Mobile Networked Creativity:

Developing a theoretical framework for understanding creativity as survival

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Abstract

Mobile networked creativity is an emergent practice that arises from the ongoing relationships among people and people with technologies—or networked resources. In this paper, we propose a concept of creativity as emerging from serendipity and mobility. We focus on how unplanned or emergent uses of digital technologies reveal how creative practices emerge, particularly in the context of mobile phone use where people are also physically mobile and yet connected via the internet. This concept of creativity as a constant process of becoming is a “recursive organization” that can be seen in groups such as migrants, or people living in disenfranchised communities that survive in make-shift locations such refugee camps or slums. Contrary to the affluent and capitalistic-embedded traditional ideas of creativity, mobile networked creativity is a practice that is most often found in situations of economic hardship, power imbalances, and immobilities.

Keywords

Creativity, mobile technologies, locative media, appropriation, disenfranchised communities, technological transformations

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Creativity is a “hot” topic nowadays. An increasing number of trade publications aim at teaching people “how to be more creative,” or how to come up with better and more innovative ideas. Often embedded into capitalist forms of production and consumption, the concept is used as a catch all word for enticing people to work harder, beat competition and be successful in the workplace. Several companies, such as Google, institutionalize “innovation time” as a way to support employees’ creativity—often for the benefit and profit of the company (Steiber & Alänge, 2013). As such, creativity is often conflated with innovation. However, while innovation frequently includes a product as an outcome and is related to consumerist and capitalist practices, creativity is a much broader and complex concept.

Although creativity has received strong emphasis in the past few years, it has always been an important feature of humankind. Creativity has been praised as what differs us from animals and what pushes technological development forward. In fact, technological innovation and creativity go hand in hand, since both creative processes and technological developments are products of the human mind (Hayward, 1990; Kelly, 2010). As such, the history of technology is intrinsically intertwined with the history of creativity, and so with the history of humanity itself. The creative mind has also been strongly associated with artistic practices. From the cave paintings in Lascaux to current media art installations, art is commonly associated with creativity. Artists “create”; they make new things out of existing ones—a sculptor transforms a stone into a statue; a media artist transforms everyday use mobile phones into a public installation.

In all above-mentioned cases—corporate innovation, technological development, and artistic creation—creativity is almost always positively associated with “good ideas,” something

that is achieved by intense personal reflection, concentration, and contemplation. As Johnson (2010) explains, too often our model of creativity matches the outcome of a process that is achieved by a single mind working alone. Classical examples are Newton looking at a falling apple, Archimedes having his personal “eureka” moment in the bathtub, or Leonardo Da Vinci painting the Mona Lisa quietly in his studio. As a result, most accounts about creations and innovations focus on personal stories, rather than communication and networked relationships among people, conjunctures, and technologies (Isaacson, 2014). However, as Johnson (2010) states, “good ideas” have a long incubation period and often require several minds working together, as is the case with the history of the World Wide Web that involved several years of development and various ideas working together.

In addition to Johnson (2010), technology and media historians have considered creativity as a collective practice that develops over time (Abbate, 2000; Hafner & Lyon, 1998; Isaacson, 2014). However, in these accounts, the concept is mostly associated with technological innovation, and related to affluent practices, in which people have the time (and money) to dedicate to the creative practice. But creative practices also emerge in situations of hardship, at “the borders” of society, where people do not have the resources (materials, time or money) to be recognized as creative. For example, de Souza e Silva et al. (2011) has described how slum dwellers in Rio de Janeiro (Brazil) make “gatos” (cats), which are clandestine connections to the city’s utility services in order to get the services for free. Since slums were mostly built illegally on the hills of the city, the government did not feel responsible for providing them with basic services. Likewise, Masciaac (2015), reporting from the Azraq Refugee Camp in Jordan, describes how refugees have taken apart solar cells and rewired them with other cells and spare parts to construct rooftop solar panels. These practices, however, have not been named creative.

They are deemed illegal or subversive, and have frequently been described in the communication literature as appropriation (Bar, Weber, & Pisani, 2016; de Souza e Silva et al., 2011), or misuse (Farman, 2014). Creativity, then, has not been conceptualized as the process of networked minds and technologies collaborating for survival. When slum dwellers in Brazil or Syrian refugees in make-shift locations repurpose technology to improve their environments, they are not only appropriating technology: they are collectively recreating their context with technology. And they are also re-inventing themselves.

