

Bourdieuian e-capital perspective enhancing digital capital discussion in the realm of third level digital divide

E-capital and the third level of digital divide

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Abstract

Purpose – The purpose of this paper is to create a research framework to scrutinize how individuals' digital technology use produces tangible and intangible outcomes in online (digital) and offline realms.

Design/methodology/approach – The paper applies the Bourdieusian e-capital perspective to create a theory-based framework. The framework was used to guide a survey design to explore women's "social media-assisted reuse" at the micro-scale in Helsinki, Finland.

Findings – The paper argues that a new form of capital emerges when individuals utilize digital technologies in correspondence to their goals to gain added value that would be impossible or significantly more arduous to gain without the digital realm. The survey indicates that the respondents utilize the digital space – set objectives and gain capital-related outcomes – in correspondence to their differing social, economic and cultural positions and related resources in- and outside of the digital realm.

Practical implications – If digital spaces – due to social inequality and underlying power structures – become increasingly stratified, there will be significant impacts on how individuals from differing backgrounds gain accumulated forms of capital through the digital realm. The question is of great importance for battling inequality.

Originality/value – The paper enhances and synthesizes recent discussions on different forms of capital and outcomes of the use of digital technologies and presents a combined "e-capital–digital divide" framework that offers a more complete agenda for investigating the finely nuanced links between the inputs, outputs and outcomes of digital technology use.

Keywords e-capital, Digital capital, Third level digital divide, Outcomes, Benefits, Digital inequality, Inclusion, Intersectional, Gender, Women, Segregated, Digital space

Paper type Research paper

Introduction

The Bourdieusian perspective, studying the relation between different forms of capital and outcomes of the use of digital technologies, has recently gained increasing attention in the literature. The first Bourdieusian framework to conceptualize how the benefits gained from utilizing digital technologies are intertwined with tangible and intangible forms of capital and how each type of capital are both needed and produced in utilizing digital technologies, was introduced by Merisalo (2016). She redefined the concept of electronic capital (e-capital), as a form of capital that creates added value or benefits that could not be gained or would be

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significantly more difficult to gain without digital technologies. Later, a framework very similar to Merisalo (2016) was used to conceptualize and study “digital capital” referring to the accumulation of digital access and competencies (Ragnedda, 2018; Ragnedda *et al.*, 2020) and digital technology ecosystems (Park, 2017). Moreover, Calderón Gómez (2020) recently demonstrated how different forms of capital are converted to and from digital capital, defined by him as a sub-form of cultural capital (see also Leguina and Downey, 2021).

Several researchers have applied Bourdieusian concepts in the realm of digital technology use over the last decades. Selwyn (2004) showed, in his seminal research, that beside economic capital, social and cultural capital are also related to individuals’ digital technology use and skills. Another seminal research effort by Hargittai and Hinnant (2008, p. 602) argued that those with “more resource-rich background use the Web for more capital-enhancing activities” (see also Helsper, 2012). Furthermore, Baum *et al.* (2014) noticed that the benefits digital technologies can potentially produce for its users are lower if those individuals lack economic, social and cultural capitals. Recent frameworks and concepts for e-capital (Merisalo, 2016), digital capital (e.g. Park, 2017; Ragnedda, 2018; Ragnedda *et al.*, 2020; Calderón Gómez, 2020; McGillivray and Mahon, 2021) and technological capital (Carlson and Isaacs, 2018; Calderón Gómez, 2019; Choi *et al.*, 2021) have deep roots in the literature combining Bourdieusian concepts of different forms of capital and research on the use, skills of using and outcomes derived from using digital technologies (also, e.g. Seale, 2013; Baum *et al.*, 2014; Julien, 2015; Seale *et al.*, 2015; Lee *et al.*, 2021).

Relatedly, the so-called digital divide literature has developed to discuss the socio-economic and demographic divides in the diffusions of digital technologies (e.g. Hargittai, 1999; Hargittai and Hinnant, 2008; van Deursen and van Dijk, 2019). Recently, the literature has been classified into three levels of digital divide (e.g. Scheerder *et al.*, 2017): the first level of digital divide refers to access and use of digital technologies (e.g. Dimaggio *et al.*, 2004); the second level refers to skills needed to use digital technologies (e.g. Hargittai and Hinnant, 2008) and the third level refers to tangible or offline outcomes and benefits of the use of digital technologies (e.g. van Deursen and Helsper, 2015). Explorations of the digital divides have often been technology centered even though the reasons behind the divides are rather embedded in the social structures and societal inequalities (Ragnedda and Muschert, 2018). In line with this, new intersectional knowledge on individuals’ interacting social positions is needed for understanding the inequalities related to digital space (Gilbert and Masucci, 2011; Fang *et al.*, 2019; Boeing, 2020).

Only fairly recently have scholars started to explore the digital divides through well-established social theories developed by theorists such as Max Weber, Georg Simmel and Pierre Bourdieu (Ragnedda and Muschert, 2018). Van Deursen and Helsper (2018, p. 2345) argue that the contemporary digital divide literature has not sufficiently acknowledged the outcomes and benefits gained from Internet use as separate theorized constructs. To continue their work, we focus on Bourdieu’s theory for capital conversion (Bourdieu, 1986) to shed more light on the process of how the outcomes and benefits gained from the digital space emerge and are divided. We follow Merisalo (2016), Ragnedda (2018) and Calderón Gómez (2020), who all utilize Bourdieu’s capital conversion theory for conceptualizing digital or e-capital. However, so far, the literature has lacked a combined framework and related empirics that aim to understand the different – but interconnected – phases of the process. Thus, there are very few existing benchmarks that have utilized an empirical approach similar to ours to discuss the role of e-capital (or digital or technological capital) in light of the Bourdieusian theory of capital. A notable exception is the study by Leguina and Downey (2021) where it is argued, based on a large survey conducted in seven countries, that digital capital has a mediating role in the conversion of other types of capital, mostly for the benefit of those who are already otherwise advantaged (see also Calderón Gómez, 2019; Ragnedda *et al.*, 2020). This is a significant research gap, as uncovering the linkages of the e-capital conversion process helps to disentangle the differentiated benefits that individuals can gain from the digital realm. Thus,

we set the following research questions tested with empirical survey data on women's experiences of two social media-assisted reuse groups in Helsinki, Finland:

- RQ1.* How are the economic, social and cultural positions of individuals and related resources out- and inside the digital realm connected to gaining outcomes and benefits from the digital space?
- RQ2.* How are the outcomes and benefits gained from the digital space divided in online and offline realms?

