IT-mediated social interactions and knowledge sharing: role of competence-based trust and background heterogeneity. Inf Syst J 28(5):929–955

Qureshi I, Bhatt B, Gupta S, Tiwari AA (2020) Call for papers: causes, symptoms and consequences of social media induced polarization (SMIP). Inf Syst J. Available at: https://onlinelibrary.wiley.com/pb-assets/assets/13652575/ISJ_SMIP_CFP_3-1614604498620.pdf

Qureshi I, Pan SL, Zheng Y (2021) Digital social innovation: an overview and research framework. Inf Syst J

Riaz S, Qureshi I (2017) Emergence of a new institutional logic: shaping the institutionally complex field of community radio in India. Res Sociol Organ 50:383–418

Ryan CD, Schaul AJ, Butner R, Swarthout JT (2020) Monetizing disinformation in the attention economy: the case of genetically modified organisms (GMOs). Eur Manag J 38(1):7–18

Sallam M (2020) COVID-19 vaccine hesitancy worldwide: a systematic review of vaccine acceptance rates. medRxiv. https://doi.org/10.1101/2020.12.28.20248950

Setia P, Soh F, Deng K (2020) Platformizing organizations: a synthesis of the literature. Oxford Research Encyclopedia of Business and Management

Shachaf P (2008) Cultural diversity and information and communication technology impacts on global virtual teams: an exploratory study. Inf Manag 45(2):131–142

Shalini, Manoharan B, Parthiban R, Qureshi I, Bhatt B, Rakshit K (2021) Digital technology-enabled transformative consumer responsibilisation: a case study. Eur J Mark

Shanahan J, Morgan M (1999) Television and its viewers: cultivation theory and research. Cambridge University Press

Shirazi F (2012) Information and communication technology and women empowerment in Iran. Telematics Inform 29(1):45–55

Shultziner D, Stukalin Y (2019) Distorting the news? The mechanisms of partisan media bias and its effects on news production. Polit Behav:1–22

Sood AK, Enbody RJ (2013) Crimeware-as-a-service—a survey of commoditized crimeware in the underground market. Int J Crit Infrastruct Prot 6(1):28–38

Stibe A (2015, June) Advancing typology of computer-supported influence: moderation effects in socially influencing systems. In: International conference on persuasive technology. Springer, Cham, pp 253–264

Stroud NTJ, Curry A (2015) The polarizing effects of partisan and mainstream news. American Gridlock: The Sources, Character, and Impact of Political Polarization:337–354

Sun L, Wang X, Wang Z, Zhao H, Zhu W (2016) Social-aware video recommendation for online social groups. IEEE Trans Multimed 19(3):609–618

Sutter C, Bhatt B, Qureshi I (2022) What makes resource provision an effective means of poverty alleviation? A resourcing perspective. Organ Sci. https://doi.org/10.1287/orsc.2021.1570

Taber CS, Lodge M (2006) Motivated skepticism in the evaluation of political beliefs. Am J Polit Sci 50(3):755–769

Tandoc EC Jr, Lim ZW, Ling R (2018) Defining "fake news" a typology of scholarly definitions. Digit Journal 6(2):137–153

Taprial V, Kanwar P (2012) Understanding social media. Bookboon

Toderici G, Aradhye H, Pasca M, Sbaiz L, Yagnik J (2010, June) Finding meaning on Youtube: tag recommendation and category discovery. In: 2010 IEEE computer society conference on computer vision and pattern recognition. IEEE, pp 3447–3454

Tomor Z, Meijer A, Michels A, Geertman S (2019) Smart governance for sustainable cities: findings from a systematic literature review. J Urban Technol:3–27

Torero M, Von Braun J (eds) (2006) Information and communication technologies for development and poverty reduction: the potential of telecommunications. The International Food Policy Research Institute

Tucker JA, Guess A, Barberá P, Vaccari C, Siegel A, Sanovich S, Stukal D, Nyhan B (2018) Social media, political polarization, and political disinformation: a review of the scientific literature. Political polarization, and political disinformation: A review of the scientific literature (March 19, 2018)

