"Free"-to-play game: Governing the everyday life of digital popular culture

Erkki M. Lassila

Department of Accounting and Finance, Turku School of Economics, FI-20014 University of Turku, Finland

ABSTRACT

This research aims to uncover the transformative powers inherent and hidden in big data technologies, looking for revealing new areas for governing. By tracking information on the conduct of everyday users of digital apps, these technologies allow the game developers, in their pursuit of their own economic goals, to exploit the users. Employing empirical examples from the free-to-play gaming industry, this research demonstrates how the notion of governmentality gets a new, broader meaning in the modern digital space, where big data technologies are used for control and governing, by adding new insights to the existing knowledge on such digital spaces. The ability to analyze very effectively users' behavioral data with the help of modern big data technologies has changed, not only the gaming industry, but also how playing games is expected to happen in our modern digital world. The calculative practices of the accounting function, generating associations between separate and distant domains, and translating complex processes into a financially comprehensible form, have been involved in transforming application consumption. From a simple mode of occasional entertainment for individuals, gaming has become a daily attention craving, constantly changing, privacy trespassing, and data generating labor process.

1. Introduction

The prior research on accounting and governmentality has highlighted the role of different types of calculative technology in operationalizing governmental programs in society (Graham, 2010; Jeacle, 2015; Miller & Rose, 1990; Neu & Heincke, 2004; Rose & Miller, 1992; Viale, Gendron, & Suddaby, 2017). This literature has explained how the complex webs of associations are built and how they operate through different programs, highlighting the role of experts in the creation of self-regulating individuals. Still, we know fairly little about the role and influence of calculative technologies in the complex webs and associations in digital space[1], where experts of many kinds try to generate and align the interests of separate domains and interest groups through the "programmes of government" (Miller & Rose, 1990).

The digital space is unique in its capability of logging actions into digital binary format, making it a specifically efficient environment in transforming actions into stable, mobile, combinable, and therefore calculable format, enabling action and control at a

---

E-mail address: erkki.lassila@utu.fi.

[1] In this research, digital space refers to digital environment (Lassila et al., 2019) as a digital background context that is necessary for the digital action to take place (for close references see also Jeacle & Carter, 2014 and Kyriacou, 2016).

distance (Latour, 1987). The discourse related to digitalization[2] provides a good illustration of how different governmental authorities, together with other experts and actors, promote technological advancement on a global scale (Legner et al., 2017; Lenka, Parida, & Wincent, 2017; Parviainen, Tihinen, Kääriäinen, & Teppola, 2017). In many cases, advanced companies or societies are defined as those that have been able to implement information technology enabled infrastructures into their everyday processes, or the everyday lives of their citizens. Digitalization is commonly addressed by explaining its new type of opportunities and possibilities for different types of activity, for example through cost reductions or efficiency improvements (Bhimani & Willcocks, 2014). Along with the digitalization, it has been argued that Big Data[3] technologies help augment accounting records, by adding new types of data to the accounting toolbox, such as video, audio, and non-official social media related textual data (see e.g. Bhimani & Willcocks, 2014; Warren, Moffitt, & Byrnes, 2015). Perhaps, this is still more as speculation than real everyday life in accounting practice, even if "Big Data may hold the key to discovering new motivational measures and identifying harmful ones" (Warren et al., 2015, p. 401). However, digitalization has also been criticized for coming too close to individuals' private space in the search for new business opportunities (Han, 2017; Zuboff, 2015, 2019). Another subject of criticism has been its automated algorithmic decision-making properties, which often bypass the critical step of human judgement (Quattrone, 2016).

One major global transformation, which has happened alongside digitalization in the past few decades, has been the proliferation of free apps. Whether positive or not, different types of digital application are currently part of many people's everyday lives. These free apps, while in use or sometimes even while idle in the mobile device, generate a continuous stream of data, which can be utilized by the individual app users themselves, by the organization delivering the app or by a plethora of other third-party actors that might see some potential in such information. This new type of Big Data, which has not been available before, may create new types of possibility for those seeking new business opportunities or governing opportunities, or might even open up new avenues for management accounting study (Bhimani, 2020).

Often, accounting scholars and other academics who aim to study the big data phenomenon refer to social media (see e.g. Arnaboldi, Busco, & Cuganesan, 2017; Turow & Couldry, 2018), which of course provides one rich empirical field to study the big data phenomenon. Similarly, when the special characteristics of big data are considered, unstructured data such as video, images, audio, and textual files are often mentioned (Warren et al., 2015). Still, empirical research on one of the most popular fields in the digital era in which people are willing to spend their free time might shed more light on the subject. This field is free-to-play gaming[4]. It is a fascinating field to study, not only because it has to date been largely neglected by accounting scholars (as an exception see Lassila, Moilanen, & Järvinen, 2019), but because it provides some additional characteristics of digital space not previously studied in the accounting domain. Moreover, free-to-play gaming is no longer a marginal phenomenon, and has significant economic and social value that merits academic interest. It is also a good illustration of free apps markets where users may adopt services without any initial monetary transaction. Instead of giving money, users give rights for service providers to collect, quantify and utilize different types of user-generated digital data, for purposes that are often unclear and unknown to the users (Chapman, Chua, & Fiedler, 2021; Han, 2017; Zuboff, 2015, 2019), and which might raise quite many ethical concerns if revealed (Islam, 2021).

As a big data research context, the digital space of free-to-play gaming provides something additional to social media context. In this context, there are additional types of behavioral data that may be translated into knowledge and how those with capabilities and power to intervene may try to act from a distance on the actions of those who use the service and provide the data. This context may reveal how "the rationally calculating self is made operable by the mundane routines and practices of management accounting" (Miller, 2001, p. 381) and most importantly in the private space of individuals.

By utilizing the governmentality thesis (Miller & Rose, 1990; Rose & Miller, 1992), this research explores how governing calculative practices (Miller, 2001) inherent in free apps markets influences the way in which free-to-play mobile gaming is conducted, and how accounting molds and shapes the rhythm by which people engage with this instance of digital popular culture. Thus, this qualitative research captures the transformative influence of accounting and calculative practices in this particular digital context. It contributes to governmentality studies by demonstrating how the big data technologies act as enablers for the problematization of new areas of individual private space, and thus may initiate new programs of government and governmental ambitions. Thus, free-to-play gaming serves as a context to demonstrate how programs of government are articulated (Miller & Rose, 1990) in the modern digital era, and how the technologies of government (Rose & Miller, 1992) operationalize certain ideals into the domain of reality. Furthermore, this study contributes to the literature on accounting and popular culture (Jeacle, 2012), by further elaborating the key role of calculative practices of accounting in the digital free-to-play gaming phenomena[5].

The paper is structured as follows. Following the thematic structure introduced by Miller and Rose (1990) and Rose and Miller (1992), section 2 provides an overview of the governmentality thesis and some of the accounting literature that has used it. Section 3

---

[2] Digitalization is understood in a very broad sense. It includes digitization of material things into digital format and digital transformation in general due to technological advancements in multiple layers of society.

[3] Big data refers to a technology understood in this research as a technology able to transform different forms of physical entities (numbers, images, texts, videos, etc.) or physical action (human behavior, machine movement, landscape changes, etc.) from close or faraway distance (e.g. all over the world or from space) into digital format (e.g. binary code inside a computer or a computer network) on a massive scale and at high velocity, which can then be conserved, transferred, handled, combined, calculated, etc. further with the help of a machine. See Andrew and Baker (2019) as a reference.

[4] Free-to-play gaming is part of the free apps industry and thus free apps markets. Free-to-play gaming plays a significant role in free apps markets and is therefore considered to be a good illustration of these markets.

[5] From the developers' perspective, see Lassila et al. (2019).

provides some background to why big data should matter in respect of governmentality, and why the field of free-to-play gaming provides an excellent example of this in practice. Section 4 presents the methodology. Sections 5 through 8 provide a simple demonstration of the field of free-to-play as it has presented itself. Section 5 demonstrates how the problem emerges with the help of the expert knowledge. Section 6 presents the elements in the program of a profitable "free game". Section 7 presents the technologies of government, and section 8 presents the self-regulating users. Section 9 discusses the overall findings and explains how the modern big data technologies are influencing society in terms of the governmentality framework, together with some concluding remarks and final thoughts.

2. Governmentality, problems, programs, technologies, and the role of the experts

The governmentality framework introduced by Miller and Rose (1990) and Rose and Miller (1992) provides a fruitful way of understanding how power is conceived and made operable in liberal democracies. The notion of governmentality is inspired and based on the ideas and works of Michel Foucault on the operations of power in modern society (Burchell et al., 1991). The notion of government highlights "the diversity of powers and knowledges entailed in rendering fields practicable and amenable to intervention" (Miller & Rose, 1990, p. 3). Therefore, government needs to be placed "beyond the state" (Rose & Miller, 1992), and thought more of as a realm constituting problematizing activity, distinct from traditional sovereign power. In this way, the term "government" is placed outside of the political context, and understood more in its sociological than political sense (Spence & Rinaldi, 2014). Hence, to try to understand the complexity of heterogenous assemblages and conditions that make the problematization and administration of certain objects possible, accounting should also be understood not just as a practice in a certain context, but instead in terms of its involvement in the governing economic life beyond the workplace (Miller & O'Leary, 1987; Miller & Rose, 1990), while translating complex non-financial matters into financially comprehensible and calculable entities.

The act of government is inherently a problematizing activity (Miller & Rose, 1990). The ability to govern something or someone requires an intervention (Miller & Rose, 1990). However, before this intervention can occur, there needs to be a moral justification or some rationale for this intervention, meaning that there has to be a problem that needs to be solved or cured (Miller & Rose, 1990). The problem itself first needs to be created or made to exist by means of discourse. The government is always dependent on knowledge, and thus the government of a population or an enterprise "becomes possible only through discursive mechanisms that represent the domain to be governed as an intelligible field with its limits" (Miller & Rose, 1990, p. 6). Theoretical arguments and truth claims related to the problem open a space within a "discursive field" (Miller & Rose, 1990, p. 5), in such a way that makes that object known. This process should be understood more in the sense of fact-building (Latour, 1987), rather than a merely speculative activity (Miller & Rose, 1990, p. 5).

Making some object knowable in a certain conceptual sense requires a common language, a discourse as a "technology of thought" (Miller & Rose, 1990, p. 5), which can be used in a process of negotiation and persuasion, requiring different technical devices such as writing, numbering and computing, and procedures of notation and inscription. After this, these knowable objects can be made amenable to intervention and regulation in terms of what Miller and Rose (1990) describe as "programmes of government". Language serves as a translation mechanism between the general and the particular, and thus the government of a domain becomes possible through these discursive mechanisms, which represent those domains as intelligible fields (Miller & Rose, 1990, p. 6). Government thus requires knowledge to be generated on the phenomenon, and therefore distant events and phenomena which are to be governed must be rendered into a stable, mobile and combinable form, as objects of information (Latour, 1987; Miller & Rose, 1990). By knowing an object, together with its moral justification for intervention, a realm is constructed in such a way that it has a programmatic character and a need for governing. Any identified failures or problems, which supposedly require repair, may then be optimistically administered better, perhaps in the form of goals and objectives (Miller & Rose, 1990).

Therefore, language serving as an intellectual technology together with knowledge, renders aspects of existence amenable to different types of inscription, calculation and intervention (Miller & Rose, 1990, p. 7). "Technologies of government" (Miller & Rose, 1990, p. 8) are the means by which those politically rational thoughts are then translated into the domain of reality. These technologies establish further new spaces and devices that supposedly make it possible to act on those entities they stand for (Miller & Rose, 1990, p. 8). Different types of calculation, technique, apparatus, document and procedure comprise the technologies, which "seek to embody and give effect to governmental ambitions" (Rose & Miller, 1992, p. 175). Through these technologies, various types of authority seek to "shape, normalize and instrumentalize the conduct, thought, decisions and aspirations of others" (Miller & Rose, 1990, p. 8), while reaching their own objectives and desires. Through these technologies, programs of government are put into operation (Miller & Rose, 1990, p. 8).

Miller and Rose (1990) draw upon the theory of translation (Latour, 1987) to explain how complex networks of interests are aligned in governmental processes, in such a way that the goals of diverse actors become aligned. The calculative practices of accounting take part in the construction of the "centres of calculations" (Latour, 1987), which enable action at a distance. It is then through indirect and self-regulating manner that "government at a distance" (Miller & Rose, 1990, p. 9) is achieved.