The paper proceeds as follows. First, we introduce Bourdieusian theory of capital conversion and define digital capital and e-capital (Merisalo, 2016; Park, 2017; Ragnedda, 2018; Calderón Gómez, 2020; Ragnedda *et al.*, 2020). Second, we create a synthesized “e-capital–digital divide” research framework by applying a logic model (Funnel and Rogers, 2011). We do so by categorizing the process of the emergence of the benefits gained from the digital realm to inputs, activity and objectives, outputs and outcomes. Third, the framework was used to guide survey design to investigate two urban Facebook groups engaged in “social media-assisted reuse” from two socio-economically different urban neighborhoods in Helsinki, Finland. The utilized survey (166 respondents out of which 94% were women) offers interesting micro-scale insights on how tangible and intangible resources are intertwined in off- and online spaces. Further, it shows how and for whom the groups produce added value and benefits (converted to different forms of capital). Finally, we conclude with a discussion on the main implications of the combined “e-capital–digital divide” framework.

Bourdieu, capital conversion and e-capital

Bourdiesian theory of capital conversion underlines the fact that different types of capital – both tangible (physical and economic) and intangible (cultural, human and social) – are in continuous conversion with each other (Bourdieu, 1986). In brief, Bourdiesian tradition provides a theoretical platform to understand that different forms of capital are both needed and produced in the process of gaining benefits from using digital technologies (also Calderón Gómez, 2020).

Bourdieu (1986) argues that it is impossible to appraise the structure and functioning of society unless also intangible forms of capital, that is social and cultural, are recognized beside traditional tangible forms of capital, that is physical and economic. Thus, focus needs to be laid on both tangible and intangible forms of capital. This means taking into account: social capital that is related to networks of connections (Bourdieu, 1986), information channels, social norms (Coleman, 1988) and trust (Putnam, 1995); cultural capital which relates to social status, customs, values, life-styles and self-expression (Bourdieu, 1986, 2010/1984) and, accordingly, human capital referring to knowledge, education and skills (Becker, 1964; Bourdieu, 1986).

In the Bourdiesian theory, both intangible and tangible forms of capital are converted during social actions. In brief, the conversion process means that one form of capital can be converted into another. These transformation processes of capital presuppose certain transaction costs such as money, time and attention. The profits from investing in intangible types of capital will commonly appear only in the long run: for instance, one can use one's “cultural capital (knowledge of cultural codes) to build networks (social capital), which then give access” to new work opportunities and subsequent “earnings (economic capital)” (Bourdieu, 1986; Haase Svendsen *et al.*, 2010, p. 632). Thus, different types of capital are convertible in either their materialized or immaterialized form as tangibles or intangibles.

In contemporary society, individuals and organizations are increasingly implementing and using digital technologies. The realization that (1) the use of digital technologies requires both tangible (e.g. hardware) and intangible (e.g. skills) assets and (2) that the use of digital

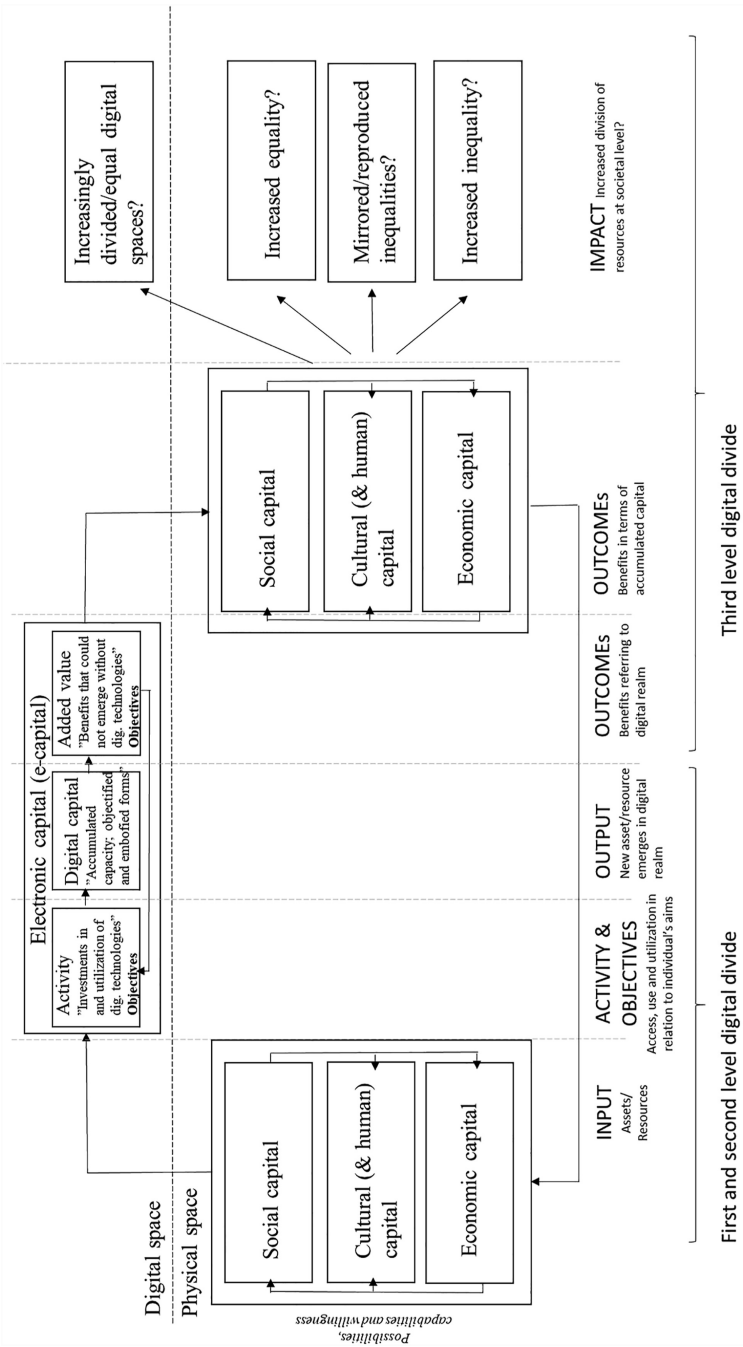
technologies also creates both intangible and tangible outcomes in terms of, for example, social (e.g. via social network platforms) and economic (e.g. via selling goods and services online) benefits led Merisalo (2016) to coin the concept of e-capital. The main argument behind the introduction of e-capital into the Bourdieusian theory of capital conversion was that the discussion on a distinct type of capital that would take into account the recent advances in utilizing digital technologies, was clearly missing a thorough theoretical and conceptual elaboration.