UN ECOSOC (2021) Progress made in the implementation of and follow-up to the outcomes of the world summit on the information society at the regional and international levels. United Nations, New York

Valkenburg PM, Piotrowski JT (2017) Plugged in: how media attract and affect youth. Yale University Press

Van Alstyne M, Brynjolfsson E (2005) Global village or cyber-balkans? Modeling and measuring the integration of electronic communities. Manag Sci 51(6):851–868

van de Weijer SG, Leukfeldt R, Bernasco W (2019) Determinants of reporting cybercrime: a comparison between identity theft, consumer fraud, and hacking. Eur J Criminol 16(4):486–508

Van der Brug W, Van Spanje J (2009) Immigration, Europe and the 'new' cultural dimension. Eur J Polit Res 48(3):309–334

Van Hee C, Jacobs G, Emmery C, Desmet B, Lefever E, Verhoeven B, Daelemans W, Hoste V (2018) Automatic detection of cyberbullying in social media text. PLoS One 13(10):e0203794

Wall DS, Williams M (eds) (2017) Policing cybercrime: networked and social media technologies and the challenges for policing. Routledge

Warner-Søderholm G, Bertsch A, Sawe E, Lee D, Wolfe T, Meyer J, Fatilua UN (2018) Who trusts social media? Comput Hum Behav 81:303–315

Weimann G (2016) Going dark: Terrorism on the dark web. Stud Confl Terror 39(3):195–206

Welch EW, Feeney MK (2014) Technology in government: how organizational culture mediates information and communication technology outcomes. Gov Inf Q 31(4):506–512

Westerwick A, Johnson BK, Knobloch-Westerwick S (2017) Confirmation biases in selective exposure to political online information: source bias vs. content bias. Commun Monogr 84(3):343–364

Williams HT, McMurray JR, Kurz T, Lambert FH (2015) Network analysis reveals open forums and echo chambers in social media discussions of climate change. Glob Environ Chang 32:126–138

Wojcieszak M (2011) Deliberation and attitude polarization. J Commun 61(4):596–617

Wojcieszak M, Garrett RK (2018) Social identity, selective exposure, and affective polarization: how priming national identity shapes attitudes toward immigrants via news selection. Hum Commun Res 44(3):247–273

Woon J (2018) Primaries and candidate polarization: behavioral theory and experimental evidence. Am Polit Sci Rev 112(4):826–843

World Economic Forum (2021) World leaders urge mindset change to build trust, foster collective action in the year ahead. 29th June, 2021, https://www.weforum.org/press/2021/01/world-leaders-urge-mindset-change-to-build-trust-foster-collective-action-in-the-year-ahead/

Wright R, Jacobs J (1994) Male flight from computer work: a new look at occupational resegregation and ghettoization. Am Sociol Rev:511–536

Wu L, Morstatter F, Carley KM, Liu H (2019) Misinformation in social media: definition, manipulation, and detection. ACM SIGKDD Explorations Newslett 21(2):80–90

Yang S, Shu K, Wang S, Gu R, Wu F, Liu H (2019, July) Unsupervised fake news detection on social media: a generative approach. In: proceedings of the AAAI conference on artificial intelligence, Vol 33, No. 01, pp 5644–5651

Yoo Y (2010) Computing in everyday life: a call for research on experiential computing. MIS Q:213–231

Young MM (2010, June) Twitter me: Using micro-blogging to motivate teenagers to exercise. In: International conference on design science research in information systems. Springer, Berlin/Heidelberg, pp 439–448

Zeller M (2021) Extremists thrive in times of crisis: the COVID-19 pandemic is no exception, Open Democracy, 12 May 2020 https://www.opendemocracy.net/en/global-extremes/extremists-strive-times-crisis-covid-19-pandemic-no-exception/

Zhou R, Khemmarat S, Gao L (2010, November) The impact of YouTube recommendation system on video views. In: Proceedings of the 10th ACM SIGCOMM conference on internet measurement, pp 404–410