In this deployment of programs, the role of the experts, their professionalism, vocabularies and technologies provide the required mechanisms for molding and shaping different domains of the private (Miller & Rose, 1990, p. 8). Therefore, accounting as a form of expertise and its various calculative practices become important parts of this constellation of actors involved in governmental action. It is accounting and its calculative practices that can transform complex processes into single financial figures, and therefore render these processes visible, calculable and governable (Miller, 2001). As Miller (2001) has pointed out, as a calculative practice accounting "represents one of the preeminent devices for acting upon individuals and intervening in their lives in an attempt to ensure that they behave in accordance with specific economic objectives." (p. 392). Therefore, it is accounting that acts as a key mechanism for

translating macro-level programs to the micro level (Jeacle, 2015). Of course, accounting is not the only form of expertise, as there are plenty of others that participate in this complex assemblage. However, it still serves as one of the focal points when it comes to the construction of the "calculating self" (Miller, 2001, p. 381). Miller and Rose (1990) argue that the self-regulating capacities of subjects are key resources for governing, as governmentality "has come to depend in crucial respects upon the intellectual technologies, practical activities and social authority associated with expertise" (Miller & Rose, 1990), specifically in liberal-democratic societies.

The literature on governmentality studies on accounting may shed some light on these previously presented issues. Miller and O'Leary (1987) studied the emergence of standard costing and budgeting in the USA during the early twentieth century, and how these local-level practices were related to other, broader-level social practices. Accounting was approached as a social and organizational practice which, instead of merely being a technical local-level practice or a means to serve certain economic and political interests, was seen as a complex assemblage of relations related "to a range of other discourses and practices which share a common vocabulary and set of objectives" (Miller & O'Leary, 1987, p. 238). Accounting was located in a network of power relations that comprised organizational and social lives (Miller & O'Leary, 1987, p. 240). Such macro-level notions as standardization and normalization, which attempted to influence the lives of individuals, were seen to be intertwined with the emergence of standard costing and budgeting and the notions of the inefficient and efficient worker (Miller & O'Leary, 1987, p. 238). Programs of government always require their technical counterparts. Individual efficiency as a discursive program could only fulfil its aims when it had adequate technology as its counterpart to operationalize the underlying intent (Miller & O'Leary, 1987, p. 240). The moral justifications of programs, such as the "positive concern to take and to improve the life of the person" (Miller & O'Leary, 1987, p. 261) justified the means. Ultimately, the life of the individual person will be observed and measured against those standards and norms generated by morally justified programs aiming to serve all, thus generating the governable person. Therefore, self-disciplining individuals are a manifestation of the power of accounting.

Over the decades, governmentality studies on accounting have shown how accounting as a technology for governing has many implications in practice. Neu (2000) studied the interlinkages between accounting techniques and colonialism and showed how accounting techniques helped to translate governmental policies into practice and thus was related to the production of colonialism. By using accounting technologies, such as incentive schemes, government tried to influence indigenous people's decisions about their activities in everyday life. Similarly, Neu and Heincke (2004) examined how administrative techniques and techniques of force intersected with monetary and financial relations. They showed how financially related governmental techniques may be efficient if the resistance towards such attempts of governing is small-scale, but may fail if the resistance increases (Neu & Heincke, 2004). Graham (2010) focused on the Canadian retirement income system and used the governmentality framework to explain how accounting as a technology of government was incapable of meeting some of the requirements as a technology of the self in a modern society. Therefore, accounting was seen as inadequate as a tool of governing retirement and retirement savings.

More recent studies by Jeacle (2015) and Viale et al. (2017) may provide yet further insight into how the power of calculative technologies may create and sustain the governance of everyday life, but also how digital measurement expertise and knowledge production may yet be one considerable step in the neoliberalization of society. Comparable with the gaming industry, a rapid movement of fashion markets and trends has initiated a need for different types of quick response initiatives to cope with the issue of response timeliness through information. This was the case in Jeacle (2015) research, which aimed to highlight the role of calculative technologies in the fast fashion industry. She studied the role of accounting and calculative technologies in the enactment of quick response initiatives by utilizing the governmentality framework. The governmentality framework was used to explore the linkages between different calculative regimes, which were part of the construction of the way fashion was conceptualized and operationalized (Jeacle, 2015, p. 307). This study provided insights into how different centers of calculations functioned in their own manner, while as a whole they were part of a larger assemblage of a sophisticated calculative infrastructure (Jeacle, 2015, p. 321). The quick response technologies that were used to address the issues of fast fashion were themselves in part exacerbating the initial problem (Jeacle, 2015, p. 323).

Furthermore, the case study by Viale et al. (2017) on the advertising profession brings out the influence of digitalization and the rise of the digital measurement of online consumers in the media industry. Similar to the evolution in the gaming industry, digitalization and the rise of online consumption through the internet has shifted the advertising industry from being "a mysterious art" toward a measurable science (Viale et al., 2017, p. 272). New techniques of inscribing and measuring users have had impacts on the practices of organizations and thus transformed professional expertise (Viale et al., 2017). Eventually, individuals who were supposed to be free to choose according to the laws of the market and the program of neoliberalism, were influenced by new networks of socialization and surveillance mechanisms for re-orienting the "freedom" of consumers (Viale et al., 2017, p. 273). The new digital experts became the professionals of crucial know-how through the microscopic gaze of visibility on consumer behavior and psychology, which enabled a new type of intervention and understanding of the conduct of conduct (Viale et al., 2017, p. 295).

This line of thinking guides this research as it tries to understand the role of accounting in conducting and shaping society through corporations dealing with big data technologies. This research therefore uses the free-to-play mobile game industry sector as a first-class example, which can demonstrate how big data technologies have impacted the way gaming is expected to be conceived, giving rise to a new rhythm by which people are expected to engage with this specific popular culture. The focus of concern here lies within the generation of the conduct of governors, i.e. the game developers, and how their program of government is articulated and made operable. What are the premises of such a problematization, especially when there exist the modern big data technologies, which may be used "in the modification of behavior and choices of individuals as consumers" (Andrew & Baker, 2021, p. 566)? How are these organizational problems affecting wider social and economic life? Analysis at the micro-level of how game developers engage with users through big data technologies to improve the problematics related to organizational aims is expected to provide a way to address broader movements in society. The next section provides some background related to big data and an introduction to the gaming

industry and free-to-play games specifically, which serves as our empirical field of reference.

3. Big data and free-to-play gaming

3.1. Why big data matters?

When discussion switches over to the topic of big data, it quite often means that the discussion starts to revolve around things related to social media and the corporate giants of that sector. Discussion might also turn towards surveillance of private citizens (Han, 2017; Zuboff, 2015, 2019) or perhaps different types of new opportunity presented by these advanced technologies (Bhimani & Willcocks, 2014). However, very seldom does anyone start to think about the connection between mobile games, big data technologies and how individuals arrange their daily schedules and routines because of the entanglement of these different domains[6]. To govern something or someone requires knowledge of the object to be governed (Miller & Rose, 1990), and big data technology could be seen as technology par excellence, which can provide a new type of resource for those who have the will to govern. As the first part of the name hints, big data relates somehow to the amount of data, which it deals with. However, it has been said many times that mere volume is not enough to make data big. Even if there is no single common definition for big data, there exist many excellent options for how big data can be approached and understood (see for example Vasarhelyi, Kogan, & Tuttle, 2015; Arnaboldi et al., 2017; Andrew & Baker, 2021).

For the aims of this research, Andrew and Baker (2021) provide the most illustrative definition of big data, which they have divided into three main sources of big data that reflect well the widespread prevalence of the phenomenon. These are organizational records; the accumulation of data from individuals' activities on the internet, such as social media platforms, e-commerce and web browsing; and digitalized data on the physical geographical information and movement of people. These three categories obviously cover a huge portion of most individuals' daily lives. However, there seems to be one specific area missing from this list of different spaces, which have been penetrated by the digital gaze of modern big data technologies. Depending on how it is interpreted, this space can be understood as fragmented and so tiny that it can be invisible for us to comprehend, or it may be interpreted as enormous in its size and growing bigger every minute of every day. This is the virtual world of digital online games.

In this space, when entered into, users have no other choice than to provide data on every single action they carry out in this space, be it any move, any click of a mouse or keyboard, any idle time spent without doing anything, any place visited in the virtual world, any item used or consumed, any advertisement watched, any friend invited to that world and much more. It is also unique in another sense, as it is a place where all the battles not fought, items not bought, and places not visited are available for quantification, calculation and combination with other data. Furthermore, this digital world may be tweaked in manners not possible anywhere else as, for example, all the laws of the physics in that world may be changed if so wished. This world can also be intertwined with the real world in such a way that it may link the data from some of those previously mentioned categories to the real world outside the virtual world of the game. All these data are available for those who have the expertise, resources and will to gain knowledge on and possibly the will to govern the behavior of individuals in this digital space. As will be demonstrated in the following sections, there is possibly something to be learned from this special case of digital space, i.e. the free-to-play games, in terms of governmentality in the era of big data.

3.2. The gaming industry as an illustration of paradigm changes and problematics

In recent years, we have witnessed a huge transformation in how popular culture emerges in our contemporary society: how it is produced, distributed and consumed (Bergvall-Kåreborn & Howcroft, 2014); how certain popular cultural items have been transferred from material products into their current digital form (Nieborg & Poell, 2018); how traditional major publishers of newspapers, music and games have lost their position as a singular point of market entry to those new major players who provide digital distribution platforms (Nieborg, Young, & Joseph, 2020; Nieborg, 2016), making them new gatekeepers, i.e. governors, of these digital markets; and how consumers of popular culture have become the producers of behavioral big data for multiple sorts of calculative regimes of our time (Hamari & Järvinen, 2011; Sifa, Bauckhage, & Drachen, 2014). This section will look into the domain of gaming.

Gaming is no longer a marginal phenomenon or a pastime just for boys. Especially with regard to mobile gaming, it seems to be women who play most, at least in the UK and US markets (Dickson, 2018). It is one of the most popular ways for people to spend their free time (Murdock, 2017). In 2015 and 2016, there were over two and a half billion monthly active users of mobile games (Clement, 2021). Games ranked second behind social media activity in terms of time spent on devices, generating over one billion hours spent by consumers each month playing games (Murdock, 2017). Mobile gaming is also relatively big business already, generating more than USD 40 billion in revenue in 2016 (Rutnik, 2017). Digital distribution is beginning to be larger than physical sales in the games industry (Orland, 2017). A new generation of consumers is downloading music and games onto their mobile devices to an increasing extent for "free" (Davidovici-Nora, 2014). The concept of free is no longer a bizarre phenomenon in these industry sectors (Drachen, Lundquist, Kung, Rao, Klabjan, Sifa, & Runge, 2016; Marchand & Hennig-Thurau, 2013; Rayna & Striukova, 2014). The free-to-play revenue model has increased its significance in the gaming industry (Alha, Koskinen, Paavilainen, Hamari, & Kinnunen, 2014).

Along with the rise of the internet, mobile technology, e-commerce and the big data phenomenon, there seems to have been a major shift in the business ideology of the video game industry, which could be partly described more generally as a mobile application

---

[6] As an exception see Chapman et al. (2021), who have recently touched on the gamification as a control method in app industry.

industry ideology (Nieborg, 2016). The traditional game industry, where a small number of big industrial actors marketed premium priced Triple-A[7] videogames toward quite a restricted sector of the total population, mainly young males, has been described as a "few to few" business paradigm (Rayna & Striukova, 2014). "Many to many" seems to better describe the current ideology, especially in the free-to-play gaming sector (Rayna & Striukova, 2014) as multiple small and large development organizations are serving a much wider audience. Similarly, the revenue generation logic has changed from premium to "freemium" and free-to-play. Premium refers to the traditional model where the consumer needs to buy the product upfront to be able play, whereas freemium is a model where the consumer may start using the service up to a certain point before a monetary transaction needs to be made (Nieborg, 2016). The free-to-play model differs from the freemium model, as the consumer may download and play the game without any monetary transaction and use the service for free for the whole life of the product if they so wish (Hamari & Järvinen, 2011). These changes in the industrial ideology paradigms and revenue generation logics are used to guide the analysis of what role the calculating practices of accounting may play on how free-to-play games are conducted and therefore consumed in everyday life. Developers choosing the free-to-play strategy are influenced by different requirements for development and monetizing ideologies compared to traditional models. It would be difficult or even impossible to imagine a free-to-play development model without the availability of big data technologies. Without the continuous deep-level data on how existing or potential users find, use or behave with the unfinished and ever developing game (see e.g. Lassila et al., 2019), it would not be possible to compete in these dynamic markets.

User acquisition, retention and monetization metrics are said to be the three central analytics-related metrics in games (Viljanen, Airola, Heikkonen, & Pahikkala, 2018). The existing literature describes the close relationship between good customer retention and monetization (Koskenvoima & Mäntymäki, 2015). Retention metrics are thought to reflect player enjoyment, and better retention simply means that players are engaged with the game for longer and, as the revenue generation depends on usage, increased product use provides increased possibilities for monetization (Viljanen et al., 2018). Good customer retention therefore indicates that users are willing to repeatedly return and spend time in the game environment. Thus, game design is aimed to be good enough to encourage users to install and spend their time playing the game. However, a study made by Hamari, Hanner, and Koivisto (2020) indicates that enjoyment of the game may also reduce the willingness to buy virtual goods. This means that games, which can be played without any monetary transaction and which would provide enough enjoyment for the user, would not be optimal in terms of monetization and profitability for the company, and therefore would not be desired by the developers who aim for long-term success in the gaming business.