We acknowledge that all types of capital, including e-capital (or digital capital), are in a continuous conversion process with the other types of capital. Without the other tangible and intangible types of capital, e-capital or digital capital could not be acquired and developed. In fact, we define e-capital as a form of capital that (1) emerges from the capital-related “possibilities, capabilities and willingness” of individuals to utilize digital technologies in correspondence with their individual goals and assets, and that (2) creates added value or benefits that would be impossible or significantly more arduous to gain without digital technologies and that (3) converts back to different forms of capital producing capital-related outcomes (cf. Merisalo, 2016; Calderón Gómez, 2020). Furthermore, the definition of digital capital – that is based on a similar “combined” framework as the e-capital framework (Merisalo, 2016) – emphasizes accumulated competence and digital technology (Ragnedda, 2018; Ragnedda et al., 2020). In addition, Calderón Gómez (2020, pp. 4–5) divides digital capital into embodied digital capital referring to, for example skills, motivations, interest and expectations and objectified digital capital referring to, for example devices and infrastructure. We see that these definitions of e-capital and digital capital complement each other. They enhance the theoretical understanding of the digital divide discussion: While e-capital emphasizes added value or benefits that would be impossible or significantly more arduous to gain without digital technologies, the definition of digital capital by Ragnedda (2018) is missing a connection to the outcomes and impacts of digital technology use (van Dijk, 2017). In fact, we argue that the digital capital index of Ragnedda et al. (2020) is a combined index of first- and second-level digital divide as the index is about capabilities (competencies) and access that have repeatedly been shown in the literature to be connected to sociodemographic factors (age, gender, region, education, incomes). The e-capital perspective provides a clear connection to better understand how benefits and outcomes of digital technology use are intertwined with the capital conversion process, and how these benefits are divided in the offline world. The perspective provides a framework to explore the connection between the individuals’ resources out- and inside the digital realm and categorizes capital-related outcomes of digital technology use. Therefore, we further develop this conceptual discussion into a combined framework for exploring the connection between initial resources and outcomes of technology use (e.g. van Deursen and Helsper, 2015; Scheerder et al., 2017; Van Deursen and Helsper, 2018; Calderón Gómez, 2020). To do so, we apply a research framework based on a logic model (e.g. Funnel and Rogers, 2011, see Figure 1) that increases our understanding of the relations between the different forms of capital in physical and digital space affecting (1) the objectives for digital technology utilization in social space (cf. Calderón Gómez, 2020); (2) emergence of accumulated competence (Ragnedda et al., 2020) and (3) emergence of added value and benefits (outcomes) of digital technology use (Merisalo, 2016).

The “e-capital–digital divide” framework

Inputs and activity

In the following text we categorize different forms of capital, that is resources or assets (Bourdieusian definition of capital), as *inputs* that are required for entering the digital realm (cf. Merisalo, 2016; Helsper, 2012). These inputs are linked to possibilities, capabilities and



Source(s): Developed from Merisalo (2016, p. 31)

Figure 1. Synthesis of the theoretical part of the study presenting conversion of capitals and different levels of digital divide within a logic model

willingness to access, use and utilize digital technologies, that is to *activity* in digital space. Thus, individuals have to access and use the physical capital of the information society (i.e. information infrastructure, Internet, hardware and software) to enter the digital space (Graham, 2011, p. 220) and to be able to promote e-capital. Thus, physical and economic capital create first and foremost the *possibilities* for e-capital to emerge. Already a decade ago, Robinson (2009, p. 491) noticed that the restrictions on Internet access and the “limited spatial-temporal resources” (the quality and autonomy of Internet access) “burden the most economically disadvantaged” groups impacting negatively on information-seeking skills, knowledge acquisition and attitudes towards online activities.

Individual attitudes towards technology predict the use of digital technologies (Haramban *et al.*, 2013; Mota and Cilento, 2020). Attitudes also shape the perceived benefits derived from the digital realm: those with high educational backgrounds and high levels of privacy concerns commonly regard themselves as susceptible to harm (Blank and Lutz, 2018), while “digital doubters” do not view their non-use (exclusion) of digital technologies as a problem (Dutton and Reisdorf, 2019). In fact, recent evidence has shown that – while the traditional explanations linked to economic (access), social (support networks) and human (skills) capital still matter (Helsper and van Deursen, 2017) – the importance of attitudinal factors in explaining the use and non-use of digital technologies has increased in importance over time (Helsper and Reisdorf, 2017).

Chinn and Fairlie (2007) have shown that, even after controlling differences in economic capital (income), human capital (measured as years of schooling) is an important factor in generating the global (second level) digital divide. In line with this finding, Hargittai and Hinnant (2008, p. 602) showed that those with higher levels of education and more resource-rich backgrounds use the internet for capital-producing actions. In addition, online skills determine how people can utilize and reap benefits from the internet, that, in fact, also relate to the third level of digital divide. The adoption, use and utilization of new technology is, therefore, a cultural and human capital-intensive activity (Wozniak, 1987) and thus, differing *capabilities* of acquiring e-capital are by definition connected to human capital.

While the specific relation between cultural capital and digital technology use has been rarely addressed in earlier literature (Leguina *et al.*, 2021), what is known is that digital competence is related to cultural capital (Hatlevik and Christophersen, 2013) as well as to people’s orientation in life and their “degree of openness to difference and novelty in life” (Tsatsou, 2012, p. 185). According to the literature, individuals possess different degrees of willingness to adopt an innovation (Rogers, 1983). Consistent with this, Bourdieu (1986, p. 247) has argued that in order to acquire machines, individuals need economic capital, but to use them for specific purposes they must have access to cultural capital. In fact, Calderón Gómez (2020, p. 11) argues that embodied cultural capital (motivations and interests) is connected to the use of the digital realm for particular purposes. Finally, access, adoption and use of digital technologies refer also to social capital, as connections and networks of people affect the utilization of new technologies in societies (Selwyn, 2004; Chen, 2013). Thus, the *willingness* (along with capabilities) to utilize digital technologies is connected to cultural and social capital. In fact, Inkinen *et al.* (2018) showed that individual willingness is the most important indicator (among gender, income and education) explaining variations in the adoption of e-services.

Objectives, outputs and (digital) outcomes

The activity in digital space leads to accumulated digital competencies to utilize digital technologies, i.e. digital capital (cf. Ragnedda, 2018; Ragnedda *et al.*, 2020), that is an *output* of combined activity in digital realm and resources (inputs) rooted in the physical world (also Merisalo, 2016). Different opportunities are linked to skills and capabilities: some activities in

digital space require less capabilities than other activities. Moreover, the utilization of different opportunities of the internet are related to individuals' socio-economic "position in the social space" (Calderón Gómez, 2020, p. 16). Thus, activity is related to the *objectives* that individuals set from their differing positions in relation to the diverse opportunities that the internet provides. The activity, that varies in digital space according to accumulated competencies (Ragnedda *et al.*, 2020) and socio-economic position (Calderón Gómez, 2020), produces *outcomes*, that is added value or benefits that are dependent on the utilization of digital technologies (Merisalo, 2016). As the opportunities and digital spaces and places are diverse, also the added value(s) are manifold and connected to the objectives that people have for their utilization of digital space.