In this paper, we propose the concept of “mobile networked creativity” as an emergent practice that arises from the ongoing relationships among people and people with technologies—or networked resources. Unlike traditional conceptualizations of creativity, which is normally focused on a novel outcome (an object or an idea), mobile networked creativity is in constant process of becoming (Deleuze & Guattari, 1987). It is a relational practice. In particular, we propose a concept of creativity as emerging from serendipity and mobility. We focus on how unplanned or emergent uses of digital technologies reveal creative practices, particularly in the context of mobile phone use where people are also physically mobile—possibly at various distances—and yet connected via the internet. This concept of creativity as a constant process of becoming is a “recursive organization” that can be seen in such groups as migrant users or people living in disenfranchised communities that survive in make-shift locations, such as refugee camps or slums. Contrary to the affluent and capitalistic-embedded traditional ideas of creativity, mobile networked creativity is a practice that is most often found in situations of economic hardship, power imbalances, and immobilities.

To develop the concept of mobile networked creativity, we first address how creativity has been broadly defined, especially in the prominent contexts of artistic practices, as an

individual cognitive process, and corporate innovation. Then we analyze the many theoretical frameworks used within communication studies to understand more specifically the relationship between creative practices and technology use such as diffusion, adoption, and appropriation. Finally, based on examples of creative mobile practices under situations of hardship, we propose our concept of creativity as spatial (it takes place in hybrid spaces), networked (arising from networked interactions among people, and people with technologies), and mobile (where people are mobile and their (lack of) movement are mediated by mobile technologies). Deeply embedded into this conceptualization are the politics of creativity—power imbalances and differential power structures, which keeps this process moving. At very last, we conceptualize mobile networked creativity as a politics of survival. Creativity, in this context, enables people to survive with tools that are not necessarily designed for their survival, but are within their hands.

The many faces of creativity

Creativity is a frequently explored topic in many disciplines, such as education, business, psychology, art, and communication, but it is conceptualized very differently depending on the area. For example, those in psychology focus on internal determinants of creativity such as genetics or personality traits, suggesting creativity is something innate that manifests itself (Amabile, 1996). Those in business focus on creativity as strategies to improve marketing campaigns for existing products, suggesting creativity is something yet to be done (Andrews & Smith, 1996). The majority of existing studies on creativity, however, fall into three main categories: those that focus on creativity as an artistic practice, as an individual cognitive process, or as innovation.

Creativity as Artistic Practice

Prominent scholars agree that creativity has been related to artistic practices both in the lay and in its theoretical conceptualization (Glăveanu, 2014; Runco, 2007; Wreen, 2015). As an artistic practice, creativity is typically viewed as an a product of the imagination intended to express original ideas, as “a reflective and inexplicit gift from some other world with a transcendental quality such as power to perceive [and produce] sounds, colors, and other imagined worlds” (Gahan, Minahan, & Glow, 2007, p. 43). This idea of creativity was first documented in 1875 to describe Shakespeare’s work (Weiner, 2000). Following this, trends in creativity studies focused on visual, musical, and literary artists and the aspects of their work or characteristics.

From the Greeks, the terms *genio* (creator, begetter) or *ingenium* (of innate talent) were used to describe “the household god” because within this culture, only a deity created (Weiner, 2000). Thus, a genius, one who could bring forth something new to the community through their unique talents, was prized. On the other hand, the Greeks also used the term *techne* (a skill, a craft), but this term was used to describe those who could repeat and reproduce tasks. Some suggest this may have contributed to the divide between the artist or genius who comes up with original ideas and the craftsman who carried out ideas (Glăveanu, 2014; Runco & Jaeger, 2012).

This manifests into the distinction between aesthetic and functional creativity (Kaufman, 2015). Aesthetic creativity represented any area where the product’s main purpose is beauty or entertainment, whereas functional creativity emerges from a system of existing knowledge and iterations that produce something appropriate for the task. Both require bringing forth something with talent, but it was easier for creativity researchers to measure aesthetic creativity due to functional creativity’s domain specificity. Similarly, for lay audiences, it’s easier to recognize when an artist “creative” than when an engineer—or a refugee—is “creative.” Thus, the

difficulty in measuring and recognizing functional creativity has made it seem as though creativity is predominantly about the arts, when creativity, in fact, has many faces.