With regards to data-driven development, Viljanen et al. (2018) mention that "[w]ith increasing availability of data, researchers and industry alike are motivated to gain insight into the data through game analytics." The technological development in information technology has enabled new types of research opportunity to study this domain. Game User Research (GUR) provides one such example (El-Nasr, Drachen, & Canossa, 2013). Due to the digital platform, the scale of the empirical data can sometimes be vast, such as in the study by Sifa et al. (2014), who presented a large-scale analysis of the temporal patterns in player behavior from a data set covering over 3,000 digital games with more than 6 million players combining over 5 billion hours of playing time. This type of academic research, they say, "informs about the nature of human-game interaction." (Sifa et al., 2014). Different types of insight related to player behavior and models for calculating purposes have been reported in this academic field of enquiry. However, conclusions have also been drawn on the difficulty of explaining why these different types of human game interaction occur, even if reliable temporal behavioral patterns could be found from the massive telemetry data sets (Sifa et al., 2014).

The time spent on games can also have some societal influences, as we can see from the latest proposal of the World Health Organization (WHO), which has recognized the online gaming phenomenon and has included "gaming disorder" in its list of mental health conditions in the 11th Revision of the International Classification of Diseases (ICD-11). By enhancing the engagement of games and the fun experienced by balancing the game design, developers may try to influence the different types of player, and thus the frequency and playing by these players (Seufert, 2013). The player's perception of the game is said to be one of the determinants explaining much of the engagement level, thus the design of the game and the adjustments made to it influence these perceptions (Altimira et al., 2017).

The prior literature on gaming has concluded that games must be entertaining and fun for the users to continue playing, and have to remain so over time (Merikivi, Tuunainen, & Nguyen, 2017). Hamari and Järvinen (2011) examined game mechanics that were especially created for building customer relationship and therefore included economic dimension for game design, combining "conventions from game and business domains". This so-called "convention" between games and business through game mechanics is an important example and one of the focal points of this research[8]. This is because this research is about the calculative practices of accounting, which are perhaps not always so obvious in domains outside accounting. They may still be part of programs of government, such as customer relationship for example, and can be operationalized by utilizing big data technologies. However, the customer relationship is the commonly used language of the experts used in the field of game development. Hamari and Järvinen (2011) categorized customer relationship areas of interest into acquisition, retention and monetization, according to the customer relationship and business model literature. Using the governmentality framework, these three categories could be viewed as the problems of the game developers: the problem of acquiring users, the problem of retaining them and the problem of turning users into revenue-generating consumers.

---

[7] Triple-A games refer to the games developed by major game publishers who normally make large investments in time and money for the development of high-quality games.

[8] The way that the development of game mechanics is intertwined with the big data technologies, see Lassila et al. (2019). This 'convention' relates also to the user control illustrated by Chapman et al. (2021).

4. Research methodology

This study is an explorative qualitative field study, the primary data of which were collected through semi-structured interviews conducted with respondents from the free-to-play game industry sector. The interview data consist of 35 interviews, 25 of which are from game development professionals working for five different game development organizations and at several different organizational levels and functions, from executive to the operational level of game designer, and ten interviews with game users. In this way, the interviews should provide an illustration of the practices around and reasons for the use of game analytics in game development, but also provide some demonstration of the user perspective. The interviews were conducted in Finland and in Germany between January 2015 and April 2021. Appendix 1 presents a table of the interviews. They were recorded and transcribed verbatim for analysis purposes. The language of the interviews was either Finnish or English, depending on the mother tongue of the interviewee. In total, over 40 h of interview data were collected. Secondary data consist of publicly available data on the industry, observations and discussions with game users and game development professionals during company visits, several gaming-related workshops and one game conference, which provided the industry specifics beyond the professional informants' organizations. Some company-specific confidential figures and data were also presented during the visits as examples of the topics discussed.

To guarantee the anonymity of all interviewees, this study will not identify specific professionals by their real working titles. Instead, titles such as Executive, Finance Manager, Business Manager, Analytics Expert, Analytics Manager, Game Developer and Game Lead are used to describe the function and types of work in which the interviewees were involved. Additionally, a number after each title is added to differentiate the interviewees with similar functions and types of work. The real titles of these professionals were many: artist, game developer, game lead, executive producer, CEO, finance director, business controller, project portfolio manager, head of analytics and data scientist, to name but a few. The users are anonymized as User 1, User 2 and so on.

The questions for game development professionals were different from those for game users. The questions for the professionals related to working practices around game analytics and metrics. Several questions were prepared for the interviews, the order of which was followed in a flexible manner, depending on the progression of each interview. In the analysis of the data, open and selective coding was used (Neuman, 2007). Core themes were identified from the interview transcripts following abductive logic by going back and forth between the data and the literature, where the empirical data continuously redirected the theoretical view and vice versa (Järvenpää, 2007). After the most important themes were identified by open coding, second-stage coding was performed for further analysis of those themes. Throughout the process, a flexible approach was adopted in both the analysis and gathering of data, so that the author could be open to any potential surprises (Burgess, 1991). Drawing on governmentality framework (Miller & Rose, 1990; Rose & Miller, 1992) seemed to provide a fruitful lens for further analysis of the data. Ultimately, the series of abductive reasoning resulted in the patterns described in the following sections.

Gaming organizations comprise different functions, which will be addressed throughout the paper: product development teams focusing on game design, game mechanics and development; business and marketing functions responsible for the business and marketing aspects of the games and the whole organization; and the analytics function focusing on the analytics and business intelligence aspects, providing data analysis support for the rest of the organization. The game design refers to the designing of the individual game and the gameplay itself, its graphical design, its rules and mechanics and its storyline. In a product development team, there can be several designers responsible for different areas of game design. The user refers to any individual who potentially might become an active player of the game or who is already an acquired player acting with the game.

There is no exhaustive list of metrics used for monetization purposes, but it is important to highlight some of those commonly used monetization metrics in free-to-play game development. The abbreviations and definitions of different game analytics and metrics may also vary, depending on the information source, as there are no commonly accepted definitions for game analytics metrics. Here are some very common metrics, which will be referred to in following sections: average revenue per user (ARPU), average revenue per paying user (ARPPU), average revenue per daily active user (ARPDAU), customer lifetime value (LTV), cost per install (CPI) and user acquisition cost (UAC). The conversion rate metric, which does not come straight from financial transaction but which relates to the monetization, is also worth mentioning. The conversion rate measures the percentage of all users who convert into paying users. The ARPU is simply a lagging measure that provides the indication of the possible revenue generated by each game install or user. Similarly, instead of a total user average, ARPPU indicates the average revenue of each user who has made any in-app[9] purchase in the game. The ARPDAU is a metric that indicates the amount of revenue generated by users on any given day. The LTV metric indicates the amount of revenue an average user is expected to generate over a whole lifetime of playing (between the first install and the end of playing), and therefore it is normally predicted using the knowledge of average lifetime of users based on the current retention rate and the previous knowledge of the estimated user lifetime. The CPI metric refers to the cost of any new install through paid advertisement. The UAC is similar to the CPI measure, but it should include all costs related to the new user acquisition. However, sometimes these are used synonymously.

5. It's a numbers game, free-to-play and the problem of free

The act of government is inherently a problematizing activity (Miller & Rose, 1990). Before an intervention can occur, there must be a problem that needs to be solved (Miller & Rose, 1990). Traditionally, before the age of free-to-play or games as a service, the

---

[9] In-app purchase refers to purchases of virtual items made in-game environment.

emphasis by the major game publishers was on the games' marketability for retail sales and customer acquisition, i.e. games needed to be attractive to the potential buyers for them to make a purchase, after which these customers had been acquired and no additional revenue was expected to be received from them by that individual game (Hamari & Järvinen, 2011). In the free-to-play model, the revenue logic differs fundamentally from the previous model: the requirement for revenue generation is the continuous use and consumption of the game, i.e., its long-term engagement properties and its value propositions for in-app purchases and advertisement consumption (Hamari & Järvinen, 2011). In the world of the traditional model, a problem for the developers was attracting major publishers with high-quality, marketable products. In the free-to-play model, the developers' problem is to attract masses of users with long-term engagement and still monetize a free product.

One of the problems that free-to-play game developers face is how to get people to find and download their games from those multiple options available. It is common nowadays that people have their phones and tablets full of different types of app and service, which are more often than not downloaded for free from various app stores. This is also the case with games. Games are downloaded for playing purposes. However, if they do not fulfill the expectations of users very quickly, they will be deleted straightaway or become one of those idle icons on the screens of cellphones and tablets. The number of existing applications and services in digital stores is huge, and new ones are constantly being developed. During the first quarter of 2019, there were almost 2 million apps available in the Apple App Store and over 2 million in the Google Play Store (Statista, 2019a). Over 24% of the apps in the Apple App Store were games, comprising the largest category of apps (Statista, 2019b). Therefore, the problem of user acquisition becomes an issue.

Another related problem, but this time closely related to economically ambitious organizations, is that with free pricing, only a small proportion of acquired users convert into paying users, and often they do not buy immediately.

> "… few players of free-to-play games buy any in-app during the first days. Instead, they play it more and then get hooked, and if they like it then they might make a purchase later." (Business Director 1)

This has also been highlighted by the research on gaming that suggests around 95 percent of free-to-play consumers will never make any monetary transactions (Rayna & Striukova, 2014), and thus will never become paying customers. While game developers generally design games to entertain or provide fun experiences for gamers, in the free-to-play revenue model, games are also designed to persuade players to spend some money or to monetize by some other means (Alha et al., 2014). The literature on gaming has therefore proposed that the marketing and business logic should be merged somehow with the game design (Hamari & Järvinen, 2011) to improve the problems of long-term engagement and monetization. Monetizing with the free-to-play revenue model is based on different streams of revenue, such as micro-transactions from in-app purchases, i.e., selling virtual items inside the game environment, or revenue streams from in-game advertisement (Koskenvoima & Mäntymäki, 2015). There exists a plethora of game development-related research on the ways to balance the game design features to facilitate an engaging experience for players of different skills (see for example Altimira et al., 2017; Bateman, Mandryk, Stach, & Gutwin, 2011; Cechanowicz, Gutwin, Bateman, Mandryk, & Stavness, 2014).

Therefore, the proposition is that the product should intrigue enough people for it to generate some profit. And as people seldom buy anything at the beginning, they should be retained long enough for them to convert into paying users or to generate revenue by some other means.

User acquisition together with user engagement becomes an issue for the developers, not only due to the small proportion of paying users, but also because of "user churn". User churn refers to the phenomenon of acquired users leaving the service permanently. When, for example, a user uninstalls a game from their device, it can be interpreted as a permanent abandonment of the partnership with the game provider. User churn is therefore seen as a problem for the game developers. Because the product is free, people do not have too many reasons to keep playing if they do not find the game appealing enough in some way or another. The switching costs are very low.

> "The inflow of new users is the thing by which games either live or die. How to continuously acquire new users is a problem for all game developers, even if there were plenty of existing ones. If the DAU (amount of daily active users) was high, say several million users, you'd still continuously need new users because of user churn. In free-to-play products, there are no pennies involved for those players who have never paid anything for it, and therefore stopping playing can be very easy for them […] it happens all the time and we have to fight against it […] it has to be continually compensated for by acquiring new users." (Analytics Expert 2)

These are some of the major problems faced by the free-to-play gaming industry, from the perspective of game developers. Hence, experts such as academic researchers, gaming industry consultants and the free-to-play game developers themselves have introduced many different initiatives to address these issues, which should eventually lead to a free but profit-generating game. Such a game would represent a service that aims to generate viable business for the developers in the name of neoliberal individualistic free citizenship. Developers would rely on the judgement of individual users by providing the option of a possibly fun experience and enjoyment for the users, who would then make individual decisions related to playing or not playing, watching or not watching advertisements, and converting or not converting into paying users. Therefore, the introduction of the program of the profitable "free game" begins.

6. The program of a "profitable free game"

Those problems identified above may be optimistically administered better by the programs of government, through which these knowable objects can be made amenable to intervention and regulation (Miller & Rose, 1990). The program for developing a "profitable free game" requires the game design to be understood as a combination of creative and financial ambitions. On the one hand, the game should be a creative and intriguing product or service, which should stand out from other products or services by its

attractive proposition for providing a fun, enjoyable and engaging experience for the user through its clever game mechanics and game design. On the other hand, it should also have clever monetizing mechanisms to generate revenue and profits for further development opportunities, in such a way that these monetization mechanisms will not jeopardize the first goal.

> "Our aim (in game design development) has been that just by playing you can achieve anything there is in the game. You don't have to spend any money." (Company Executive 1)

However, if many people download the game and play it frequently and are thus willing to spend their time playing it, it might generate revenue, for example through advertisement income, and would thus become a monetizing free game. Therefore, a monetizing free game should be able to address issues related to user acquisition, user engagement and monetization aspects.