In fact, the widespread diffusion of the internet has created a complex system of "cyberspaces" or digital spaces. The activities within them are embedded in and influenced by users positioned in the physical space (Zook, 2006; Graham, 2011). Thus, the potential added value that the digital realm can produce is connected to physical places through individuals that generate the digital realm and benefit from it. E-capital and other forms of capital are interconverted in the parallel dimensions of physical and digital spaces. In other words, the benefits produced by the use of digital technologies have compounding geographical aspects relating to needed investments and the accumulation of produced capitals. The conversion of capital occurs in a complex spatial system, and thus, also the added value gained from the use of digital technologies is confined to tangible and intangible forms of capital that individuals possess in physical places (cf. Kiuru and Inkinen, 2019). The use of digital technologies is embedded in social, political, cultural and economic circumstances (Zook, 2006; Graham, 2013), and thus, "people may be stratified and segregated in cyberspace in similar ways to the physical world" (Li and Wang, 2014, p. 323). Therefore, digital technologies cannot flatten the "structural and social forces of exclusion and inequality" but can potentially be a "powerful impetus behind positive economic and social change" (Graham, 2011, p. 223; cf. van Deursen and van Dijk, 2014).

Capital-related outcomes and impact

The added value(s) or benefits that are gained from utilizing the digital space have a potential to convert back to tangible and intangible forms of capitals in the physical space, for example turning into money or new social resources (also Merisalo, 2016; Calderón Gómez, 2020). Thus, e-capital in practice becomes visible in different tangible and intangible forms of capital (Bourdieu, 1986). First, e-capital has the potential to be manifested in the form of economic capital, that is, utilization of digital technologies can, for example, produce money (including virtual), savings or reduce costs (Choi, 2003; Choi and Hoon Yi, 2009). Second, e-capital has the potential to be manifested in the form of cultural capital (and human capital), that is, utilization of digital technologies produces, for example new opportunities for learning new skills and increases awareness of different topics. For instance, social media groups that are focused on sharing knowledge on certain subjects can gather tens of thousands of people and provide an opportunity to increase participants' knowledge bases on the selected topic (unfortunately, corresponding communities have an opportunity to share false information). Digital spaces accumulate both objectified and embodied forms of cultural capital: People consume these spaces as goods or products to correspond to their objectified cultural capital according to their own interests and motivations to achieve personal goals and to implement their lifestyles that correspond to certain values, customs and attitudes, that is their embodied cultural capital (e.g. Calderón Gómez, 2020). Embodied cultural capital, an integral part of a person's habitus (Bourdieu, 1986, p. 245), is renewed in the internet era as "information habitus" (Robinson, 2009) or digital habitus that can show (or help to create) social status of a person being (or aiming at being) an opinion leader or an influencer. In addition, a person can

show (for others) participation, inclusion, belonging or consuming of certain services or social media spaces, and thus, implement and amplify his/her own social position in the eyes of others. Bourdieu (1986) also discusses an institutionalized form of cultural capital referring to educational qualifications. The digital realm has a growing institutional role in society. For instance, a person can use social media for professional purposes to show and build their own qualifications and expertise (to increase professional status in the eyes of others), and thus, to enhance (institutionalized) cultural capital through the digital realm.

Third, e-capital has the potential to be manifested in the form of social capital. As social capital emerges from durable networks with mutual acquaintances (Bourdieu, 1986), it is natural, that digital social interaction, especially the use of social network sites, produces social capital (Ellison *et al.*, 2007; Ellison *et al.*, 2014). Bourdieu's (1986, p. 249) argument that "the profits which accrue from membership in a group are the basis of the solidarity that makes it possible" is still timely in the digital context. However, social media has given new meanings for networking in forms of large digital groups but loose networks of mutual (and one-way) followers. Still, like Bourdieu (1986, p. 249) states, also in digital space, networks of relationships are products of investments that are "consciously or unconsciously" aimed at building relationships that are profitable in the "short or the long term". Digital space has provided an unforeseen variety of networking opportunities especially in the form of weak ties and bridging social capital (although social media is used also to enforce strong ties and bonding social capital). Thus, networking in digital space can increase trust (Putnam, 1995) leading to increased civil engagement (e.g. Mandarano *et al.*, 2010) and digital inclusion (cf. Helsper, 2012; Park, 2017).

Bourdieuian theory suggests that individuals' positions in different social fields is connected to these different forms of capital (Ignatow and Robinson, 2017). Examining social positions of the users of different digital spaces and services is, thus, critical in understanding for whom these new modes of capital accumulate in the internet era. An interesting question is how the resources that individuals possess out- and inside the digital realm determine the emerged outcomes in terms of different forms of capital. Helsper suggests that (2012, p. 417) "even if an individual engages with a certain digital field and thus benefits from this, those with more resources still take more advantage of the same type of uses". Moreover, Calderón Gómez (2020) notices that a better socio-economic position is related to a more advantageous position in gaining different forms of capital by using the internet. However, the internet also has the potential to empower those with less resources (e.g. Mehra *et al.*, 2004; Amichai-Hamburger *et al.*, 2008). Accordingly, Van Deursen and Helsper (2018, p. 2344) point out that economic resources are not necessarily important in the process of gathering different capital from the digital realm. Rather, they suggest, that "what people do online and the skills they have are more important than who they are when it comes to inequalities in outcomes of Internet use."

Fang *et al.* (2019) point out the importance to address the benefits gained from the digital realm from an intersectional approach. In fact, individuals' social positions and related inequalities are shaped within the interaction of different factors (such as race, gender, class, age, religion, etc.) that are socially constructed and connected to power relations (Hankivsky, 2014, p. 2). Therefore, in order to get a deeper understanding of the gendered inequalities related to digital space it is important to acknowledge the given societal context and to place emphasis on exploring digital divides not only between but also within social subgroups. That is, it is not enough to compare different groups of people but also to acknowledge the different social groups' internal heterogeneity (individuals' interacting social positions) and, thus, to explore the outcomes of digital technology use within the context of specific groups. Gender and age have traditionally been included in digital divide analyses as separate categories. However, neither young people (Calderon-Gomez, 2019), older people (Fang *et al.*, 2019) nor (marginalized groups of) women or men (Mehra *et al.*, 2004; Gilbert and Masucci, 2011)

are unambiguous groups including individuals that use technology and gain capital-related benefits uniformly. Rather those groups (among other groups such as low-income families, sexual minorities) are entities that include a great variety in interacting social positions. In fact, to tackle the inequalities related to, for instance, women's digital technology use more knowledge is required on the everyday practices of technology use related to particular contexts, places and subgroups (Gilbert and Masucci, 2011). Therefore, it is important to explore the emergence of added value gained from the digital realm not only at an aggregate population or society level but also at the micro-level focusing on specific groups of people under interest.

Finally, we briefly shed light on the societal *impacts* of the capital conversion process between physical and digital spaces. This is important because new forms of digital economic, social and cultural capital are accumulated through the digital realm. Exclusion from digital spaces may thus result in exclusion from the new forms of capital. However, acquisition of the new forms of capital through the digital space may substitute gaps in initial resources of an individual. Thus, we acknowledge three complementary and intertwined societal impacts presented in the literature: (1) Increased inequality and division of resources in physical space (e.g. Boeing, 2020); (2) Reproduced and mirrored inequalities (e.g. van Deursen and van Dijk, 2014); (3) Decreased inequality (increased social equality) through Internet empowerment (Mehra *et al.*, 2004; Riquelme *et al.*, 2018).

