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# Social materiality of smartphone game apps

## Case analysis of *Pokémon GO*

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**Abstract.** In this paper, we examine the connectivity and digitalization affecting our private lives through a case analysis of *Pokémon GO*, a game application for smartphones. First, we outline the concept of sociomateriality as a keyword to consider the effects of *Pokémon GO*. Subsequently, we explain the outline of the game *Pokémon GO*. Finally, we show the usefulness of sociomateriality for examining the impact of digitalization on our private lives, using the example of *Pokémon GO*.

**Keywords:** sociomateriality, smartphone game app, Pokémon GO.

## 1 Introduction

In recent years, connectivity and digitalization have deeply penetrated our daily lives. Consequently, it is no exaggeration to say that our daily lives and collective reality have changed significantly

Consider, for example, the phenomenon of the filter bubble [1], which happens when web space negates the infinitely expanding information space. The filter bubble creates personal information spaces filled with only the limited and biased views that website algorithms have guessed we want to see. The guesses are based on our past online activity, personal information, and demographic descriptors, including our locations, past click actions, and search histories. This leads us to see and hear only opinions similar to our own, resulting in the echo chamber phenomenon [2], the result of people's tendency to look for information that reinforces their existing views—filtering out dissent and filling the “bubble” with accord—through unconscious confirmation bias.

Now, consider that in the Digital Era, there are a variety of realities (e.g., virtual reality, augmented reality (AR), mixed reality, and substitutional reality), so we cannot rule out the possibility that the filter bubble will expand into real space. When the information space becomes combined or fused with reality, this provides a more personalized information space, reinforcing the tendency toward confirmation bias.

By the way, this real–virtual information environment is already deeply involved in our daily lives. No special equipment is required to enjoy such an information space. The only device needed is a smartphone.

ICT (information and communications technology) has advanced sufficiently that mobile phones are no longer considered “special equipment,” and smartphones are the

latest evolution of mobile phone technology. They are not just phones; their various sensor, GPS, and data communication functions are used more often than their telephone functions.

In this paper, we examine how the composite device known as the smartphone affects our daily lives using the theory of sociomateriality, a framework for studying the intersection of technology and everyday life, especially leisure. As detailed in the next section, sociomateriality has been proposed as a theoretical framework for analyzing everyday organizational life. Its characteristics are that social and organizational factors and material and technical factors are not understood as binary conflicts but as indivisible factors. In this paper, we adopt this framework, extending and applying sociomateriality to the connectivity and digitalization in everyday private life through examining the use of *Pokémon GO*, a game app on smartphones.

The remainder of this paper is organized as follows. First, we outline the concept of sociomateriality as a keyword to consider the effects of *Pokémon GO*. Subsequently, we explain the outline of the game *Pokémon GO*. Finally, we show the usefulness of the sociomateriality framework for examining the impact of digitalization in our private life, using the example of *Pokémon GO*.

## 2 The Concept of Sociomateriality

Many keywords have been proposed as a theoretical framework for examining how connectivity and digitalization affect our private lives. In this paper, we chose the lens of sociomateriality, through which we focus our investigation.

In recent years, sociomateriality has become an increasingly common theoretical framework in information system research for considering the effects of ICT on everyday organizational and work life. The term was introduced in a paper published in 2007 by Orlikowski, the Alfred P. Sloan Professor of Information Technologies at the Massachusetts Institute of Technology Sloan School of Management.[3]

The following year, Orlikowski and Scott [4] categorized streams of research on ICT and organizations into three research streams based on their view of the ontological priority of technology; First, the research group considers technologies and organizations as “discrete entities” and examines their effects (or moderation). Next, the researchers understand technology and organization as “mutually dependent ensembles” and discuss “interaction” between them from the viewpoint of “affordance”. The last is sociomateriality, which regards the relationship between technology and organization as “sociomaterial assemblages,” allowing a distinctive research stream that examines “entanglement” and “performativity.”

The significance of the sociomateriality concept lies in its assertion that social and material factors should not be distinguished in the practice of organizational activities. In other words, it assumes that in everyday organizational life with ICT systems, social and material factors are in a state of “constitutive entanglement.” Simply put, this theoretical framework focuses on the intrinsic intersections of technologies, jobs, organizations, and activities.