> "We didn't make it to enhance our revenue…the central idea was that we wanted to develop the game so that the players like it even more and stay in that game, and monetization follows from there." (Finance Director 1)

The "profitable free game" seemed to be an idealized concept of a game, in which people are willing to invest their time and perhaps eventually money, due to the fact that the game is fun to play.

These notions of user acquisition, user engagement and monetization are the three pillars upon which the idea of a monetizing free game is built. They were all attributed with different values as to what was meant by good user acquisition, good user engagement or good monetization. Still, they could serve as understandable concepts, which could be used as a platform to understand the possible areas of interventions.

Disciplinary power is dependent on the aggregated knowledge of individuals for creating knowledge among the wider population. Through this knowledge, programs of government can then be developed, which may be used to target certain individuals from identified distinct groups of people (Miller & Rose, 1990). Language "serves as a translation mechanism between the general and the particular" (Miller & Rose, 1990, p. 6).

6.1. User acquisition as a discourse, a "technique of thought"

To be able to talk and act on the issues related to user acquisition, a common language and understanding about what it means, in this specific environment, needed to be brought into existence (Miller & Rose, 1990). The first thing to be considered is: What is an acquired user? In this context, an acquired user relates to the number of game installs made through digital stores, which are the distribution channels for the game. Therefore, when a new install is made onto a person's device, they are considered an acquired user. There are mainly two ways to acquire users: an organic approach or a paid user acquisition. The paid user acquisition means that new users are acquired through different advertisement channels, which have a price tag for each install. This is expressed as a cost per install principle.

> "First of all, can we afford to advertise ourselves? Those prices are quite high. We pay based on the cost-per-install principle. And after this whole funnel… (it's) considered whether we'll get that user. Then, how much an average user who comes through this channel is worth to us, and therefore the lifetime value, is one of our most important indicators. […] can we make profitable user acquisition." (Analytics Expert 2)

In the development, the knowledge generated by the experts of free-to-play gaming highlighted issues to be considered such as average user ratings and visibility at the top of the lists of the distributor channels like Apple App Store and Google Play, especially in terms of organic user acquisition.

Organic user acquisition refers to a new user acquisition method where new installs do not come through the paid advertisement channels but through other marketing efforts. Press coverage optimization, search engine optimization and application store optimizations can be used as examples of such efforts. Experts also point out how, for example, the top grossing games on the Google Play Store are guaranteed visibility as they are at the top of the list. The page can of course be scrolled through, but those games that are at the top will get most visibility. Other game quality-related expert knowledge is the simplistic view of average user ratings, which is visible for all the games on this list. It represents one normalizing technique for free-to-play games.

> "Average rating is actually quite important to us, and something we value. Because it has an impact on organic downloads, which we're looking for. It also has quite a big impact on these Store algorithms. How quickly it rises on the ranking lists. It's one of the multipliers there. This is similar to the uninstall ratio. This means how many of those who've downloaded the game delete it practically immediately. […] we have to get the game to the top of the list so that it will get the organic lift. It's kind of our featuring place. […] as we make use of organic, it's damn important that it (average customer rating) is at least four point something." (Business Director 1)

More detailed information on the average user rating is visible on the game info page. A user can get to the info page by tapping an icon on the top list.

The options presented in the top lists can be understood as "the market", circumscribed and framed, from which the individual users are expected to find the optimal, or at least rational, choice in a regulated manner. This form of panoptic visibility brings out immediate visibility for individual decision-makers of what is preferred in an efficient manner. Those games that get the visibility at the top of the lists will get more visibility among potential users, and therefore those individuals who generate the algorithms for ranking games on these lists possess power over those others who may become "merely entries on the chart" (Rose & Miller, 1992, p. 200). Those deciding the mechanisms and algorithms for rankings become the powerful actors in this network, as these app store top lists are increasing the platform owners' possibilities for governing the markets by establishing new relations and means of calculating (Rose & Miller, 1992, p. 200).

From the game developer's perspective, these platforms represent the obligatory passage points for the games markets due to their dominating positions on different technological platforms. Platform owners, therefore, hold great power not only over the developers, but also over the users searching for entertainment for their "spare" time. As economic actors, these platform owners are driven by financial interests, and the algorithmic mechanisms for governing are therefore driven by the financial calculations and market mechanisms. The best monetizing games, in terms of platform owners, will get the top positions and achieve the best visibility.

The issue of organic versus paid user acquisition was something that generated some mixed feelings among interviewees. Paid user acquisition brought about issues of inequality between smaller and bigger industry actors. This was explained by the fact that the market price for an install was very volatile due to the dynamics and the quality of the markets. Big industrial actors, who had very lucrative cash flows, could easily out-buy smaller actors by bidding at higher prices for certain markets and advertisement channels. Smaller developers would then need to resign themselves to looking for some other less expensive but possibly not so profitable markets and acquisition channels. Here the financial calculations were seen as very important, but also very complex and sometimes difficult to do in practice, as they required quite complicated predictive calculations about user values. One of the examples was the calculation of the Lifetime Value of a user.

> "One is the LTV prediction. I don't even know on a detailed level how those models work as they become so mathematical. But those data scientists are the ones who run them. They try to predict when new players will start playing the game, during those first days and weeks they can make pretty accurate predictions into the future about what those users' LTVs will be." (Finance Director 1)

The lifetime value calculation is a well-known method for calculating past or future customer value. To be able to calculate the difference between the user lifetime value and the cost per install was thus important information for developers to understand their capabilities in user acquisition. The concept of a user acquisition funnel became one of the means to understand better what happened in user acquisition before the user was actually acquired. The user acquisition funnel expresses the flow of potential new users through the different steps they have to take before the game installation occurs.

The possibility of creating knowledge and therefore the notion of a user acquisition funnel were making an object, the user, knowable in a certain conceptual sense and thus amenable to intervention in different steps in this funnel. The user is an object going through the funnel, which, if necessary, needs to be adjusted at different steps, so that as many users as possible can pass through the funnel. Therefore, the language serving as intellectual technology, together with knowledge, rendered aspects of existence amenable to intervention (Miller & Rose, 1990).

6.2. Engagement: To play or not to play

Similarly, as in the case of user acquisition, user engagement needs a common language and understanding about what it means as an intelligible field that can be optimistically administered (Miller & Rose, 1990). User retention is said to be one of the most important factors for understanding whether a game is engaging and if it has the potential for further development. User retention in free-to-play gaming expresses the phenomena that a certain user activates the game again, usually in the sequence of days, after the initial installation day. It is commonly measured in temporal frequencies such as day 1, day 3, day 7, day 14, day 30 and so forth. Thus, the figures can be calculated, for example, for day 1 retention rate, day 7 retention rate, etc. The user retention rate is said to indicate the overall level of the engagement of the game and reflects in certain ways such attributes as fun, enjoyment and the attractiveness of the game. If people are willing to return to and spend their time playing a certain game, this will indicate that the game is well designed for that purpose. This is because there are several other activities that an individual could choose from, but still they decided to return to this specific game. Therefore, it should be a clear indication that this specific activity was perceived to be better than some other options available.

> "The common thinking is that those games are for our players, as any other hobby is for others. They might spend quite a lot of time on it and sometimes even some money. But it's like… some people go fishing and others might collect wine or paintings or other things. So, others might spend a lot of time and money gaming." (Finance Director 1)

A similar type of thinking was related to the time spent gaming. If people were willing to spend their time playing a certain game, then it would indicate that that specific game was perceived as good and worth spending time on. Therefore, the time spent playing could also be understood as an indicator for an engaging game.

> "… we follow our gut feeling when we're developing a game. […] And then we can of course validate it, as retention provides us with an understanding of whether people enjoy that game. And I'd also say that ARPDAU (average revenue per daily active user) partially tells us that… people aren't foolish. They won't spend money on things they don't like. So, in a sense they both measure it, at least some aspects about the "goodness" of the game, if people are willing to spend their time and are willing to spend money on it." (Product Lead 1)

A multitude of gaming industry-related books and studies exist that seek to provide expert analysis methods, tools and theories for game development purposes related to user behavior and engagement factors, together with the long-term success of the games (see for example Bauckhage et al., 2012; El-Nasr et al., 2013). These studies may be understood as representing "truth claims" about the user behavior and engagement domain that are to be governed, by which the government of a user population may then become possible. As Miller and Rose (1990) explain in terms of the economy, "Before one can seek to manage a domain such as an economy, it is first necessary to conceptualize a set of processes and relations as an economy which is amenable to management." (Miller & Rose, 1990, p. 6). The language of user engagement as a specific domain will have "its own characteristics, laws and processes that could be spoken

about and about which knowledge could be gained" (Miller & Rose, 1990, p. 6). Therefore, the governing and managing of the engagement becomes possible, as is the case with the monetization that follows.

6.3. From free to monetization

In addition to user acquisition and user engagement, there is a third area of interest that needs to be taken care of by developers to generate a viable business from game development, and that is monetization. It is the last missing area of interest in the program of the profitable "free game". This sub-program is morally justified by the discourse on the requirement for profit for continuity. If developers want to make a living by developing games, there must be some form of revenue that would cover the costs of compensation required for their efforts, thus monetizing fun and enjoyable game steps into the picture. However:

> "And then of course, one important aspect of the (game) design is that, because it's free-to-play, it really has to be as such. There can't be such things as pay walls, so that now it becomes so damn difficult that you have to buy to advance. There are plenty of those and there's been some discussion in the news media that those sorts of games are kind of cheating." (Business Director 1)

Common ways for free-to-play games to generate money include the previously mentioned micro-transactions from in-app purchases and in-game advertising.

> "…Then again, I'd say that those (game metrics) were, at that point in time (2012), quite poorly defined or even missing in the field (free-to-play gaming). I'm not sure if even today the same metrics are in use everywhere." (Analytics Expert 1)

This means that even if, for example, the lifetime value calculation is in use in two different game development organizations, it might be calculated differently in each of them. Third-party solutions for calculating certain metrics may also differ by their inner algorithms, and therefore any reported game metric should be approached with caution. Still, the common understanding about the goal of monetizing creative development may provide the means to normalize, instrumentalize or transform the abstract concept of the profitable "free game" into a more actionable form. However, to be able to translate those politically rational thoughts into the domain of reality, "technologies of government" are needed (Miller & Rose, 1990).

7. Calculations, analytics and metrics as technologies of government

It is through technologies that programs of government are put into operation (Miller & Rose, 1990, p. 8). Technologies comprise the different types of calculation, technique and procedure that seek to embody and give effect to governmental ambitions (Rose & Miller, 1992, p. 175).

7.1. Interventions in user acquisition

Technologies of government establish new spaces and devices, which should make it possible to act on those entities they stand for (Miller & Rose, 1990, p. 8). When developers are testing their latest games, or some other new game that they might want to publish through their label, the experts advise them to do a soft launch before a full global launch. This means that the game is published in a certain demarcated area such as in Canada or Singapore, which is expected to represent their main target markets, such as the USA, Europe or Asia, for example. During the soft launch, and with the help of expert technologies, developers have several different options for generating knowledge on user behavior from different steps in the funnel and from perspectives. Once this knowledge has been acquired, they can try to intervene in user acquisition, for example by cross-promoting this new game through their existing games. Therefore, if necessary, the game can get some additional visibility among their existing users.

> "…if it looks like it won't get enough users otherwise, then we start driving some traffic there through cross-promotions, so that we can get enough users there." (Publishing Executive 1)

For the soft launch, not only does the game have to be working properly, but so do other things related to its front and back ends, such as games marketing materials, algorithms for necessary data collection and game servers for running the software.

> "Then, the next step is that story page where the game that we're about to publish is located. In there, perhaps the most important things are those six pictures of the game. People don't read the text below them, but that text influences the search engines." (Publishing Executive 1)

The pictures, despite being still pictures of the game action, are seen as an important part of the user acquisition funnel, as they might either induce potential users to get to the next step in the acquisition funnel, or they might hinder the flow. Even the text below the pictures was seen as important, as it influenced the algorithms of search engines. When people used search engines to try to find certain types of game, these simple texts written on the game info pages in app stores were part of the search process.

The idea behind the soft launch was to test the game, not only for its possible bugs and defects that would have to be fixed before the global launch, but also because developers wanted to see several game-specific and marketing-related performance metrics that would indicate the game's potential in terms of user acquisition, engagement and monetization. Specifically for user acquisition, metrics such as the click-through rate and conversion rate provide an indication of how attractive the new game is for their existing players. The click-through rate indicates the number of users clicking the promoted banner in some other game. The user acquisition-related conversion rate indicates the percentage of users who will eventually install the promoted game related to the banner they have either seen in the game or which they have clicked.

> "… there's a game that hasn't been launched yet, but has been soft-launched. We take the banner from that and put a certain amount of it into our games in some slots. And then we check the conversion route and see how well game X (one of their existing hit games which is already on the market) users are clicking that banner. Then we look at how well they install that game via that route." (Publishing Executive 1)

Because of the digital platform, developers were able to develop, i.e. tweak and change, these specific features related to games marketing efforts. The development was possible not only during the soft launch, but also later on after the global launch.