Moreover, creativity scholars argue that this widespread idea that equates creativity with artistic practices, or innate talents, overlooks non-artistic practices, ignores the power dynamics at play, and ignores the fact that some creative ideas are evil or not always good (Glăveanu et al., 2019; Runco, 2007). For example, Sternberg (2018) explains that terrorists and hackers are also creative. And so are the migrants and low-income communities in our examples, which we will address later.

Creativity as an individual cognitive process

Since creativity has been traditionally associated with individual traits, studies examine the characteristic of creative individuals to determine if there were particular traits or genetics that influenced their cognitive process (Amabile, 1996; Shalley, Zhou, & Oldham, 2004). In many ways, this approach is deeply connected to the idea of the genius. Most of these studies focused on memory, attention, knowledge, divergent thinking and used metrics such as IQ tests to identify creative individuals or the Creative Achievement Scale to exact the degrees of creativeness (Runco & Richards, 1997).

In the efforts to understand what makes a person creative, two criteria were established in Creativity Studies: originality (uncommonness) and “adaptiveness to reality” (acceptable or appropriate ideas) (Runco & Jaeger, 2012). The later required some kind of instrumental added-value, be it cognitive, legal, economic, moral, aesthetic or what not that satisfies human needs and desires (Wreen, 2015). Such criterion was used to reward desired minds yet exclude those with mental illness (p. 94). For example, a study surveying creative professionals and mental

illness shows a close association between creativity and mental illness, but when mental illness exceeds “adaptiveness to reality,” the rhetoric shifts from genius to insane (Runco & Jaeger, 2012). Although both the focus on cognition and the “adaptiveness to reality” aspect of creativity takes learning and environmental factors into consideration, understanding creativity as a cognitive process places value on individual human intellect (Runco & Richards, 1997), instead of the networked situation in which creativity actually emerges.

Creativity as Innovation

In connection with the previous two categories, the third category clearly identifies creativity as either achieving an end product or designating innovation as a method to creativity. Creativity as innovation comes out of the belief that individuals with innate talents can bring about creativity or can be coaxed into being creative. This can be seen primarily in the cross-over of creativity studies, psychology, and management sciences in the effort to foster creativity in the workplace. As such, researchers have started to use “creativity” and “innovation” inconsistently—sometimes as synonyms and other times as juxtapositions.

Although the ideas of creativity and innovation are intrinsically related, the two terms often get conflated (Anderson et al., 2014). Novelty is a determining factor in creativity. In management studies, for example, scholars have defined creativity as the development of ideas about products, practices, services or procedures that are novel and potentially useful to the organization (Amabile, 1996; Mumford & Gustafson, 1988; Shalley et al., 2004) and as a novelty (Anderson et al., 2004). While creative practices have been traditionally related to an “absolute true novelty” (the artist or genius), innovation is concerned with the diffusion, or the communication, of ideas that are “relatively novel” (Anderson, Dreu, & Nijstad, 2004).

Relatively novel ideas are created and become adopted and adapted from others—that is, they are not original. As such, innovation is the intentional introduction and application of an original idea (p. 148). Innovation, in this manner, takes on a similar meaning to *techne* (a skill, a craft): it becomes something one does with the skills they have and have acquired. Along these lines, scholars conceptualized creativity as a necessary first step for subsequent innovation, while innovation has been discussed as applied creativity in a social field (Amabile, 1996; Brass, 1995; Brennan & Dooley, 2005; Paulus, 2002; Perry-Smith & Shalley, 2003). Yet, the two concepts are interrelated. Although employees might share ideas or develop products and resources with others, the phenomenon is not considered creative until it can be successfully implemented, or diffused, at the organizational level (Amabile, 1996; Anderson, Potočnik, & Zhou, 2014). In this respect, innovation is necessary to validate creativity. UPS, for example, developed a navigation software to “route its vehicles in such a way that left-hand turns are avoided, thus reducing time spent waiting at intersections for an opportunity to turn across on-coming traffic, UPS has reportedly saved millions of dollars of fuel” (Cropley & Cropley, 2010, p. 305). This was a creative idea that was intentionally introduced and thus innovated by others, but without the adoption of this idea through innovation, the UPS navigation system would not be validated as a creative or novel idea. However, others scholars have argued for the reverse relationship between creativity and innovation by locating creativity as the result of innovative resources in people’s social network (Brass, 1995; Brennan & Dooley, 2005; Paulus, 2002).