Method

The empirical part of this paper scrutinizes the conversion of e-capital and other forms of capitals between the physical and digital space at the micro-level in Helsinki, Finland. Helsinki, the capital city of Finland, leads the country statistically in individuals' digital technology use (Merisalo, 2016) and thus was selected as an optimal location for distributing the survey. The study setting examines the added value of using digital technologies (here two Facebook groups) among those who are "connected" in digital space (members of the groups): Group A is from a city center neighborhood with higher-than-average yearly incomes and educational levels in Helsinki; Group B represents a suburban neighborhood with below-average yearly income and educational levels in Helsinki (Table 1). This setting is interesting since although the use of Facebook can be assumed as relatively equal between the study areas (Merisalo, 2014), the purposes of its use are clearly socio-demographically divided (Correa, 2016). Thus, the study setting provides an interesting opportunity to explore differences in the benefits of digital technology use in relation to different forms of capital. These Facebook groups are, by their definition, created (by the residents themselves) for social media-assisted reuse, that is for the members to sell and buy (also give and receive for free) their (own) used items (e.g. clothes and furniture) among each other. In other words, these

Name of the group	Number of members in the group ^a	Number of residents in the area ^b	Over 65 years old (%) ^b	Average yearly income (€) ^b	Higher educated in the area (%) ^b	Un-employment rate (%) ^b
Group A	9,373	24,367	17	53,849	32	6
Group B	7,512	17,923	17	31,076	15	11
Helsinki in total/ average	–	653,835	17	34,184	19	10

Source(s): ^aGroup information in Facebook

^b"Ullanlinnan peruspiiri/Pitäjänmäen peruspiiri/Helsinki" (Helsinki region Statistics, 2019)

Table 1.
Statistical description
of the study regions/
groups

Facebook groups create the digital spaces that are linked with the physical boundaries of the residential areas.

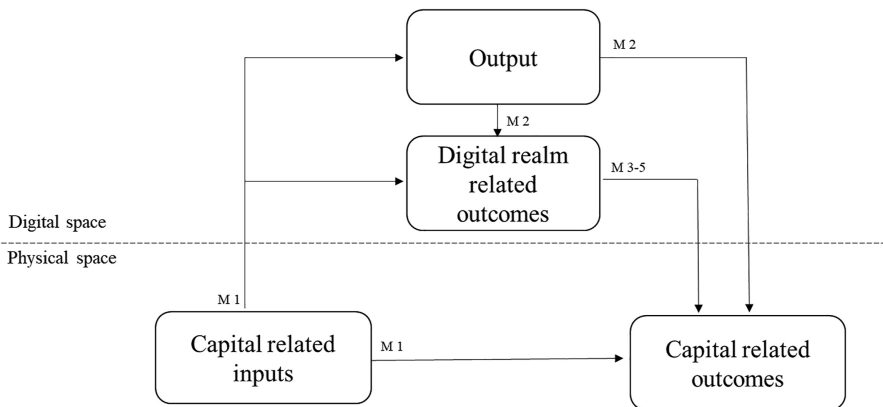
The data was gathered through a structured online survey in the Facebook groups between May and August 2019 by posting the survey link on the groups' walls (after gaining consent from the groups' administrators) and, additionally, by directly contacting 750 members of the groups via Facebook via the groups' contact lists. Members were contacted in the order that the names appeared in the contact lists. This method is problematic as even though the list is seemingly random, we could not locate information to confirm how the order was defined and whether (and how) Facebook's algorithms define the contact list order (recently, Facebook has provided an opportunity to sort the list in alphabetic order or according to the date of joining the group). Further, General Data Protection Regulation prohibit us from gathering any member lists of our own. Thus, for ethical and practical reasons, we contacted the members in the order of appearance in the list. Finally, Facebook restricts the number of private messages to approximately 30 per day: thus, it took us three months to send the 750 messages, explaining why we made the practical decision to restrict the sample to 750 individuals. In total, 166 anonymous responses were received (82 responses from both groups; two respondents did not disclose their group).

In terms of gender, the gathered data was very skewed (94% of the respondents were women). This may be due to several reasons: women are the majority in these two Facebook groups; women are more active than men in these groups and have, thus, noticed the survey link; women were over-represented (due to Facebook algorithms) in the member list view used for sending private messages. Unfortunately, we did not have access to data on the total population of the Facebook groups. Therefore, we could not compare the distribution of our sample and the total population. Thus, due to these uncertainties, we decided to include only women respondents in the analysis. This was not only a practical and necessary choice to tackle the problem of skewness in terms of gender, and thus, to get more accurate results from the target group but it was also a theoretically justified choice as it produces new gender-specific knowledge on the topic. New gender-specific knowledge is needed in order to understand women's interacting social positions in relation to their everyday uses of digital technologies (Gilbert and Masucci, 2011). However, this highlights the need for further studies to examine all genders (including non-binary) as well as different social subgroups in gaining added value from the digital realm.

The online survey form included 21 questions (most followed a scale: 1 = fully agree; 2 = partly agree; 3 = partly disagree; 4 = fully disagree and 5 = do not know). We selected this scale to get a clear understanding of whether the opinion of the respondent is rather positive (fully/partly agree or rather negative partly/fully disagree). The theoretical framework (Figure 1) guided us in designing the survey questions. First, to explore (in addition to age) the input resources, we inquired the yearly income level (to reflect economic capital), the educational level (to reflect human capital), sustainability in terms of reuse as a value/lifestyle (to reflect cultural capital) and social networks that had inspired the individuals to join and use the group (to reflect social capital) of the respondents. Second, to explore the digital assets (output), we asked the respondents whether they perceive the use of the group as technically easy. Third, to explore the added value of the digital space for the users (digital realm-related outcomes), we asked the respondents to assess whether the digital space (the group) has facilitated and increased their reuse practices. Finally, to explore the capital-related outcomes (i.e. how the use of the Facebook groups turns back into different forms of capital) we asked the respondents to disclose whether they use the group (buy/sell used items) to save or make money (reflecting economic capital), whether the use of the group has increased their consciousness about reuse (reflecting cultural and human capital) and whether the use of the group has increased their trust towards their neighborhood (reflecting social capital). Since there are only very few existing empirical studies that could be used as

benchmarks (as discussed in the Introduction), the questions were derived from theoretical premises presented in this paper and applied to this specific empirical context rather than specific previous empirical papers. The questions were tested and discussed with a small group of respondents (10 respondents) that gave their comments to improve the formulation of the questions.