> "The person who owns the game, like the Lead Designer or those developers who're working on it, are always really interested in how their work is being welcomed and how it could be improved…" (Business Director 1)

Those previously mentioned metrics together with other more game-specific metrics were the channel for different types of professional to see how well they had succeeded with the initial innovation, but more importantly what could be done better in the name of the profitable "free game". Developers are also interested in the opinion of lay experts, i.e. the users' own experiences and opinions of the product. According to the experts, this indicates the overall success of the game design. If the average user rating is above four (with the maximum being five), this is an indication that the game's core loop, mechanics, story line, overall design, etc. has been developed well enough that users who have downloaded and tested the game are willing to express their opinion by giving it a good rating. Similarly, as in other rankings, this, then, is expected to influence other individuals who come to see these ratings (Jeacle & Carter, 2011).

> "The average customer rating. It's been said aloud many times that, for goodness sake, it has to be four or more. Otherwise it's not good." (Business Director 1)

The average user rating can be understood as a mechanism that enables the relationship to be established between a good and a bad game, while rendering public opinion into thought as a calculable entity (Rose & Miller, 1992). Therefore, the average user rating may become a calculating locale, providing power for both users and developers. This may happen as "[t]he accumulation of inscriptions in certain locales, certain persons or groups makes them powerful in the sense that it confers upon them the capacity to engage in certain calculations and to lay a claim to legitimacy for their plans and strategies because they are, in a real sense, *in the know* about that which they seek to govern." (Rose & Miller, 1992, p. 185–186)

However, this average user rating could not be used independently by developers to pinpoint certain features or issues in the game design, which might need to be improved or fixed, but it provided the means to open up a conversation about the healthiness of the acquisition part of the profitable "free game", after which more detailed investigation could be initiated about the possible reasons behind the figure. It is also seen as an important metric because, as previously mentioned, this figure influences the algorithms of top-ranking lists of games in the application stores. This figure thus has an impact on the game's visibility to a larger audience through the top lists. After the user is acquired, to keep them engaged becomes the main objective for the developers. Thus, engagement as a discursive space gains the focus of the negotiations among the developers.

7.2. Enhancing user engagement

The moral justifications of governmental programs can be achieved by translating the observable behavior of individuals into a measurable form and measuring them against standards and norms generated by morally justified programs aiming to serve all, thus generating the governable person (Miller & O'Leary, 1987, p. 261). Different types of tweak and change made to the game mechanics or design, in terms of its content, are supposed to drive the engagement properties of the game. Different types of game-related aspects are normalized with the help of the big data technologies, which then become objects of administration. Any actions made to the game mechanics or the game design more generally can then be verified by following certain high-level metrics such as the retention rate, or more detailed game-specific metrics and graphs, which are related to users' progress inside the game environment. For example, the higher the retention rate, or the further the user progresses inside the game's virtual environment, the better the game's engagement is.

Of course, the retention rate figure, as it is a very high-level metric, is not able to pinpoint any specific reason inside the game design. However, it does indicate whether the users are willing to keep playing the game for longer and keep coming back to the game day after day, and therefore it is thought to indicate the overall enjoyment of the game. The drivers of retention rate can be found in the details of the game design – such as whether there is enough content in a game so that users have enough different options and things to do inside the game world. The level of difficulty of the game is also one of the factors that is said to drive the retention rate figure. As an example, the game designers might have assumed that a certain game level is designed to be challenging enough to keep players motivated to master the game at a high enough level to continue playing. However, if the metrics indicate something else, then the figure coming from the metrics may be trusted over the designer's professional knowledge, and the game design could be changed accordingly. These metrics may thus function as "'self-steering' mechanisms of individuals" (Miller & Rose, 1990, p. 18) and can therefore be related to calculating "mechanisms through which authorities of various sorts have sought to shape, normalize and instrumentalize the conduct, thought, decisions and aspirations of others in order to achieve the objectives they consider desirable." (Miller & Rose, 1990, p. 8).

If the level of difficulty of a certain game level is not optimally balanced, it can be too challenging for players and therefore they might stop playing and perhaps never come back to play it again. Similarly, if the level design is too easy, then players might see the game as too simple and would stop playing because they become bored too easily. In both cases, there would be more user churn compared to more optimally balanced difficultness, when players would have enough – but not too much – challenge to motivate them to continue playing. Therefore, the designers are trying to anticipate the players' average level of competence at different stages of the game. However, it can be difficult or even impossible to predict this for certain a priori, and therefore big data technology becomes

handy as efforts are made to balance the game according to the figures coming from the actual behavior of millions of users.

To intervene in user engagement requires continuous monitoring of users' behavior from several different perspectives. The previous knowledge of the designers related to what types of things might work guides the creation and development of new updates. But the user feedback through different types of user behavior-related figures could then either verify or refute these assumptions.

> "If we notice, for example, that there's a mine in the wrong place at level ten and it causes deaths per level, let's say there are 40 deaths per 2 million players at that level, meaning that on average they need to start that level from the beginning 40 times before they can pass it. This is too much. And some might even try more than 100 times. Then we need to start thinking OK, the biggest reason for these deaths is a mine. Then we know that OK, we should dig deeper to see which mine it is that they're most probably hitting at this level and then we take it away." (Product Lead 3)

In addition to the game mechanics-related issues, the developers were also using marketing knowledge to improve user engagement. For example, specific occasional campaigns or events such as happy hours, when players are offered extra points if they are active during these events, can serve as an example of the types of marketing-related mechanism that are introduced to get people playing in quieter periods of the week or day. By looking into user metrics, developers are able to pinpoint certain days or hours during which users are less active, and therefore they may try to intervene and thus induce users to be active by promoting certain events at these times.

Instead of the initial intentions of the designers, these events sometimes have surprising elements, as they also might induce people to play more before these events as they are building up their inventories for certain game items or features to be used in those events. Sometimes, players also buy additional items during these campaigns, using all their inventories to try to reach the event-specific high scores or rankings.

7.3. Monetization by time

In line with the gaming industry-related literature (see for example El-Nasr et al., 2013; Seufert, 2013), interviewees explained how they used several monetization metrics. Several different types of calculation method for monetization were available, which seek to help developers understand the financial aspects of the industry. These metrics are there to provide higher-level performance metrics, which are not used as a means for some detailed game mechanics development per se. Rather, they indicate the success of a game in terms of its commercial potential and, thus, the future potential for further development.

All of the monetization metrics are intrinsically related, at least to some extent, to the financial transaction and are not therefore the main focus of game mechanics development, which is said to aim mainly for fun and an enjoyable game experience. However, the monetization metrics are among the core elements of the development of the profitable "free game" and thus they are part of the overall program of all developers. These types of metric are higher-level indicators of the healthiness of the whole program, and are thus less actionable in the game development teams than, for example, in the marketing departments and their investment decision practices. For example, cost per install or user acquisition cost metrics might be improved by choosing the right channels for user acquisition. Therefore, different monetization metrics were still important indicators for the developers in terms of the whole program, as they can verify the financial success of decisions made related to the gaming experience.

The decisions related to a game's level of difficulty, for example, could sometimes have drastic implications in terms of monetization metrics. This is especially true if the game has recently been launched or the game is being developed with a less previously known game concept for the development team themselves, as it is hard to predict how users will respond to the new design. Even the existing live games could be analyzed in terms of level of difficulty and changed accordingly, aiming to improve monetization.

> "We focused on level design based on analytics. […] The results were quite clear when I took out the graphs. I could then guide the level designers so that, from this level onwards, players were able to progress until this specific level. These previous levels have to be easy. And then from this level onwards you can make it more difficult […] This could double the game's profits." (Game Developer 1)

The availability of behavioral data on players' progress within the game enabled the generation of association between the difficulty of level design and the monetization parameters. If users continued playing instead of stopping due to getting frustrated by the level of difficulty, the opportunity to monetize players increased.

The possibility of interacting with players about their continuous progress was one possible way of trying to influence player behavior. For example, if a game did not have a table for top player scores, developers could add this type of real-time table and make it visible for players to continuously compare their own scores with others. If the existing game already had a top player score list, which showed the best player statistics on a global or country level, then developers could introduce more local-level top score lists to boost the number of players getting visibility on those lists. This of course required combining location information from the physical world with the game. In this way, the developers could try to influence different individual psychological drivers such as the competitiveness, self-esteem or vanity of players. This, in turn, when achieved, increased the potential for monetizing players. For example, increased motivation to reach to the top list could mean more time spent playing, which meant more advertising possibilities. In addition, high motivation to get and stay at the top rankings could lead users to play a bit more frequently or to make in-app purchases to boost the game's progress. These types of top list could even be the sole reason for playing for some players, and therefore could prevent these users from quitting the game completely.

"…as we had that town- (physical world location) level data available, we started to bring it in. Be the best in your own town. We were able to improve the competitiveness level. Instead of players trying to be top players in the world, as there are so many of them, most of the players will never get into any of those lists. […] players liked that very much." (Publishing Manager 1)

Making the game more engaging means more time spent playing, which can then provide opportunities for more advertising income, but it also increases the possibility for users to make in-app purchases. Therefore, more time spent playing increases monetization opportunities.

"In fact, retention is more important to us. If players stay, then the likelihood is greater that at some point they might use money. There's a high risk of starting to optimize the monetization. It might shoot a hole into the retention immediately, if people get the feeling that they're being cashed in. […] if the game is well balanced, we might make some small adjustments…" (Finance Director 1)

In a sense, users were expected to be rational in terms of time and money, because they were expected to think about the monetary value of time. Even if users could get everything that the game had to offer without any payment or monetary transaction, just by grinding through the game and slowly collecting and gathering enough resources to get what they needed in the game world, they could also choose to buy immediately, with real money, enough resources to get to that objective. Without a real money purchase, it would just take more time and effort to get there.

"You can be an expert player if you just spend your time playing…but if you spend money, you can advance faster. In a way, you can buy time with money." (Product Lead 1)

Users are thus given the free choice of deciding the sense or the rationality of the proposed investment option. Therefore, "the language of individual freedom, personal choice and self-fulfilment" (Miller & Rose, 1990, p. 24) underpins the program of the profitable "free game".

8. Self-regulating users

"[T]he technologies which seek to operate on activities and processes produce their own difficulties, fail to function as intended, and sometimes intersect poorly with the rationalities in terms of which their role is conceived" (Miller & Rose, 1990, p. 14). If users are expected to be rational in terms of their personal finances, then the idea of a free game compared to premium game should remove a major obstacle for installing a game in the first place. On the one hand, in the field of free-to-play gaming, game users can be recognized as calculating selves who constantly make decisions related to installing or not installing some new game, between playing or not playing, and between paying or not paying. On the other hand, developers constantly try to find ways to intervene in the behavior of users in different steps along their path, by improving their game design in relation to the user acquisition, the user engagement and the monetization, so that the users' decisions become more aligned with developers' aims and interests.

Expectations are placed on individual users and their self-regulatory capacities. These rational users who can understand and calculate the monetary value of time, who may place trust on lay expertise when making decisions about which games to install on their devices or who can calculate the benefits related to the incentive schemes proposed to them, should be able to act in a predictable manner and according to the principles of existing expert knowledge. Measuring the online activity of these actual and potential users generates an indirect means by which the existing expert knowledge is tested and possibly updated.

8.1. Acquisition through self-regulation

As there are only two major distributors of mobile free-to-play games, Apple App Store and Google Play Store, they can be seen as obligatory passage points for individuals who wish to download games for their mobile devices to get through some boring moment. Individuals may search these stores randomly or simply check the top rankings by different categories, or perhaps search a game recommended by their friends. There are certain specific things, which might have some influence on individual choice, especially when looking for a game, which has not been recommended by a friend, such as the average customer rating for example. This is visualized by the star ratings of each game in the store. On average, the impact might be pretty low as those ratings are quite high for any game at least at the top of the rankings. However, if the rating for the game in question is for some reason really low, it might have an impact on the user's decision to install that specific game, especially if the number of users generating that figure is large enough.

"Yes, I check the star ratings … maybe more like, if it's two [five being the maximum], then it would mean something. […] maybe it's buggy or something else. […] I've never downloaded anything that had less than something like several thousand player reviews." (User 6)

Of course, the star ratings in general, when no manipulation by third parties is involved, are generated by the users of those games and therefore represent the subjective views of previous individual players. This measure cannot be impacted directly, at least unless it is "through the back door" by the game developers. It can only be impacted through users' subjective experience of those specific games. However, some portion of the number and quality of users who play the game and possibly provide reviews might be impacted indirectly by the developers, by cross-promoting the reviewed game in a developer's existing games for those users who fit best the profile of that specific game. Or developers could choose paid user acquisition for a certain user profile. In both these methods, developers can focus their advertisement on specific user profiles, which would most likely fit the user profile they are looking for. Therefore, the average user rating is not totally as objective a figure as it might intuitively seem to be.

Users also seem to comprehend star ratings as rough indicators of the possible quality of the game. It is not expected to be a totally

objective figure, but it can give an idea of whether the game has some really bad flaws, or if it could be regarded as a decent game to be installed. Still, by itself it is not regarded as very informative. The previous review comments from other players may be seen as a complement to the star rating.