This juxtaposition has helped others to consider creativity and innovation as a recursive and networked process that made use of available resources (Degele, 1997), such as ideas, things, and serendipity (Degele, 1997; Leenders, van Engelen, & Kratzer, 2003). Following this, creativity is a matter of combinations or organizations that come into being because of chance.

Thus, creativity has many faces, and the conflation of creativity and innovation reveals the recursive nature of what it means to be creative. It is in the field of communication studies, however, that the recursive relationship between technologies and their uses has been more deeply explored.

The communicative frameworks of creativity

In communication and specifically mobile communication, discussions about creativity and innovation are normally related to technology diffusion (Rogers, 1962), adoption (Dourish, 2003; Isaac, Leclercq, & Besseyre des Horts, 2006; Wirth, Von Pape, & Karnowski, 2008), and appropriation (Aricat & Ling, 2018; Bar et al., 2016; de Souza e Silva et al., 2011). Diffusion studies are the predecessor to the more recent studies of appropriations (Bar et al., 2016) that are starting to circle back to the idea of creativity. Such studies focus on users' initial decisions to engage with emerging technologies (Isaac et al., 2006).

Adoption of innovations was first analyzed at the individual level, via models such as the Theory of Diffusion of Innovations (TDI) and the Technology Acceptance Model (TAM). These initial studies did not focus on creativity itself, but did explore how creativity was communicated through the diffusion of innovations. For example, TDI was used to understand the adoption of information communication technologies (ICTs) within organizations. This model aimed at explaining the whole process of adoption and diffusion over time (Rogers, 1962). Meanwhile, TAM was developed to understand user's perceptions about adopting ICTs within organizations. This model was narrower in focus and tried to identify predictors of adoption and diffusion (Davis, 1989). However, both of these models could not be extended to a dynamic group setting outside of an organization. Besides, they also assume that adoption is a top-down or linear

process (Isaac et al., 2006). As a result, TDI has been partnered with the Theory of Planned Behavior (TPB) and the Unified Theory of Acceptance to account for how external and internal factors influence individuals' behaviors, and to explain the variances in adoption (Ajzen, 1985; Venkatesh, Morris, Davis, & Davis, 2003). Yet, it remains that TDI and TAM's micro-level approaches, which focus on the individual, are not enough to understand adoption within varying social contexts that include, for example, mobile technology use (Isaac et al., 2006). These approaches overlook issues of power associated with access to infrastructures, devices, and literacies necessary for individuals to make choices to adopt technologies.

In the field of mobile communication, appropriation models start to shift focus from individuals to social groups. Earlier studies did not define appropriation; rather, they attempted to describe the phenomenon. Domestication studies, for example, explored how adopting technologies into the home rearranged the moral order of the home and the domestic sphere (Fortunati, 2018; Lehtonen, 2003). Subsequent studies such as the integrative model of Mobile Phone Appropriation (MPA) were among the first to attempt to define appropriation by distinguishing patterns of use. MPA combined previous models such as TDI and TAM, which examined user decisions, with the TPB model that focuses user intentions (Wirth et al., 2008). As an integrative approach, MPA begins to account for social relations that might directly relate to individual decisions through the concept of metacommunication. Although MPA focuses mainly on individuals, at the level of the group, MPA considers use itself as a form of communication.

In an earlier study, Bar et al. (2007) distinguish three phases of the appropriation process. First, the adoption phase involves the use of technology as envisioned by designers. Next, the appropriation phase involves users' experiments with technology within the limits of what the

technology already is. Lastly, the cannibalistic appropriation phase involves creative and sometimes subversive uses of technologies by users. Developing on this, Bar et al. (2016) defines appropriation as “the process through which technology users go beyond mere adoption to make technology their own and embed it within their social, economic, and political practices” (Bar et al., 2016). Appropriation is conceptualized, then, as a political process and a negotiation of power and control over the configuration of technology use and diffusion (Bar et al., 2016; de Souza e Silva et al., 2011). Although using different terminology, Bar et al. (2007) demonstrate that creativity is recursive, similar to the previously mentioned creativity scholars.