The relations between the survey items are first analyzed here by using crosstabs and chi square tests to get a descriptive overview of the data (Online Supplementary Material). Our main methodological tool for investigating the relations between input (resources in the physical world), output (digital asset) and outcome (digital realm-related outcomes and capital-related outcomes) variables is logistic regression analysis. Our research design includes five logistic regression models (Figure 2): the first model (M1) sets out to explore whether the input resources can explain the variation in the output (digital assets) and the outcome variables. The second model (M2) also includes the output (digital assets) as an explanatory variable to test whether the input resources and outputs can together help to explain the variation in the outcomes. The third model (M3) tests whether the digital realm-related outcomes can explain the variation in the capital-related outcomes. Finally, the fourth and the fifth model add digital assets (M4) and input resources (M5) into the model (in addition to digital realm-related outcomes) to test whether they can explain the variation in the capital-related outcomes. For the analysis, the variables were transformed to dummy variables where “true” equals fully agree and “not true” equals the other answers (excluding “do not know”). This selection was made because fully agree (in comparison to partly agree) leaves no hesitation regarding the opinion of the respondent.



Note(s): M = model

Figure 2. Research design

Results

Descriptive overview

We start by exploring the added value and capital-related outcomes that are gained by utilizing digital space. The results indicate that the respondents agreed that utilizing the group has produced added value for them, as using the group has eased and increased their practice of reusing items: two-thirds of the respondents fully agreed that the group has made it easier to reuse (66% fully agreed and 28% partly agreed). Moreover, over 40% of the respondents agreed that the group has very much increased their reuse practices (53% slightly). In line, 37% of the respondents fully agreed and 40% partly agreed that they would reuse less without the group. Thus, the group produced added value for individuals in terms

of their practice to reuse items. The results show that the use of the groups converts back into different forms of capital (economic, cultural and social):

- (1) Referring to economic capital: 50% of the respondents fully agreed and 39% partly agreed that they use the group to save money. Moreover, 21% of the respondents fully agreed and 58% partly agreed that they use the group to make money;
- (2) Referring to cultural capital: 48% of the respondents fully agreed and 40% partly agreed that they use the group because reuse is an important value to them. In addition, 22% of the respondents fully agreed and 36% partly agreed that they use the group to implement their lifestyle;
- (3) Referring to human capital: 11% of the respondents fully agreed and 28% partly agreed that the use of the group has increased their consciousness about reuse;
- (4) Referring to social capital: 7% of the respondents fully agreed and 30% partly agreed that the group has increased their trust towards their neighborhoods.

Thus, the clearest added value in terms of accumulated capital seems to manifest in the form of economic capital. However, the results suggest that social media create spaces that generate all forms of capital.

Outputs and digital realm-related outcomes

The results of the logistic regression analysis show that those who appreciate reuse as a very important value are two times more likely to experience the use of the group as technically easy in comparison to those who consider reuse as a less important value (Table 2).

The results indicate that resources related to cultural and social capital, as well as digital assets (technical ease of using the group), are connected to achieving added value (for the practice to reuse) through the digital realm (Table 2): the logistic regression models show that those who appreciate reuse as a very important life value are two times more likely to agree that the group has increased their reuse practices in comparison to other respondents (see also Online Supplementary Material). Social networks are also (strongly) connected to reuse. Those who agreed that social networks inspired them to start using the group are over three times more likely (in comparison to other respondents) to agree that the group has made it easier to reuse, that is the group has added value to their reuse practices. The impact of social networks is even stronger when digital assets (technical ease of using the group) is added into the model. In addition, the model shows that those who experience using the group as easy are over 15 times more likely to agree that the group has facilitated (made it easier) their reuse practices. Moreover, the chi square test results show that higher income levels are connected to experiencing that the group has made reuse easier. However, this connection vanishes in the logistic regression model that includes all of the explored variables in the same model (see Online Supplementary Material and Table 2).

In brief, those who experienced reuse as an important life value and those whose social networks were important in starting to use the group, as well as those who experienced the use of the group as technically easy, were more likely to gain added value (in terms of the group having increased and eased reuse practices) in comparison to other respondents. Thus, the results suggest – within the explored empirical context – that individuals' differing social and cultural positions and related resources out- and inside the digital realm are connected to the process of gaining added value from the digital realm (see Figure 1).

Capital-related outcomes

The results of the logistic regression analysis show that resources related to social capital (social networks), cultural capital (reuse as a value) and economic capital (income levels) are

Exp(β)	Asset I experience		Digital realm related outcomes ^a				Capital-related outcomes in physical space ^a				The group has increased my consciousness about reuse		
	MI	M2	The FB group has increased my practice to reuse used items	The FB group has made it easier to reuse used items	I use the group (buy used items) to save money	I use the group (sell used items) to make money	I use the group (buy used items) because reuse is an important value to me	I use the group (buy used items) to implement my lifestyle	MI	M2	MI	M2	
Age	Ref	rm	rm	Ref	Ref	rm	Ref	Ref	Ref	Ref	Ref	Ref	
Less than 30 years old													
30–49 years old	1.026	rm	rm	0.901	0.608	1.863	rm	0.532	0.470	4.529	4.686	2.560	1.946
50–59 years old	2.014	rm	rm	2.689	2.679	1.738	rm	1.861	1.401	2.128	2.166	1.720	0.911
60 years old or older	1.024	rm	rm	1.923	1.411	0.894	rm	1.031	0.897	3.082	3.240	4.645	3.815
0.000													
Input	Ref	rm	rm	Ref	Ref	Ref	Ref	rm	rm	Ref	Ref	Ref	Ref
Income level													
Below 20,000 €/year													
20,000–59,999 €/year	3.013	rm	rm	2.852	2.295	0.663	0.644	rm	rm	0.930	0.918	0.119*	0.096*
More than 59,999 €/year	3.683	rm	rm	1.656	1.029	0.198*	0.215*	rm	rm	0.242	0.251	0.117	0.081*
Education													
Academic/ applied university/ post-secondary	rm	rm	rm	0.709	0.368	0.964	rm	rm	rm	2.703	2.586	9.3E + 08	2.3E + 09
Vocational college or other													
Values/lifestyle													
How important value reuse is for you?													
Slightly/fairly important	Ref	Ref	Ref	Ref	Ref	Ref	Ref	rm	rm	Ref	Ref	Ref	Ref
Ref													

(continued)

Table 2. Results of the logistic regression analysis

Table 2.