> "There might've been some bugs or other flaws in the earlier versions of the game and therefore it might have a low star rating. That's why I focus on the comments from other players." (User 5)

These actions of checking the star ratings and the review comments are optional steps in the sequence of the game installation process, which may influence potential new users passing through the game page in an app store. These star ratings and review comments can be understood as the voice of lay experts (Jeacle & Carter, 2011) who have allied themselves with both the developers and the other users. By highlighting either the positive or negative characteristics of the game in a simple form of a star rating or in textual form in their review comments, these lay experts may translate the lived subjective experience into a form that informs both parties and may thus influence their actions.

It is not only the previous users' subjective opinions or the final result of an audit by lay experts, i.e. the star rating, which matters in this sequence toward installing. The visual graphics of the gameplay that are presented on the game's information page in an app store might also affect the final decision. This can be the first real contact with the aesthetics of the game, if the picture of the game logo is not counted as the first contact. At this point, the first more realistic visual contact is made with the gameplay and game graphics. The aesthetics seem to be a very important part of the game for some users and therefore can make a big difference in terms of the decision to continue the process toward installing that specific game.

> "Those (gameplay) pictures also matter. The game also has to be visually nice." (User 5)

It was mentioned by several users how they rated the aesthetics or visual appearance of the games very highly in terms of which games they would like to play. However, it seemed that none of these previously mentioned issues mattered too much, if some game was recommended by their friend, as that game was installed regardless of any star rating or the aesthetics of the game. Therefore, any expert knowledge of how to improve the "recommendation by a friend" option is a very powerful means for getting new installations. Once again, big data technologies and expertise may provide opportunity for developers to try to find different ways to utilize this organic channel for user acquisition. One common and simple way, which has been used a lot is the feature "recommend to a Facebook friend and receive something extra as a reward for doing that".

The top lists and the app store's search engine results represent the obligatory passage points and a centrally directed network (Rose & Miller, 1992, p. 196), where expertise is incorporated into the proposals from the economic actors. These proposals are presented to the individual users, among which these individuals are expected to find their favorites. The self-regulated users may panoptically compare the different options available to make their quick judgement about the aesthetics of the available options and choose the best fit for their current needs. The average customer star ratings and textual user comments may then provide more detailed, but still quick, information on different options in general.

8.2. Engaged self-regulating individuals

"[T]he conditional supply of financial resources is conditional upon the conviction that an alignment of interests exists, that the local authorities, […] will remain more or less faithful allies." (Rose & Miller, 1992, p. 190). User engagement measures the faithfulness of users in the free-to-play game design. The threat that the users might stop using the service and would withhold their funds or move elsewhere can be a powerful incentive for the developers to listen carefully to the concerns of their existing user base, while trying to convince these users that their concerns and the developers' concerns are mutually aligned (Rose & Miller, 1992). The more established the engagement is, the more value-generating opportunities there should be for both. As the game is free, there are no opportunities for developers to generate revenue from users without their active engagement with the product.

Most of the interviewed users had more than one free-to-play game on their devices. Some had more than two games, which they played frequently, but most of them concentrated on one or two games on a frequent basis. A couple of interviewees mentioned having more than ten games on their devices. Commonly, users played one or two free-to-play games on a daily basis and other games, on weekly or monthly basis. One game therefore seemed to be the obvious favorite, which got the most attention from users. Some also had two games that were almost evenly favored and therefore engaged with frequently.

All the interviewees also played, or seemed to have previously played, at least one free-to-play game on a daily basis. Some of the users commented on how the gaming had some seasonal variation so that at some point they might play it daily, but sometimes only on a weekly basis. It seemed to be more common that they played several times per week, or several sessions daily, and perhaps a bit more at weekends. The reasons for engaging with the game seemed to be very different.

> "Daily. Because there are those daily challenges. I don't know why. I just have to. I wouldn't even need those boosters or money (game currency), but still. […] They (two different game titles) both have the daily challenge. Because there are always ten new levels every week. And I play those ten levels during the week. Plus, there are also those side games, daily challenges and some tournaments." [User 3]

Those users who were not "playing" games every day still seemed to be interacting with their favorite game every day or nearly every day. There always seemed to be some kind of reason for interacting with the game, even for a while.

> "Every day. Because I need to collect those gems. I'm not playing every day, but I open it every day to collect those diamonds." [User 1]
>
> "Yes, every day, to keep my daily streak unbroken. […] I've played now 428 days in a row." [User 10]

The length of each session varied a lot, depending on the activities in the game. The length of one session was estimated to vary from a few minutes to hours of playing. On the one hand, if the user was not "playing" the game and was just "checking" or collecting something, which was seen as necessary for retaining some advances or extras, it would last only few minutes. On the other hand, one playing session, either on the favorite game or a combination of games, could last for hours, especially during the first months of playing some new game or at weekends or at times when there seemed to be plenty of "spare" time.

> "One attack is roughly three minutes and then you have to wait for the next troops to complete. So it's possibly around five minutes at a time. Or perhaps more like five to 15 min, because you might need to do some other things, too. Then there's a break and then after some time (during the same day) you come back and do another attack and so forth." [User 6]

The number of sessions per day also varied quite a lot between users. During the weekends, the number of sessions was commonly a bit more than on weekdays. One of the users mentioned how on Saturdays he could easily play ten sessions if there was "nothing else" to do.

Even if some of the users seemed to have the opinion that they were not playing so much, some of them were very aware of their gaming habits and mentioned that they were playing a lot and perhaps even "a bit" too much.

> "This is a puzzle game. I haven't played too much of it, but soon I'll be on level 2000 (laughing after the sentence)." [User 2]

Getting bored or tired of the game seemed to be the most common reason for quitting or uninstalling a game. Some mentioned how they had reached, figuratively speaking, the "end" of the game. This meant that they felt they had experienced everything or almost everything that the game had to offer. Even if the game did not have a real ending stage, they felt that it did not have anything else to offer them, or anything that would give them a reason to continue playing. Similarly, if the game was not able to provide new things, new experiences or new sources of interest, then the game would soon be uninstalled.

> "Those (campaigns) have increased my activity. So I play a bit more often nowadays and perhaps for a bit longer. Before them, we were thinking about quitting the game, but when those campaigns started, the amount of playing increased and quitting was forgotten. It was a kind of new excitement." [User 5]

Almost all users stated that the games they were playing were fun and enjoyable, or at least they had been fun and enjoyable at the beginning when they had installed the game for the first time, although one user mentioned that the game she was playing was specifically not fun. For her, it was one way of forcing her to focus on one certain thing and therefore forgetting other things before going to sleep. Others were willing to engage continuously with their fun game, especially when there was plenty of "spare" time or "nothing else to do" and could thus be regarded as allies with the developers' proposition for an enjoyable and engaging free game.

Individual or group progress inside the game world, and the level of achieved benefits, represents a certain type of mechanism by which individual users could measure their progress as a player of the game compared to the others who were playing that game. Losing a gained benefit or an advancement would be considered somehow a failure, and therefore users commonly tried to engage with the game frequently, at least to keep up their gained benefits. The vocabulary of "free" and the technique of frequent campaigns were much used by active players whose participation in frequent campaigns qualified them for benefits, generating a distinction between earned and unearned benefits, while teaching the lesson of the contractual obligation (Rose & Miller, 1992) of active frequent interest and player loyalty.

For developers, frequent and long-lasting engagement is a requirement, due to their economic interests, but also due to the power of the platform owners over them. Revenue generation is relative to the visibility of the game at the top of the charts. Visibility helps to acquire new users and therefore creates a basis for monetization opportunities. To achieve the visibility, at the minimum level the platform owners need to be satisfied. To get the long-term loyalty of the users, developers try to provide frequent interesting action and new experiences for them. Different types of campaign and event need to be introduced, which will keep users engaged with their games instead of looking for some other games to provide them with the necessary interest. The regular market-based power possessed by the users is obvious here. However, the way developers may try to act upon and intervene in the minutiae of users' everyday lives makes the difference. Users are expected to be autonomous agents who "make their decisions, pursue their preferences and seek to maximize the quality of their lives." (Rose & Miller, 1992, p. 200–201). Thus, the knowledge related to the minutiae of user behavior can reveal insights into the users' conduct, which can then turn the power relation upside down. Choosing the right balance for the game according to the biggest mass of the existing users determines the more appropriate future audience for a specific game. Therefore, those existing users who stay and those new users who will download that game in the future are expected to be a better fit for the profile of the game due to data-driven development. Detailed profiling of different user groups determines the best-alignment and therefore the right type of actions for different groups, according to the aims of the organization.

8.3. Monetizing the self-regulating user

Some of the interviewed users had spent real money on free-to-play games. The reasons for using real money varied between respondents. Some of the reasons mentioned were related to such things as getting rid of advertisements; contributing to the common good in games that had some social aspect, such as clans and friends playing; a gift to a friend; or support for the developers because of the good game they had provided.

Daily challenges can generate some competition between players and there can be different types of "boosters" available to gain a competitive edge over other players who are trying to win those challenges. Normally these boosters can be acquired with in-game (secondary) currency such as diamonds, which can be collected by playing the game, or which can be bought with (primary) game currency such as gold or coins, which are also collected by playing, or by using real money for in-app purchasable items. These types of

booster connected with a diminishing time frame in daily challenges can sometimes have a powerful effect on user behavior.

> "… yes once. When I needed to upgrade my kitchen to win a (daily) challenge, I once… or twice bought extra coins. […]. I paid 99 cents, twice. […] I thought that one upgrade would've been enough, but it wasn't, and I needed to buy another one to win." [User 1]

A couple of respondents explained how they had spent money to get rid of advertisements. They thought that it was worth paying a small amount so they didn't have to spend their playing time watching advertisements. Another respondent explained how she had spent real money to buy a "builder", a game character that enhances the speed of building different things in the game, for her spouse as a birthday gift. She explained that the progress in the game that her spouse was playing had become so slow that she thought that a builder character would be a nice addition and would be appreciated by her spouse. A couple of respondents explained how they had a yearly ritual of making an in-app purchase, aiming to support the company developing the game they were playing. They wanted to give something back to the company that had developed this wonderful game.

However, the common behavior of most of the respondents was that they would not normally spend money for free games.

> "I don't know why I'd want to spend real money on a game. […] I don't think mobile games can add any value to my understanding or knowledge or anything. It's just a way to have fun or relax, or a way to kill time." [User 1]
>
> "I started playing the game [game title] at the same time as some friends. […] in some way it made me feel more involved. And the use of money didn't feel so weird. […] Maybe it has something to do with the naïve thinking that, when you buy a computer game, you will have that game in reality forever. But a mobile game, when you've bought it, it could at some point, in some mystical way, just vanish. […] if you think like an amount of €10. In my [name of a computer game service] account, I have a large number of games there, which I've never even installed. I've just bought them and thought I might play them some day. […] That €10 is basically nothing. You use €10 for many unnecessary things anyway. But for some reason it feels like something with these mobile games …" [User 6]

When interviewed users were asked if they would be ready to spend real money on free games if they provided some means to learn some new skills such as mathematical, language or economic skills, or some other similar subjects, most of them were more willing to spend money on these types of game.

> "Yes, I could think of paying for such games. For example, games that might improve learning languages…" [User 4]

One user who was playing a free-to-play game, which was especially made for learning language had different opinion about this.

> "I just haven't felt that I'd get any extra benefit if spent money on it." [User 10]

Even though all the users interviewed were reluctant to make purchases in free-to-play games, they all owned or had bought some other games, either computer games or some card games for example, and did not see those purchases as being problematic. Some of them had also used some real money for free-to-play games that their children had played. In a way, it was only the free-to-play mobile games, which they themselves were playing that somehow could not be the object of real money transactions.

> "…to use €20 to get some boosters, which are gone really fast … for some reason, there seems to be something dirty about playing (free-to-play games) …" [User 3]

Several of the respondents mentioned that, even if they frequently watched the advertisements, they did not normally click the links available in in-game advertisements to be able to get forward in the game or to get something extra from watching them. However, they explained how they might later, after the playing session was completed, go to the app store and check out some of those games for which they had seen advertisement during the playing session. They had sometimes even installed those games later on. Most of the respondents mentioned that the advertisements were mostly irritating, as they were there to play the game and not to watch advertisements. Of course, many of them also mentioned that they understood that, because the game was free, those developers had to make money somehow and therefore advertisements were somehow acceptable. Even if they did not normally click on the link inside the advertisements (to install the game that was advertised), some of them remembered having clicked on those advertisements once or twice because, in a funny way, they felt that the advertised game had been interesting.

The self-regulatory capacity of individuals to recognize the monetary value of time did not become obvious from the interviews. None of the users recognized a decision-making moment when they had compared the value of their time spent "grinding" their way forward against buying that objective immediately with real money. It was more like they saw purchasing some type of booster, with real money, to help their own way forward, as a kind of cheating, even though they might still look for ways to cheat the game's software for their personal advantage. Their purchase situations related somehow more to the comparison between the value of time spent playing, when they had chosen to play, instead of using their "valuable" playing time for something else, such as watching advertisements.