Three appropriation modes emerge from Bar et al.’s (2017) definition. First, baroquization occurs when users adorn devices for “built in personalization features” (p. 629), such as adding external charms or embellishments or changing the greeting message to a phone. Next, creolization occurs when users crossbreed established designs with their own needs, such as swapping out SIM cards or batteries. Lastly, cannibalism occurs when users appropriate a device and make it their own. Users can sometimes do this by purchasing a phone that is intended for use with a particular subscriber but alter the device so that it can operate as a stand-alone phone. Although these modes help us to frame the cycle of technology evolution as culturally specific, the metaphors themselves produce culturally problematic relations of power because the concepts suggest a linear progression of innovations rooted in a specific geographic space and historical time through analogies of colonial cultural encounters. Building on the political aspects of this work, de Souza e Silva et al. (2011) investigate mobile phone appropriation in the favelas of Rio de Janeiro where high- and low-income populations interact to bring about unique uses of mobile media. This study finds that mobile media practices and appropriation reflect and are constituted by social and material conditions. For example,

diretãos, illegally obtained phones with a special SIM card, allow drug traffickers to call anywhere in the world for free for ten minutes. de Souza e Silva et al. (2011) conclude that appropriation is a political process of reconfiguring the technological system of mobile phones in relation to local cultures and conditions. Similarly, Aricat and Ling (2018) conduct a study of migrant-worker's appropriation of mobile phones in Singapore and conclude that appropriation is a cultural process of reconfiguring technological systems of mobile phones to meet the cultural demands of host and home countries. Such studies, however, focus on users and not the networked nature of creativity such as the co-constitutive relationship of users and technology.

In a later study, de Souza e Silva et al. (2017) conceptualize mobile phone appropriation as a creative and networked process. In situations where artists lack access to technologies, they make up for it through creative appropriations and collaborations. This is similar to Kelly's (2010) account of the Amish Hackers wherein Amish users will find creative ways to gain access to technologies without having to own the technologies themselves. Other studies have investigated how users and games can subversively and creatively misuse location-based technologies (Farman, 2014). Farman argues that through creative misuse of GPS and locative media, users can reimagine space and resist the dominant modes of spatial production. These examples illustrate how the adoption, diffusion, and appropriation of mobile technologies have resulted in a mobile network of creative users who are embedded into relationships with technology as an aspect of their creativity.

Creativity often "arises in an unplanned fashion" (Leenders et al., 2003, p. 84). The co-constitutive relationship between people and technology reflect issues of power. What a person can use reflects the kind of access they have to specific technologies. Serendipity, in this case, accounts for context specific (unplanned) variables that impact a person's adoption, use, and

appropriation of technologies as a function of chance (Degele, 1997). As such, studies that do not integrate a measure of movement and serendipity often result in typologies, which are useful for developing frameworks, but overlook the possible and nuanced ways in which uses can occur. For example, based on patterns of mobile phone appropriation, Wirth et al. (2008) produced five types of users, Aricat and Ling (2018) produced four types of users, and Bar et al. (2016) produced three modes of mobile phone appropriation. But each type of user and mode of appropriation necessarily changes as users move around, and their relationship with technology is affected by the access to networked resources. For instance, mobile phones are used for wayfaring and connected presence, but in locations where there isn't internet access, the terms of use and type of user change. One way to account for serendipity is through mobility. When moving, users have access to varied resources and network ties, as a result of constraints or opportunities that are context specific, while attending to issues of power and access.

The literature above suggests that creative practices occur through use and become useful through diffusion that emerge out of what users need, or their relationship to technologies. Although communicative frameworks of creativity include social groups, this is mostly a linear and individual process: technologies are designed, diffused, adopted and appropriated by individuals. However, a different perspective emerges when we think of this cycle as emergent and ongoing, where the relationship between users and technologies are symbiotic and co-constructed. So, rather than addressing users vs. technologies, we propose a networked context that is constituted by technologies, people and the environment. As such, we offer the concept of mobile networked creativity, a definition that communicates about disenfranchisement, power, tactics, and strategies.

Defining Mobile Networked Creativity

As we have seen, some recent literature on creativity has indeed defined it taking into consideration network resources (Brass, 1995; Johnson, 2010), infrastructures (Kelly, 2010); communication (Leenders et al., 2003), and serendipity (Degele, 1997). But these studies are isolated and do not “communicate” with each other. As such, there is no comprehensive definition of creativity that takes into consideration the ongoing relationships between users and technologies in the context of their environment. In addition, recently, critical creativity scholars have argued,

The conceptual and methodological narrowness specific for much theorizing in this area makes the psychology of creativity largely incapable to answer calls for social transformation coming from different parts of the world, in particular from communities that experience colonialism and oppression (Glăveanu & Sierra, 2015).