Exp(B)	Asset I experience the use technically easy		Digital realm related outcomes ^a The FB group has increased my practice to reuse used items		I use the group (buy used items) to save money		I use the group (sell used items) to make money		Capital-related outcomes in physical space ^a I use the group (buy used items) because reuse is an important value to me		I use the group (buy used items) to implement my lifestyle		The group has increased my consciousness about reuse		
	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	M1	M2	
Very important	2.186*	2.283*	2.108*	1.715	1.046	2.500*	1.857	rm	rm	29.558***	27.072***	38.318***	29.580*	6.369*	6.094*
<i>My social network inspired me to start to use the FB group</i>															
Fully/partly agree	rm	rm	rm	3.383*	6.139***	rm	rm	2.233	2.409	3.033*	2.922	4.645*	6.463*	4.782*	5.404**
Other	rm	rm	rm	Ref	Ref	rm	rm	Ref	Ref	Ref	Ref	Ref	Ref	Ref	Ref
Asset															
<i>I experience the use of the FB group technically easy</i>															
Fully agree				1.595	15.356***		1.545	2.205	2.205		1.263		4.343*		1.356
Other				Ref	Ref			Ref	Ref		Ref		Ref		Ref
Nagelkerke	0.131	0.050	0.066	0.182	0.448	0.113	0.088	0.108	0.146	0.501	0.496	0.477	0.520	0.297	0.312
Hosmer and Lemeshow (ϕ -value)	0.501		0.767	0.949	0.807	0.833	0.677	0.749	0.849	0.635	0.297	0.951	0.786	0.812	0.766
Omnibus (ϕ -value)	0.030	0.017	0.024	0.021	0.000	0.096	0.049	0.041	0.019	0.000	0.000	0.000	0.000	0.009	0.001

Note(s): * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

^a"I would reuse less without the group" and "The group has increased my trust towards my neighbourhood" was left out of the table because lack of fit. Note: the outcomes have a connection to objectives/aims that individuals have for their digital technology use
RM = removed from the model in order to meet the Omnibus test of fit ($p < 0.05$). Backward LR was utilized to identify the least significant variables to be excluded from the final model that was obtained by using the Enter method

dominating the conversion process of the initial resources and assets through the digital space to economic, cultural and human capital (Table 2). The logistic regression analyses show that economic capital explains the use of the group to save money: The results show that those having the highest initial economic resources (in terms of yearly incomes) are 80% less likely to use the group to save money in comparison to the smallest income group (Table 2). There is also a statistically significant connection between using the group to save money and experiencing reuse as an important life value: those for whom reuse is a very important life value are 2.5 times more likely to use the group to save money than those who appreciate reuse as a less important life value (Table 2). However, the statistical significance of values vanishes when the variable referring to digital assets is added into the model. Only income level remains as a statistically significant explanatory variable in the model (Table 2).

Cultural capital in terms of values (naturally) explains why the respondents use the group: reuse is an important value to them. In addition, social networks explain the use of the group because reuse is an important value. Similarly, cultural capital explains the use of the group for implementing lifestyle, as those who value reuse highly are almost forty times more likely to use the group to implement their lifestyle than those who consider reuse as a less important value (see also Online Supplementary Material). Having initial social networks that influenced the respondent to join the group led to a fivefold increase in the likelihood of using the group for implementing lifestyle. Having more economic resources decreases the likelihood of using the group for implementing lifestyle: the “middle class” has a 90% lower likelihood of using the group to implement lifestyle in comparison to those having less economic resources in terms of yearly income. When the digital assets variable is added into the model, the effect of economic resources also encompasses the highest income group. The model shows that those who experience using the group as easy are four times more likely to agree that they use the group to implement their lifestyle. Furthermore, the results show that initial resources related to social capital (social networks) increase the likelihood that the group has increased respondents’ consciousness regarding reuse fivefold, and initial resources related to cultural capital (reuse as a value) has a sixfold impact (Table 2).

Finally, we tested how the added value gained from the digital realm is connected to accumulated capital in the physical space. The logistic regression analyses show that those who gain more added value from the digital realm (in terms of whether the group has increased their reuse practices) are five times more likely to agree that the group has also increased their consciousness about reuse (Table 3). The statistical connection becomes even stronger (tenfold) when the initial resources and digital assets are included in the model. In addition, the chi square statistics show that those who fully agree they have gained added value from the digital realm regarding their reuse practices more often fully agreed that the group has also increased their consciousness about reuse. Moreover, the chi square results show that those who fully agreed they would reuse less without the group more rarely fully agreed that they use the group to implement their lifestyle (Online Supplementary Material).

Discussion

Our results on women’s use of the digital space (in the context of social media-assisted reuse) suggest that resources out- and inside the digital realm (initial resources and added value) are connected to the outcomes that digital technology use produces in terms of different forms of capital. Our notions are in line with Helsper’s (2012, p. 417) correspondence model suggesting that resources (here resources related to cultural capital and social capital and digital assets) are connected to the benefits gained from the use of digital technology (at least for the specific purposes explored here). Moreover, the results are similar to the arguments raised by Leguina and Downey (2021) that people already in the most advantageous positions (here in terms of values, social networks, digital assets) are the ones that benefit most from the digital realm.

Exp(B)	Capital-related outcomes in physical space ^a		I use the group (buy used items) to save money ^a	I use the group (buy used items) because reuse is an important value to me ^b	The group has increased my consciousness about reuse		
	M3	M5			M3	M4	M5
Less than 30 years old	rm	rm		Ref	Ref	Ref	Ref
30–49 years old	rm	rm		3.706	0.292	0.309	0.209
50–59 years old	rm	rm		1.367	0.791	0.931	1.202
60 years old or older	rm	rm		2.254	0.403	0.397	0.000
<i>Has the FB group increased your practice to reuse used items?</i>							
Fully agree	1.779	1.857		1.315	4.686*	4.543*	9.635*
Other	Ref	Ref		Ref	Ref	Ref	Ref
<i>I would reuse less without the</i>							
Fully agree	rm	rm		0.535	3.759	4.030	6.256
Other	rm	rm		Ref	Ref	Ref	Ref
<i>The use of the FB group has made it easier to reuse used items</i>							
Fully agree	1.754	2.130		1.683	1E + 08	2E + 08	6E + 07
Other	Ref	Ref		Ref	Ref	Ref	Ref
<i>I experience the use of the FB group technically easy</i>							
Fully agree		rm		1.170		0.588	1.613
Other		rm		Ref		Ref	Ref
<i>Income level</i>							
Below 20,000 €/year		Ref		Ref			Ref
20,000–59,999 €/year		0.564		0.928			0.789
More than 59,999 €/year		0.207*		0.284			0.904
<i>Education</i>							
Academic/applied university/post-secondary		rm		2.738			2E + 08
Vocational college or other		rm		Ref			Ref
<i>Values/lifestyle</i>							
How important value reuse is for you?							
Slightly/fairly important		rm		Ref			Ref
Very important		rm		24.814***			5.497
<i>My social network inspired me to start to use the FB group</i>							
Fully/partly agree		0.538		3.020			9.483*
Other		Ref		Ref			Ref
Nagelkerke	0.061	0.117		0.504	0.346	0.352	0.569
Hosmer and Lemeshow (<i>p</i> -value)	0.057	0.238		0.543	0.807	0.714	0.998
Omnibus (<i>p</i> -value)	0.030	0.030		0.000	0.000	0.001	0.000
Note(s): * <i>p</i> < 0.05, ** <i>p</i> < 0.01, *** <i>p</i> < 0.001							
“I use the group (sell used items) to make money” and “I use the group (buy used items) to implement my lifestyle” was left out of the table due to lack of fit. The outcomes have a connection to objectives/aims that individuals have for their digital technology use							
rm = removed from the model in order to meet the Omnibus test of fit (<i>p</i> < 0.05)							
^a M4 removed in order to meet the Omnibus test of fit (<i>p</i> < 0.05)							
^b M3 and M4 removed in order to meet the Omnibus test of fit (<i>p</i> < 0.05)							