For example, when people use public transportation such as railroads and buses, it is not possible for those with smartphones to separate their devices from the act of traveling. Rather, it would be more appropriate to recognize that the use of smartphones has changed the meaning of travel. In extreme cases, low battery in a smartphone may create anxiety about moving itself, and it is highly likely that many people cannot remember or imagine traveling before the emergence of smartphones. For example, just a few decades ago, no one suffered paroxysm of anxiety over the prospect of traveling with a low battery or no cell service or Wi-Fi. As there are approximately three billion smartphone users worldwide, many of them millennials, it is highly likely that many people cannot remember or imagine traveling before the emergence of smartphones.

In many ways, people have become their geotags and metadata. Sociomateriality allows for a research stream that understands this assemblage—people and smartphones—and focuses on the process of socially configuring the entanglement.

That is the essence of sociomateriality; it provides a way to reexamine the binary conflict between organizations or people and technology and translate the complexity of the real world into a relationship rather than a causal model. In Buddhist terms, “causality” is replaced by *engi* (縁起, which refers to the idea that everything in this world is dependent on and related to one another in direct and indirect ways, changing and disappearing in the relationship—that is, “dependent co-arising.”

Previously, discussions of sociomateriality have primarily focused on work life. However, this paper focuses on everyday private life to broadly consider the effects of connectivity and digitalization. The significance of this paper lies in how it expands the discussion, extending the sociomateriality perspective to everyday private life beyond the concept as proposed by Orlikowski and others [3, 4]. Specifically, this paper adopts the concept of mobilities from the field of tourism research.

Mobility has become an evocative keyword for the twenty-first century and a powerful discourse that creates its own effects and contexts [5]. Especially, Urry [6] advocated the concept of mobilities as a way of rethinking the intersection social science and transport science—essentially, tourism—in terms of assemblages in the act of moving. The mobilities concept proposes that many of the human abilities of tourism (that is, mobilities) should be understood as a hybrid of technology (mobility, smartphones) and the physical environment.

Certainly, when understanding the behavior of a person who operates a smartphone while walking, it may not be useful to distinguish between the person and the device. Instead, they should be understood as a hybrid. In Buddhist terms, this is called *nini-funi* (而二-不二 in Japanese; in English, duality–nonduality or two (in phenomena) but not two (in essence)). For example, unlike walking, moving by car involves an act of movement that is no longer a human activity alone but a hybrid activity. This leads people to perceive the landscape differently.

In Japan, there is the neologism “Insta-Bae” (インスタ映え), for which the English equivalent would be “instagrammable.” This means that the photos uploaded to the photo- and video-sharing social networking service (SNS) Instagram get noticed; photos receive “likes” from followers, so people seeking more followers post *Insta-Bae* photos to gain praise and new fans. Therefore, consider the behavior of tourists who think that the view of Kobe is photogenic. Earlier, they might have thought, “This view

of Kobe is beautiful!” However, now, their first thought is often “I have to upload an image to Instagram!” Such people cannot exist comfortably without a smartphone device. In other words, the act of sightseeing is becoming impossible to practice without smartphones (cameras, SNS, other apps). This can be easily understood by imagining the anxiety of forgetting or losing your smartphone. This can be understood as the act of tourism forming a mixture of devices and SNS. Therefore, the keyword “hybrid or assemblages” is attracting attention.

This paper examines these specific effects of increased connectivity and digitalization using the example of a popular location-based AR smartphone game, *Pokémon GO*.

### 3 Overview of *Pokémon GO*

*Pokémon GO* is a smartphone game application jointly developed by Niantic, Inc., Nintendo, and The Pokémon Company. Niantic, Inc., is a US company that produces location-based apps and games for mobile devices, such as Ingress, which combines the map information of Google Maps with GPS and AR. The “encampment game” is characterized by its real world–virtual world interactivity: players’ real-world GPS locations and surroundings (e.g., public buildings, monuments, etc.) are used to manifest virtual “portals” tied to a narrative game in which players save the world.

*Pokémon GO* was released in July 2016. Building on the portals created for Ingress, in *Pokémon GO*, players use their smartphones to interact with an AR narrative; in this game, they move through the real world to capture, battle, and train fantasy creatures.