Following this call, we define mobile networked creativity as a way to take into consideration creative practices “at the borders,” those that emerge from situations of hardship, and people who experience colonialism and oppression.

In conflating creativity and innovation, a confusing yet productive definition emerges. It might seem that creativity (a novel idea or thing) leads into innovation (a novelty that is adopted or diffused) that leads into appropriation (a novelty that is adapted or re-invented). At least, this is the narrative that most studies in technology diffusion have taken on. But, the close relationship between creativity, innovation, and appropriation suggests that creativity is not so linear because recursive organization occurs at each proposed stage. Take into consideration, for example, mobile phones. It might seem that first the device is designed by developers to engender specific uses. Next, specific kinds of mobile users emerge, based on the device design

and functions (Aricat & Ling, 2018; Wirth et al., 2008). Specific locations for use, such as the domestic sphere (Fortunati & Taipale, 2017), also emerge. Then, there are unintentional uses, or the device is altered altogether. But these models fail to see that there is “creativity,” that is, recursive and co-constitutive organization involved in all phases of creation, innovation, and appropriation, as evidenced in the many possible ways that a mobile phone can create users and in how users can use and/or alter mobile phones. As such, creativity is not only an artistic practice, a cognitive process, or the production of a novelty. It is not limited to individuals or events, or by the quality of the end product, an individual’s intellect, or even add-value. Rather, creativity is the process by which something continues to be organized in relation to networked resources, chance, spatiality, and mobility. Creativity includes spatiotemporal arrangements and mobility to secure this access. We define mobile networked creativity as a spatial and networked process, emerging from social relationships as well as relationships between users and technologies. Mobile Networked Creativity is a mobile and ongoing process and is embedded into forms of power and politics.

Creativity as spatiotemporal

Location-based traffic apps like Moovit allow users to see the real-time location of a bus or train on their mobile phone screens. These apps are supposed to improve traffic and decrease users’ wait time in bus/train stops. However, they need a minimum infrastructure, such as buses equipped with GPS and maintenance. In Rio de Janeiro (Brazil), services like Moovit are notorious for not working properly; buses arrival times displayed on the app are often wrong and as a consequence the app is deemed useless. In addition, bus companies sometimes reduce the number of bus lines circulating in the city or change buses routes without properly informing the

population. This was the case with bus 581, a line that goes from Cosme Velho to Gávea, neighborhoods in the South Zone of Rio de Janeiro. Over the course of a few months in 2018/2019, a fleet of several buses was reduced to one line.¹ As a consequence, passengers were often waiting for over an hour at the stops. At some point, in order to help passengers, the only remaining bus driver decided to create a WhatsApp group to broadcast to potential passengers the real time bus locations, departure and arrival times. The group was not officially related to São Silvestre, the bus company, and did not use any kind of location-based service. Rather, location was transmitted by text. The group grew by word of mouth; passengers talked to other passengers at the stops and to the bus driver.

The people in the WhatsApp Bus 581 community did not invent a new technology. However, out of the difficulty in urban mobility and lack of public resources, they came up with a creative way to network, repurposing an existing mobile platform (WhatsApp) to replace an inexistent one (Moovit). As a result of this re-organization, they were able to adapt to the lack of proper public transport in their neighborhoods as well as to the issues of time. Similarly, Syrian migrants on route through Europe, exercise creativity to adapt and survive in unknown conditions. For example, in the absence of a major new media outlet, Syrian migrants use mobile phones to communicate insider knowledge about routes, information about border closings, traffickers or “brokers,” the costs of rides, the availability of spaces on a particular vehicle, and the safety of a particular zone (Frouws, Phillips, Hassan, & Twigt, 2016). Like the 581 bus riders, migrants require timely information about space. Official media outlets do not transmit the information that migrants need, nor do they really tend to the needs of migrants. As a result, Lukman Derky, a Syrian in France, organized Facebook posts similarly to that of news media outlet reports and targeted the information for Syrian migrants. Derky used GSP systems to

broadcast last known coordinates of missing vessel, to coordinate requests for help for followers in proximity to each other, and to illustrate trails that have been taken (Frouws et al., 2016). The idea and effectiveness of this network increased as followers communicated about this resource.² This idea allowed migrants from across vast distances and time zones to arrive at a common understanding of the situation unfolding at sea. Accordingly, creative uses of social media applications such as Viber, WhatsApp, Facebook Messenger, and Skype along with GPS enabled or locative media have played a crucial role in assisting migrants with issues of time and space.