Many of the users interviewed also mentioned that free-to-play mobile gaming still had some kind of weird stigma connected to it, at least among some generations.

> "For some reason, it feels like it's more socially acceptable to spend time watching TV series or movies than playing $\times$ number of mobile games. I don't know why. […] You shouldn't need to aim for effectiveness all the time." [User 5]

All the interviewees were really strict in terms of spending any money on free-to-play mobile games. This was the case even if they seemed to spend quite some time playing them and being especially loyal to their favorite games. Even spending €10 or just €1 on these free games seemed to be a high price. In terms of the alliance between developers' economic aims and the users' economic aims, the fact that games were free seemed to generate a difficult obstacle for the users. Some users had recognized situations where they had almost spent money on items that would have allowed them to continue playing in such situations where they had ran out of lives, and

they had "almost" succeeded in getting something they were trying to achieve with that session. However, such obstacles as having to provide their credit card number to make a purchase could be enough to prevent them from moving forward with that idea.

9. Discussion and concluding remarks

Governmentality (Miller & Rose, 1990; Rose & Miller, 1992) is a well-established framework for understanding how accounting operates in society. This paper has demonstrated how the idea of governmentality can also be used to explain the complex webs of associations bringing about the power structures in digital space. The question of how the interests of distant and separate interest groups can be aligned in the digital space so that these groups feel that they are "free" to choose, according to the neoliberal doctrine, can be answered through the governmentality framework. The alignment of interests from the perspective of game developers may occur through accumulating knowledge on user conduct (see also Lassila et al., 2019). The individual market participants, i.e. the users, are transformed into digital format as calculable and comparable figures and cohorts by calculative expert knowledge, driving the further development of the games and digital platforms toward being more aligned with the interests of the masses.

The ownership of the user's personal behavioral data related to the user acquisition "funnel", user engagement and monetization, and therefore the behavior of everyday actions with the game platform, is transformed into currency by which the user pays for the service. From the beginning of the funnel, users are identified and their actions from that point onwards until the end of their life as a user of the service are being collected and are available for analysis purposes to satisfy the organization's needs. The free-to-play markets have witnessed a similar type of phenomenon as the advertising industry studied by Viale et al. (2017), where data-driven development and automated algorithms are a commonality and where the new data-driven digital experts are the professionals of desired know-how. This know-how is conceived through a microscopic view of consumer behavior through big data technologies, generating a new type of understanding of the conduct of conduct (Viale et al., 2017, p. 295). Game developers may use an arsenal of different calculative devices labeled under the term "game analytics" (El-Nasr et al., 2013) to generate knowledge about users' conduct, so that the rules and mechanics of the developed games can better be aligned to the conduct of user masses and to the rules and mechanics of the market. Similarly, the platform owners, i.e. the app store owners, may generate algorithms for ranking developers' products and services according to their own economic aims, while possessing much power over the other market participants, as they are the gatekeepers of these markets (Nieborg & Poell, 2018). The others are then obliged either to follow the rules or to stay out of the markets and become marginalized actors.

This is of course nothing new in the sense that corporations have already been doing this for decades. What seems to be something worth noticing is more nuanced and mundane, which might be why these issues have stayed hidden for so long, and have become issues only later on when some bigger phenomenon becomes more noticeable (see World Health Organization Addictive behaviours: Gaming disorder https://www.who.int/news-room/q-a-detail/addictive-behaviours-gaming-disorder/ 2018, 2018).

What has been demonstrated with the empirics of this research, and which is tightly connected to the existence of big data technologies are those tiny raindrops, those small pieces of new truth claims, falling into the ocean of existing knowledge on the behavior of ordinary individuals going about their daily lives. Through the lens of governmentality (Miller & Rose, 1990; Rose & Miller, 1992), it is quite easy to see these tiny new additions coming from the minutiae of everyday life: what time of the day users start playing, when they stop, how far they play, whether they watched advertisements during their session, how many times they started a certain game during one day, how many times they tried a certain game level before they succeeded in passing that level or whether they stopped before they succeeded, which type of items they used from the whole repertoire of items available, whether they bought some in-apps with real money, in which locations they visited the game world, with whom they played, and how many of them invited their friends to play via social media. These are all examples of additions to the prior knowledge provided by experts about how individuals live their normal daily lives, therefore providing new opportunities to generate new problems, which might require solving, a need for governing, as they open up yet new spaces within a discursive field of experts.

These new spaces were not accessible before the era of big data technologies (Bhimani & Willcocks, 2014) in the form they are accessible now. The big data technologies enabled the possibility to observe all. This means that the successful apps presented in this research can mean millions or tens of millions of users every day, thus generating an opportunity to add something new to the existing expert knowledge and an opportunity for a new type of intervention and governing.

The specificity of accounting and its calculative technologies specifically relate to the fact that often seemingly non-financially related actions such as what time on average users use their apps, can be associated with financial calculations and financially meaningful decisions. If app users, for example, seem to be less active on Thursday afternoons, why not introduce a campaign that provides something extra for them at that time, and let the individuals choose if they would be willing to participate to these campaigns during those less active periods. This creates an association between the user behavior of not opening the application on Thursday afternoons and the financial outcome of the game. If Thursday afternoons have been a less lucrative time for the developers, as app users have not watched so many advertisements or made so many in-app purchases during those hours then, if the campaign succeeds, it means more users will start their application and are available for advertisements and possible in-app purchases exactly during those not so profitable periods. This type of intervention, however, is very easy for the users to detect and therefore they may knowingly decline the offer to participate.

What is more hidden, and related to freedom of choice on how to spend your time, is the possibility that with the help of big data technology, applications will be aligned so well with different user profiles that instead of spending a few minutes with the app, individuals will start spending hours and hours with them. How far then are we from this type of reality? As mentioned above, the World Health Organization has decided to add gaming disorder to the 11th Revision of the International Classification of Diseases, which is defined in their internet pages as follows:

"Gaming disorder is defined in the 11th Revision of the International Classification of Diseases (ICD-11) as a pattern of gaming behavior ("digital-gaming" or "video-gaming") characterized by impaired control over gaming, increasing priority given to gaming over other activities to the extent that gaming takes precedence over other interests and daily activities, and continuation or escalation of gaming despite the occurrence of negative consequences." (World Health Organization Addictive behaviours: Gaming disorder https://www.who.int/news-room/q-a-detail/addictive-behaviours-gaming-disorder/ 2018, 2018)

The type of data that need to be collected for this to happen is not transparent by any means. It is not similar to Bentham's guard who had the panopticon on all his prisoners and so was in the minds of all of them all the time. This modern gaze of big data surveillance is something different, more hidden, and it acts much more insidiously. This echoes somehow what Han (2017, p. 62) spoke about when he contemplated how individuals' digital habits may provide a more accurate image of them than they have of themselves. This, in a sense, would be in line, at least in some respect, with the behavior of some of the users interviewed who said how they had spent their time with apps perhaps a bit more than they afterwards thought they should have. Apps have been refined so perfectly to fit the needs and desires of users that it might become difficult for them to find places where they want to quit playing. The big data from millions and millions of users, along with the persistent development of those small nuances are the means by which modern-day governmentality is perhaps going further than expected in the alignment of the interests of those in power and those who are to be governed. This reflects something that Han (2017, p. 32) so cleverly pointed out about how people are so willingly exposing themselves to the type of "neoliberal psychopolitics" and the consciousness industry it promotes, that it could eventually destroy the human soul.

Even if some people were knowingly trying to opt out of the 'data factory', it would not necessarily help them to be able to avoid the reach of governing big data apparatus. This is because, as mentioned earlier, users who download a game one year after its launch might find all the aspects of the game fitting their needs almost perfectly, because the data has already been guiding the development of the game for a year and the outcome is what it currently is because of the previous users' data. This individual might have ignored this specific game a year earlier, so it is not only their current user profile that is being used to influence them remotely, but also the data of others before them, which has possibly made a significant impact on the opportunity to succeed in the endeavor of intervention. However, the way in which different real-time monetization mechanisms are perhaps presented to this individual may well depend on how the individual is actually interacting with the game at that specific moment. What type of advertisement is shown, how frequently they are shown and so on may well depend on the user's normal behavior and therefore their specific data and profile. These late-comers are thus governed by their own actions but also by the actions of others before them.

As Miller and Rose (1990) and Rose and Miller (1992) argued some 30 years ago, governmentality requires a will to govern. There has to be an actor who wishes to govern something, and a need to govern, such as in the cases of the media (Viale et al., 2017) and fashion (Jeacle, 2015) industries. To govern a domain of advertising, and especially advertising spending, requires a new calculative expert professional to move into the field of advertising and change the advertising industry from a "mysterious art" to a quantifiable science (Viale et al., 2017). This same phenomenon can be recognized in the domain of free-to-play gaming, and free app industry more generally. Nowadays, it is not uncommon to have one or several data scientists or other analytics experts in a game development organization, developing algorithms for calculation purposes and providing deeper insights into and quantified knowledge of the collected user data. These new professionals are calculating experts equipped with advanced statistical and mathematical expertise. They can be regarded as somewhat new but significant centers of power in free-to-play game development organizations, moving yet another entertainment industry sector toward more data-driven development and quantified knowledge. It is not only these data "geniuses" who are influencing the movement towards quantification; it is also the designers and other members of the game development teams who are using more and more different types of calculating technology and user behavioral data in decision-making and development.

Even if the empirical context of this research highlights these issues in the very specific context of free-to-play gaming, it should be obvious to the reader by now that similar opportunities may be available in many other digital spaces of different mobile apps, which can also be used to govern the everyday lives of individuals (see e.g. Chapman et al., 2021). Perhaps it is therefore no wonder that people go about with their gaze firmly on their mobile devices, as the apps in those devices may well be quite perfectly aligned with the rhythm of their daily lives.

Therefore, what becomes defined as a successful free game in free-to-play markets is related in a large part to the calculative technologies used by the actors in these markets. Similarly, like the quick response technologies that were used to address the issues of fast fashion, which ultimately contributed to exacerbating the initial problem (Jeacle, 2015, p. 323), big data technologies are contributing to shaping free-to-play games (Lassila et al., 2019), and therefore these markets, in the direction of calculative rules of the economy and the institutions of consumption (Viale et al., 2017). In free-to-play gaming, individuals can no longer be passive observers. Instead, frequent actions and decisions are required. Users are forced to make and take frequent actions, which leave digital traces that can be logged and recorded for further use by distant actors. The self-regulating individual needs to make several daily decisions related to in-app purchases, to buy or not to buy, and to watch an advertisement or not, because these decisions are in the interests of developers. The users acting accordingly are therefore no longer acting for entertainment purposes only, but are more like controlled calculating individuals (Miller & Rose, 1990), forced to make frequent economic decisions to keep their gained benefits and optimize their probabilities of success in the game. All these actions made through the digital interface leave a clear-cut trace of the action. In a binary world, this trace is simply either 1 or 0. These ones and zeros are then in a form that is calculable, comparable and mobile, and thus can be used in many kinds of calculations, including financial calculations, for the purposes of the business organizations.

It seems that most of the users of free-to-play games seem to choose not to pay, which does not mean that the governing act has failed. On the contrary, even if only a small percentage of so many users act according to the monetization aims of the company, there are still many of them, and they can therefore contribute greatly to the revenue streams, covering the costs of the development

organizations. Non-paying users also bring value, as they are translated into market commodities in advertising auctions. Non-paying users can be given price tags and can be bought and sold in these markets, and therefore they are also contributing to the revenue streams on their own behalf.

Therefore, the free-to-play concept has transformed gaming markets into a profiling, categorizing numbers game, where normal capitalistic rules of profits and costs apply. More is better, and continuous improvement is necessary. These types of digital service are no longer enacted when, or as long as, users think they need enjoyment, but increasingly according to the developers' governmental program for turning free services into profits. New types of expert knowledge provide calculative technologies to improve specific steps in a sequence of development in order to achieve better numbers (Islam, 2021). New user markets take care of translating the user profiles into financial figures and sellable products.

Moreover, the free-to-play game development experts should be understood as new types of hybrid expert (Miller, Kurunmäki, & O'Leary, 2008), at least at the organizational unit level, as they need to be able to take artistic creativity and economic calculations into account at the same time (Lassila et al., 2019). Traditionally, game developers needed to focus mostly on creating great games, as others, such as the publishers, took care of the marketing side of things and were mostly interested in the financial side of game development. Nowadays, developers themselves need to think about both sides right from the start of the development. Monetization mechanisms should be embedded into the fabric of artistic game design, so that the users are not intimidated by the fact that the free product is not free after all. Everything must be smoothly combined for the outsider to be more or less ignorant of the bigger picture (Zuboff, 2015). Therefore, experts try to generate and align the interests of separate domains and interest groups and "seek to shape the beliefs and conduct of others in desired directions by acting upon their will, their circumstances or their environment." (Rose & Miller, 1992, p. 175).