Table 3.
Results of the logistic regression analysis

In our data, economic resources were conversely connected to the use of the explored digital space to save money or to implement lifestyle (those with higher incomes used the group more rarely to save money or to implement lifestyle). Thus, our results indicate that the objectives women have for their use of digital spaces are connected to their economic, social and cultural position in social and digital space, and in practice to different life values and lifestyles, life circles (everyday life circumstances and networks) and life phases. Thus, our results are similar to [Calderón Gómez's \(2020\)](#) argument that individuals utilize digital opportunities in correspondence to their social position and that cultural capital is important in the capital conversion process. However, our results do not lend support to the argument by [Van Deursen and Helsper \(2018, p. 2344\)](#) that people's skills and actions in the online environment are what matters and takes precedence over who people factually are. Conversely, our results suggest that (at least within the explored digital space) social, economic and cultural capital are all important in determining women's objectives for their use of digital space, and are also further related to the emergence of the capital-related outcomes. As the literature has shown that a lack of resources negatively impacts attitudes towards online activities ([Robinson, 2009, p. 491](#)), and that individual attitudes towards technology predict the use of digital technologies ([Haramban et al., 2013](#); [Mota and Cilento, 2020](#)), it is important that further studies continue to explore the links between individual attitudes and added value gained from the digital realm.

Our case focused on exploring women's use of an easily accessible everyday space. The case, thus, provided gender-specific knowledge on the topic. New insights on the topic are needed, as also argued by [Gilbert and Masucci \(2011, p. 5\)](#): in order to understand how digital technologies shape and are shaped by inequality, we need to explore interacting social positions within the contexts of everyday uses of digital technologies in particular – physical and digital – places.

Conclusions

Main contributions and implications

This article has four main implications. First, we have contributed to enhancing and synthesizing recent discussion on different forms of capital and outcomes of the use of digital technologies through the lens of the Bourdieusian theory of capital conversion ([Bourdieu, 1986](#)). We presented a combined “e-capital–digital divide” framework in order to elaborate the definition of digital capital and e-capital ([Merisalo, 2016](#); [Ragnedda, 2018](#); [Calderón Gómez, 2020](#); [Ragnedda et al., 2020](#)). While we acknowledge these definitions as complementary to each other, we underline the importance of deepening our knowledge on how the added value and benefits of digital technology use emerge within the capital conversion process between digital and physical space. Whereas the existing definitions (only) partially capture the full complexity of the capital conversion process, we offer a more complete framework for investigating the finely nuanced links between the inputs, outputs and outcomes of digital technology use.

Accordingly, second, to contribute to the third level of digital divide discussion we provided a research framework to increase the understanding of how digital technologies produce added value and capital-related outcomes within the capital conversion process. We have done so by dividing the process where the benefits from digital technology use emerge into separate interconnected parts including: input resources in terms of different forms of capital; activity and objectives in relation to individual motivations and interest ([Calderón Gómez, 2020](#)); output, that is digital assets referring to digital competences ([Ragnedda, 2018](#)); emerged added values ([Merisalo, 2016](#)) and their conversion into capital-related outcomes.

Third, the paper applied an intersectional approach to conduct “a pilot study” in the realm of the presented research framework to explore how digital space (in terms of two

reuse-related Facebook groups) produces added value and capital-related outcomes for women in different social positions at the micro-scale in Helsinki, Finland. The results indicated that women utilized the explored digital space in correspondence to their differing economic, social and cultural positions and related resources out- and inside the digital realm. The paper suggests – within its limitations – that the gained outcomes are related to the objectives that individuals have for the utilization of the digital realm (see also [Calderón Gómez, 2020](#)). Moreover, the objectives seem to be connected to different life values and lifestyles (relating to one's economic, social and cultural position) that different groups of women have. Thus, the article suggests that, in addition to initial resources related to cultural, social and economic capital, resources gained inside the digital realm also explain the variation in how women utilize digital space, that is set objectives and gain benefits from the digital realm in terms of capital-related outcomes.

Fourth, while this paper has focused on the capital conversion process, we emphasize the importance of understanding the new forms of social and cultural capital in the internet era in order to gain a deeper understanding of the capital-related outcomes of the digital realm. We argue that digital divide research needs to acknowledge not only the input, output, outcomes and impacts of digital technologies, but also more attention should be given to exploring everyday digital spaces and the resultant capital-related outcomes, as the digital spaces may be lucrative in generating digital economic, social and cultural capital in everyday life. Simply put, the digital realm provides differentiated spaces for people with different interests. However, if digital spaces – due to social inequality and underlying power structures – become increasingly socially stratified and segregated ([Boeing, 2020](#)), it may have significant impacts on how individuals from differing backgrounds gain accumulated forms of capital through the digital realm. Thus, since socially stratified digital spaces may lead to reinforced differentiation in capital accumulation, the question is of great importance for battling reinforcement of social inequality.

Limitations and further research

The presented research framework, naturally, demands further development, but it does provide a starting point for further explorations investigating how outcomes and benefits emerge and are divided in social and digital spaces. A definite way forward would be to dig deeper into the rarely studied cultural capital, particularly through the attitudes that individuals have on using digital technologies.

Further, as noted earlier, the results are based on a “pilot” study and a survey that led to some caveats in the implemented analyses. This has several implications affecting the interpretation of the results. First, generalizing beyond a single (or two) case(s) is always (at least somewhat) problematic. Second, the initial respondents were mainly women, so we made a decision to include only women respondents into the analyses. This decision, however, produced valuable gender-specific knowledge on the topic. In addition to the scrutinized factors, we could have explored more widely the interactions of social positions of women in the survey (for instance asking their employment or immigrant status). Third, the conducted analyses allow us to talk about connections but are not sufficient for verifying causal relationships. Fourth, the analyses illuminate the subjective perceptions of the respondents towards e-capital but do not indicate whether, for example, the expected economic benefits actually (and objectively) accrue in the physical world.

Therefore, naturally, further work is needed to examine with larger sample sizes (including both genders and non-binary identities and other social subgroups) the divide of the benefits gained from the digital realm and to test (by considering the interacting social positions) whether our arguments hold in comparative settings. The latter will require collecting data from other Finnish and/or international (both in the global North and South) locations. Longitudinal data and accompanying statistical and econometric methods would

improve the possibilities of establishing causal relationships between e-capital and the other studied types of capital. Finally, collecting objective in addition to subjective data on the benefits that e-capital can accrue would give evidence on whether the perceived value of e-capital corresponds with actually realized outcomes.

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Appendix

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