Mobile networked creativity takes place in hybrid spaces (de Souza e Silva, 2006), which are defined as mobile spaces created by the interaction of users equipped with mobile technologies. What might look like disjointed people and communities are actually held together through a series of networks and infrastructures enabled by people, technologies, and the natural world.³ By looking beyond the individual and previous notions of creativity, we find that *creativity is essentially implicated as a networked spatiotemporal practice*.

The creative process in both examples are supported by and emerges from an infrastructure composed by mobile phones, social media platforms such as WhatsApp and Facebook, cellular networks, city buses, borders, and also social actors—bus passengers, the bus driver, and migrants.⁴ For instance, it seems that Derky might be responsible for the “creation of” the said Facebook page, but in light of our analysis, the creation emerges from the use of mobile phones, the internet, a large social media platform, GPS systems, and shared information. The creative practice requires this space as a medium for it to develop and further emerge.

This is similar to what Johnson (2010) states when arguing that innovation, or good ideas, emerge from a network of resources in a given space. For Johnson, the diversity (creativity) of coral reefs in the ocean (or “the reef city”) is conditioned by the organisms found in this

particular space, and the space shapes the diversity of the ecosystem. In the bus 581 example above, the creativity of the bus driver + passengers is shaped by and emerges from the spatial and cultural environment of Rio de Janeiro, a large urban space marked by massive traffic jams, heavy public transport use, a negligent municipal government, and solidarity among citizens. For Johnson, nature's creativity is built out of a collection of existing parts within a given space.

While Johnson exemplifies creativity as essentially a spatial process, Kelly (2010) argues that innovation is a matter of time. Our environment contains tools or creations that drive convergent evolution, although there are structural hindrances, the convergence is a network of relations. For example, Einstein is considered a unique genius, although others such as Lorentz, Poincare, and Wien were working on the same problems; it happened that they could not make any further leaps because they had settled on Einstein's ideas. Together, Johnson (2010) and Kelly point to the idea that the phenomenon of creativity is a function of space and time, which we later explore as a function of mobility. By considering the creative practices of communities that depend on time and space, such as bus passengers and migrants, our analysis aligns closely with what critical creativity scholars have argued about the complicated nature of creativity, that is, creativity needs to be conceptualized within the context of space, time, and power (Glăveanu et al., 2019).

Creativity as networked

Mobile networked creativity can also be subversive. In the above-mentioned example of the WhatsApp Bus 581 group, people were legally using a mobile platform in a creative way. Black markets for technology are not new in Brazil and other developing countries (de Souza e Silva et al., 2011; Ilahiane & Sherry, 2008). For example, stolen and pirate cell phones are frequently

sold at the Uruguaiana market in Rio de Janeiro (de Souza e Silva, Damasceno, & Bueno, 2019). More recently, the popularity of location-based apps and electric scooters in large cities like Rio de Janeiro and São Paulo led to several types of black markets and subversive practices. Scooters that are only supposed to be rented through the apps are being increasingly sold in online platforms such as Facebook Marketplace. The scooters are stolen from the streets and advertised online for as much as 250 USD. Through networked creativity, these scooters mostly no longer work as intended—rental location-based public transportation are turned into stand-alone private traditional scooters. Thieves are able to disable the tracking system, and in many cases, use the stolen scooter to steal cell phones in the South Zone of Rio (Guimarães, Leitão, & Soares, 2019). As Bar et. al. (2016) suggested, cannibalistic appropriation occurs when users appropriate the device and make it their own. But in this case, it is not just a class of users, it is a network of users including thieves, buyers, sellers, and devices (scooters and the mobile devices that enable various combinations of possibilities in appropriation) that engage in creativity. Multiple creativities occur simultaneously.