Of course, this research has some major limitations, as it can only scratch the surface of governmentality embedded in the digital space of big data technologies and "free" apps. This research provides only one possible interpretation of this phenomenon. Therefore, future studies should further investigate and elaborate on the reasons behind the datafication advocates, who so eagerly bring out the positive effects of the digital transformation of society, and hardly ever lift the curtain to see the things left out of the algorithmic calculations. What is inside the black box should be kept interesting, even with the machine learning algorithms and neural networks. The new technologies that are soon to be reality and commercially robust, such as 5G and 6G, will only accelerate the datafication of our societies and everyday lives. Therefore, we should be eager to learn how to interpret and construe a world comprising programmatic calculating algorithms and the pervasiveness of datafication.

Acknowledgements

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.cpa.2022.102434.

References

Alha, K., Koskinen, E., Paavilainen, J., Hamari, J. & Kinnunen, J. (2014). Free-to-play games: Professionals' perspectives. In *Proceedings of Nordic Digra in Gotland, Sweden,* 2014.

Altimira, D., Mueller, F.', Clarke, J., Lee, G., Billinghurst, M., & Bartneck, C. (2017). Enhancing player engagement through game balancing in digitally augmented physical games. *International Journal of Human-Computer Studies, 103,* 35–47.

Andrew, J., & Baker, M. (2021). The general data protection regulation in the age of surveillance capitalism. *Journal of Business Ethics, 168*(3), 565–578.

Arnaboldi, M., Busco, C., & Cuganesan, S. (2017). Accounting, accountability, social media and big data: Revolution or hype? *Accounting, Auditing & Accountability Journal., 30*(4), 762–776.

Bateman, S., Mandryk, R. L., Stach, T., & Gutwin, C. (2011). Target assistance for subtly balancing competitive play. In *Proceedings of the SIGCHI Conference on Human Factors in Computing Systems* (pp. 2355–2364). ACM.

Bauckhage, C., Kersting, K., Sifa, R., Thurau, C., Drachen, A., & Canossa, A. (2012). In *How players lose interest in playing a game: An empirical study based on distributions of total playing times* (pp. 139–146). IEEE.

Bergvall-Kåreborn, B., & Howcroft, D. (2014). Persistent problems and practices in information systems development: A study of mobile applications development and distribution. *Information Systems Journal, 24*(5), 425–444.

Bhimani, A. (2020). Digital data and management accounting: Why we need to rethink research methods. *Journal of Management Control, 31*(1-2), 9–23.

Bhimani, A., & Willcocks, L. (2014). Digitisation, 'big data' and the transformation of accounting information. *Accounting and Business Research, 44*(4), 469–490.

Burchell, G., Gordon, C., & Miller, P. (Eds.). (1991). *The Foucault effect: Studies in governmentality: with two lectures by and an interview with Michel Foucault.* Chicago: University of Chicago Press.

Burgess, R. G. (1991). *In the field: An introduction to field research.* London: Routledge.

Cechanowicz, J. E., Gutwin, C., Bateman, S., Mandryk, R., & Stavness, I. (2014). Improving player balancing in racing games. In Proceedings of the first ACM SIGCHI annual symposium on computer-human interaction in play (pp. 47–56). ACM.

Chapman, C., Chua, W. F., & Fiedler, T. (2021). Seduction as control: Gamification at Foursquare. *Management Accounting Research, 53*, 100765. https://doi.org/ 10.1016/j.mar.2021.100765

Clement, J. (2021). Average number of monthly active users (MAU) of mobile games worldwide in 4th quarters 2015 and 2016. https://www.statista.com/statistics/ 667694/average-mobile-game-mau-world/ Accessed 1 July 2021.

Davidovici-Nora, M. (2014). Paid and free digital business models innovations in the video game industry. *Digiworld Economic Journal, 94*, 83–102.

Dickson, A. (2018). Gaming's virtual architects. https://www.ft.com/content/6beb2220-afd1-11e8-8d14-6f049d06439c/ Accessed 10 October 2018.

Drachen, A., Lundquist, E. T., Kung, Y., Rao, P., Klabjan, D., Sifa, R. & Runge, J. (2016). Rapid prediction of player retention in free-to-play mobile games. In *Proceedings of The Twelfth AAAI Conference on Artificial Intelligence and Interactive Digital Entertainment (AIIDE-16) in Burlingame, California USA, 2016, arXiv: 1607.03202.*.

El-Nasr, M. S., Drachen, A., & Canossa, A. (2013). *Game analytics: Maximizing the value of player data.* London: Springer.

Graham, C. (2010). Accounting and the construction of the retired person. *Accounting, Organizations and Society, 35*(1), 23–46.

Hamari, J., & Järvinen, A. (2011). Building customer relationship through game mechanics in social games. In *Business, technological, and social dimensions of computer games: Multidisciplinary developments* (pp. 348–365). IGI Global.

Hamari, J., Hanner, N., & Koivisto, J. (2020). "Why pay premium in freemium services?" A study on perceived value, continued use and purchase intentions in free-to-play games. *International Journal of Information Management, 51*, 102040. https://doi.org/10.1016/j.ijinfomgt.2019.102040

Han, B. C. (2017). *Psychopolitics: Neoliberalism and new technologies of power.* Verso Books.

Islam, G. (2021). Business Ethics and Quantification: Towards an Ethics of Numbers. *Journal of Business Ethics*, 1–17.

Järvenpää, M. (2007). Making business partners: A case study on how management accounting culture was changed. *European Accounting Review, 16*(1), 99–142.

Jeacle, I. (2015). Fast fashion: Calculative technologies and the governance of everyday dress. *European Accounting Review, 24*(2), 305–328.

Jeacle, I. (2012). Accounting and popular culture: Framing a research agenda. *Accounting, Auditing & Accountability Journal*, 25(4), 580–601.

Jeacle, I., & Carter, C. (2011). In TripAdvisor we trust: Rankings, calculative regimes and abstract systems. *Accounting, Organizations and Society, 36*(4-5), 293–309.

Jeacle, I., & Carter, C. (2014). Creative spaces in interdisciplinary accounting research. *Accounting, Auditing & Accountability Journal, 27*(8), 1233–1240.

Koskenvoima, A. & Mäntymäki, M. (2015). Why do small and medium-size freemium game developers use game analytics? In Janssen, M., Mäntymäki, M., Hidders, J., Klievink, B., Lamersdorf, W., van Loenen, B. and Zuiderwijk, A. (Eds.), *Open and Big Data Management and Innovation*, Vol. 9373 of Lecture Notes in Computer Science, (pp. 326–337), Springer, Cham, Switzerland.

Kyriacou, O. (2016). Accounting for images of 'equality' in digital space: Towards an exploration of the Greek accounting professional institute. *Critical Perspectives on Accounting, 35*, 35–57.

Lassila, E. M., Moilanen, S., & Järvinen, J. T. (2019). Visualising a "good game": Analytics as a calculative engine in a digital environment. *Accounting, Auditing & Accountability Journal, 32*(7), 2142–2166.

Latour, B. (1987). *Science in action: How to follow scientists and engineers through society*. Harvard University Press.

Legner, C., Eymann, T., Hess, T., Matt, C., Böhmann, T., Drews, P., … Ahlemann, F. (2017). Digitalization: Opportunity and challenge for the business and information systems engineering community. *Business & Information Systems Engineering, 59*(4), 301–308.

Lenka, S., Parida, V., & Wincent, J. (2017). Digitalization capabilities as enablers of value co-creation in servitizing firms. *Psychology & Marketing, 34*(1), 92–100.

Marchand, A., & Hennig-Thurau, T. (2013). Value creation in the video game industry: Industry economics, consumer benefits, and research opportunities. *Journal of Interactive Marketing, 27*(3), 141–157.

Merikivi, J., Tuunainen, V., & Nguyen, D. (2017). What makes continued mobile gaming enjoyable? *Computers in Human Behavior, 68*, 411–421.

Miller, P. (2001). Governing by numbers: Why calculative practices matter. *Social Research, 68*(2), 379–396.

Miller, P., Kurunmäki, L., & O'Leary, T. (2008). Accounting, hybrids and the management of risk. *Accounting, Organizations and Society, 33*(7-8), 942–967.

Miller, P., & O'Leary, T. (1987). Accounting and the construction of the governable person. *Accounting, Organizations and Society, 12*(3), 235–265.

Miller, P., & Rose, N. (1990). Governing economic life. *Economy and Society, 19*(1), 1–31.

Murdock, A. (2017). Consumers Spend More than 1 Billion Hours a Month Playing Mobile Games. https://www.vertoanalytics.com/consumers-spend-1-billion-hours-month-playing-mobile-games/ Accessed 25 March 2018.

Neu, D. (2000). Accounting and accountability relations: Colonization, genocide and Canada's first nations. *Accounting, Auditing & Accountability Journal, 13*(3), 268–288.

Neu, D., & Heincke, M. (2004). The subaltern speaks: Financial relations and the limits of governmentality. *Critical Perspectives on Accounting, 15*(1), 179–206.

Neuman, W. L. (2007). *Basics of social research: Qualitative and quantitative approaches* (2nd edition). Boston: Pearson/Allyn and Bacon.

Nieborg, D. (2016). From premium to freemium: The political economy of the app. *Social, casual and mobile games: The changing gaming landscape*, 225–240.

Nieborg, D. B., Young, C. J., & Joseph, D. (2020). App imperialism: The political economy of the Canadian app store. *Social Media+ Society*, 6(2), 1–11.

Nieborg, D. B., & Poell, T. (2018). The platformization of cultural production: Theorizing the contingent cultural commodity. *New Media & Society, 20*(11), 4275–4292.

Orland, K. (2017). We've been missing a big part of game industry's digital revolution. https://arstechnica.com/gaming/2017/04/the-us-game-industry-is-a-lot-bigger-and-less-physical-than-we-thought/ Accessed 25 August 2017.

Parviainen, P., Tihinen, M., Kääriäinen, J., & Teppola, S. (2017). Tackling the digitalization challenge: How to benefit from digitalization in practice. *International Journal of Information Systems and Project Management, 5*(1), 63–77.

Quattrone, P. (2016). Management accounting goes digital: Will the move make it wiser? *Management Accounting Research., 31*, 118–122.

Rayna, T., & Striukova, L. (2014). 'Few to many': Change of business model paradigm in the video game industry. *Communications & Strategies, 94*, 61–81.

Rose, N., & Miller, P. (1992). Political power beyond the state: Problematics of government. *British Journal of Sociology, 43*(2), 173–205.

Rutnik, M. (2017). Mobile games generated more than $40 billion in revenues last year. https://www.androidauthority.com/mobile-games-revenue-2016-746986/ Accessed 25 March 2018.

Seufert, E. B. (2013). *Freemium economics: Leveraging analytics and user segmentation to drive revenue.* Elsevier.

Sifa, R., Bauckhage, C., & Drachen, A. (2014). In *The Playtime Principle: Large-scale cross-games interest modeling* (pp. 1–8). IEEE.

Spence, L. J., & Rinaldi, L. (2014). Governmentality in accounting and accountability: A case study of embedding sustainability in a supply chain. *Accounting, Organizations and Society, 39*(6), 433–452.

Statista (2019a). Number of apps available in leading app stores as of 1st quarter 2019. https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/ Accessed 20 May 2019.

Statista (2019b). Most popular Apple App Store categories in May 2019, by share of available apps. https://www.statista.com/statistics/270291/popular-categories-in-the-app-store/ Accessed 20 May 2019.

Turow, J., & Couldry, N. (2018). Media as data extraction: Towards a new map of a transformed communications field. *Journal of Communication, 68*(2), 415–423.

Vasarhelyi, M., Kogan, A., & Tuttle, B. (2015). Big data in accounting: An overview. *Accounting Horizons, 29*(2), 381–396.

Viale, Thierry, Gendron, Yves, & Suddaby, Roy (2017). From "mad men" to "math men": The rise of expertise in digital measurement and the shaping of online consumer freedom. *Accounting, Auditing & Accountability Journal, 30*(2), 270–305.

Viljanen, Markus, Airola, Antti, Heikkonen, Jukka, & Pahikkala, Tapio (2018). Playtime measurement with survival analysis. *IEEE Transactions on Games, 10*(2), 128–138.

Warren, J., Moffitt, K., & Byrnes, P. (2015). How big data will change accounting. *Accounting Horizons, 29*(2), 397–407.

World Health Organization Addictive behaviours: Gaming disorder https://www.who.int/news-room/q-a-detail/addictive-behaviours-gaming-disorder/ 2018
   Accessed 1 April 2021.

Zuboff, Shoshana (2015). Big other: Surveillance capitalism and the prospects of an information civilization. *Journal of Information Technology, 30*(1), 75–89.

Zuboff, S. (2019). Surveillance capitalism and the challenge of collective action. *New Labor Forum*, 28(1), 10–29. SAGE Publications Sage CA: Los Angeles, CA.