In 2016, it generated US\$950 million in sales, with a cumulative US\$2.2 billion in 2018. In this game, the main objective is to capture *Pokémon*s that players “encounter” while moving; the characters are manifested in the game based on the smartphones’ GPS function. The smartphone has to be moving for the *Pokémon* characters to appear on the map of the application. Thus, the game was touted as a way of promoting physical activity by encouraging players to go outdoors. The game contains “eggs,” special *Pokémon*s that hatch only after a specific distance is traveled—another mechanism to induce movement.

Several items can be used to capture the *Pokémon*s. These items (and the eggs) are available at specific locations (*PokéStops* and *Pokémon Gyms*). Some items are free, but many require in-app purchases. In the virtual gyms, players can battle or interact with other *Pokémon*s, and spending time there earns them coins that can be exchanged for items in the game. (Of course, players can also buy game coins with real money.)

Although the foundation of the game everywhere is the global map information from Ingress, companies can pay to be “sponsored locations” for *PokéStops* and *Pokémon Gyms* to attract customers. In Japan, the game is coordinated with the retailers AEON Group, fast-food purveyors McDonald’s, and SoftBank Group’s ICT shops. Those companies and many others are involved in the game elsewhere (e.g., Starbucks).

The attraction of *Pokémon GO*’s play lies in its global stage. In other words, the emphasis is on moving in the real world, not just in the closed virtual space of a

smartphone screen. For this reason, the game has a significant influence on players' daily activities—especially those involving movement.

## **4 How *Pokémon GO* impacted our daily lives**

### **4.1 Previous research**

Since the launch of *Pokémon GO* in July 2016, its significance, possibilities, and problems have been discussed. As a trial, when I searched for “*Pokémon GO*” with Google Scholar, fibrous documents appeared. For example, privacy and surveillance [7], impact on children [8], effects on health [9, 10], and sociological considerations [11]. However, this paper examines the impact of *Pokémon GO* on everyday life.

### **4.2 Viewpoint of our analysis**

As discussed, the *Pokémon GO* game app requires movement, which sets it apart from the typical image of videogames as lonely play in a room. This makes it relevant to mobilities in our everyday lives. In this section, we consider these specific points: (1) the changing image of smartphone game apps; (2) the importance of place consumption and geolocation, especially while walking; and (3) the orthogenesis of mobilities (or the trap of excessive mobilities) from the viewpoint of sociomateriality.

As sociomateriality is a framework for clarifying the meaning of everyday life as a hybrid of social and material factors, we will now examine the effects of digitalization and connectivity by investigating how the play of *Pokémon GO* has shaped many people's daily lives.

### **4.3 Change in game image: a means of maintaining and improving health at outdoor**

Walking outdoors has a high affinity with the concepts of “health” and “wellness.” *Pokémon GO* has been promoted as an effective tool for maintaining and improving health and wellness [9,10].

What does walking mean in this context? Urry (2007) offered four classification axes for walking [12]: (1) whether there is adventure; (2) whether you are alone; (3) whether there is a relationship with health and fitness; and (4) whether there is a mechanism to change the physical environment that supports walking.

Playing *Pokémon GO* is meant to encourage adventures (both virtual and real) for lone players as they walk (usually), so it scores high on both of those axes. In addition, because it emphasizes movement as opposed to just sitting at a stationary position facing a screen, it promotes health. The mechanism changing the physical environment is the game itself and its real world–virtual world interactivity. Thus, according to Urry's criteria, it involves and encourages healthy walking through the adventure of finding new destinations to capture *Pokémon*s and other items. The destinations are not just fast-food restaurants, shops, and other affiliated business facilities. *PokéStops* and

*Pokémon Gyms* can also be found in noncommercial spaces, such as museums, cathedrals, parks, and many tourist destinations. Therefore, it can be said that *Pokémon GO* provides an opportunity to refocus the tourism gaze (“re-gaze”) at places that were previously overlooked (cf. Urry & Larsen, 2011 [13]).

The game has attracted not just young people but has also caught on with health-minded middle-aged and elderly players. Most of them are at least tangentially familiar with the characters of *Pokémon* because the original *Pokémon* game was released in 1996, and it was (and remains) wildly popular. It is thought that many people downloaded the *Pokémon GO* app because of nostalgia.

A reason for the popularity of location-based AR games is that they can change the nature of people’s idle travel time—that is, time spent on trains or buses, in carpools, or walking to work. For many, those periods are spent in activities that could be called “killing time,” such as scrolling through SNS. *Pokémon GO* gives them at least the illusion of a goal. As the distance traveled is an important factor in the progress of the game (e.g., obtaining and hatching eggs), the meaning of commuting time changes from “killing time” to “key factor in playing the game.” Thus, *Pokémon GO* has created the lifestyle of “walking while operating a smartphone.”

*The Pokémon GO* app itself has come to be positioned as a tool that enriches daily life—a device that adds new meaning to movement. That is a sociomaterial interpretation of the game application wherein the meaning of the app is socially structured through the players’ processes.

#### 4.4 Consumption of place born from walking

*Pokémon GO* has also given new meaning to the simple word “place” and the concept of “place consumption.” Urry [14] restructured the concept of “place consumption,” making these four points: (1) places provide a context for the comparison, evaluation, purchase, and use of goods or services; (2) places are visually consumed; (3) places can be depleted or exhausted by use; and (4) localities consume people’s identities.

From Urry’s perspective, *Pokémon GO* offers a new value for consuming places. Players walk around cities and aim for specific landmarks (i.e., *PokéStops* and *Pokémon Gyms*) shown on their smartphone screens. These are real “places” such as a particular store, a particular vending machine, a special performance, or a statue. Therefore, the landmarks in the game and the real places intersect, multiplying the meaning of the places. That is exactly what Urry means by “consuming places.” Thus, digitalization—specifically, a game app generating new meanings for “walking” and “place”—creates a new way to “consume a place.”

#### 4.5 The orthogenesis of mobilities

From the perspective of sociomateriality, the process of digitalization can be understood as the process of constant meaning generation characterized by accidents and unintended consequences. The play in *Pokémon GO* also has unintended consequences. Here, we must discuss a contradiction that has arisen between orthogenesis and orthogenetic evolution as it is used in biology and how it applies to the context of mobilities.

The formal definition of orthogenesis is “a theory that variations in evolution follow a particular direction and are not merely sporadic and fortuitous,” per Merriam-Webster.

Orthogenesis implies that the evolution of an organism continues in an advantageous direction, pushed by some “driving force.” The validity of the concept of orthogenesis in current biology research is questionable. Nevertheless, it can be useful in explaining social phenomena. It does apply fairly well to game development; when developers find something that appeals to users, they pursue it.

It also applies to playing *Pokémon GO*, in which daily practice develops in the direction of increasing the distance moved. To extend the distance traveled, players supplement walking with modes of transportation, when this means riding rather than operating vehicles, there are no inherent problems. However, when this means riding bicycles or driving cars, attention-related mishaps occur. Consequently, there have been numerous reports of traffic collisions caused by people playing games while driving. For example, during the first 148 days following the release of *Pokémon GO*, there were 145,632 traffic accidents, 29,390 injured, 256 dead, and 20 economic losses—in the United States alone—related to people playing the game while driving. The resulting damages were estimated to be US\$7.3 billion.[15] Accidents have also occurred in Japan. Consequently, Japan has considered imposing strict penalties for “gaming while driving.” In addition, app changes have been made. A “speed limiting function” using a smartphone sensor has been added. In other words, everyday use in the real world demanded a change in the app.

Many *Pokémon GO* events have been organized using the lure of rare characters for capture. However, floods of players at event venues have caused problems with “overtourism.” Many countries have asked Niantic to exclude certain locations (e.g., government buildings, sensitive historical and religious sites, private property) from being used as PokéStops and Pokémon Gyms, and many sponsored locations have been removed at the companies’ request. In general, retailers such as AEON are less likely than fast-food restaurants to benefit from players stopping onsite to play a game; people playing *Pokémon GO* in the middle of a shop can annoy other customers. In addition, large *Pokémon GO* events can lead to problems with excessive noise and littering, making association with the game problematic, especially on private land.

## 5 Discussion

In this paper, we have described how *Pokémon GO*, released in 2016, is used in everyday life, including how its players’ use of the game has unintentionally led to changes in the game app itself. The impact of digitization and connectivity on everyday life cannot be explained by simple causal relationships—for example, technology determinism. Rather, it is more appropriate to understand that social and organizational factors and material and technical factors are integrated. In practice, they influence each other microscopically.

The sociomateriality perspective provides a theoretical framework for observing this, revealing that digitization and connectivity, as they relate specifically to location-

based AR games, can create unique “filter bubbles” that modify their travel, health, and place consumption behaviors.

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