Networked creativity is a social process of becoming. Like a rhizome (Deleuze & Guattari, 1983), no one element can be isolated as an origin: there is an *intermezzo* of ideas and resources that multiply but vary. At the Zaatari Refugee Camp in Jordan, estimated by the United Nations to be second largest refugee camp in the world, the roads are unpaved. Reports indicates that over 1 in 5 refugees in Jordan are disabled, and walking is the number one disability (*Removing Barriers: The Path towards Inclusive Access*, 2018). Safwan Harb, a disabled refugee, used spare parts to produce an “electronic wheelchair” that is part bicycle and part scooter (Copestake, 2016). In this example, Harb multiplies the idea of the “wheelchair” into the variation that it has become. The end product itself has large seat, headlights from a scooter, and

three wheels for stability. Using a network of parts, Harb created his wheelchair with spare bicycle and scooter parts, then wired a 12-volt battery for power, and installed a hand-controlled brake system similar to one on a bicycle. It's not quite clear if the origin of the idea is the bicycle or the wheelchair. Harb's process and his "wheelchair" exemplify the networked process of creativity. And because we can recognize the former self, we may not always give proper creative credit to geniuses such as Harb who have invented something that can be replicated and essentially improve the lives of some disabled refugees at the camp. Moreover, Harb's wheelchair will continue to become something else through recombination: for instance, the 12-volt battery could be replaced by solar energy, which has been popular at the camp.

Here, the creative process unfolds as a network. As we have seen above, networks are spatiotemporal structures (de Souza e Silva & Frith, 2010). They connect elements (or nodes) across distances and times. But, most importantly, networks are emergent processes. They are in constant state of flux, of becoming (Deleuze & Guattari, 1983), rather than being static entities. In a network, it is also impossible to isolate nodes, since each node influences each other and are constructed by the connections (paths) that link them. Nodes are also not only people (Latour, 1996). In the example above, nodes are the scooters, the cell phones, Facebook Marketplace, Rio de Janeiro streets, along with the urban and digital infrastructures that support the network. But, most importantly, the creative process is a self-moving cycle that pushes the creative process forward. Thieves steal cell phones from people; cell phones are sold on the black market; people purchase stolen phones; thieves use cell phones to communicate; people rent scooters; thieves steal scooters; thieves sell scooters on Marketplace; people purchase scooters; people use scooters on the streets. Rather than being a linear cycle, this process has ramifications in many directions, more like a three-dimensional rhizome. The ongoing and emergent network (or

creative process) is ignited by a series of related factors: the lack of public power in policing the streets, the lack of regulation online for selling stolen items, a large low-income class without economic power to purchase new technology, and a social acceptance of these clandestine connections.

Creativity as mobile

All our examples so far focus heavily on mobility—urban mobility, the mobility of networks, and mobile technologies. Mobility and mobile practices are at the core of how creative practices unfold. It is how people move through space and time to encounter new resources for recombination. Mobility, thus, is an intrinsic component of creative practices. However, as Hannan, Sheller and Urry (2006) pointed out, immobility and moorings are also part of the constellations of mobilities: for some people to move, others need to stay still. In our case, the very lack of mobility—social, physical, and economic mobility—is what facilitates creativity. For example, the *celular pai-de-santo*⁵ (father of saints’ cell phone), as it is called in Brazil, is a common practice in countries that have the calling-party-pays (CPP) policy for cell phones. According to this policy, customers who own pre-paid phones (which are the majority of the population, but mostly lower classes) do not need to have credits in their phone in order to receive calls. As a consequence, often people own—and use—phones but their phones “just receive” calls. This led to the common practice of beeping described in many countries (Donner, 2005), where users without credits call another phone, but hang up before the other person picks up. Having a pre-defined arrangement, the targeted person can call back, if they have credits, or pick the kids at school, if they have so previously arranged. In these cases, the lack of resources leads to people using cell phones in creative ways. It’s not the way phones are intended to be

used. But the alternative uses allow people to be part of the mobile telephony economy. However, these users will be deprived of several benefits of the mobile society. If their phones cannot call, they also cannot use the internet or receive data—except when using free wi-fi—and therefore won't have the same access to information of someone with a full subscription that includes unlimited data. A Pokémon Go player in Rio, for example, told us that she stopped playing for many months because her phone didn't have any credits. Not playing Pokémon Go is one of the consequences of not accessing data, one that might not have many socio and political consequences, but it comes with broader implications: they represent a segment of people who are counted as being mobile users, but in fact lack the ability to “move” properly. Their phones do not work as intended, they cannot communicate with the same speed and easiness, and are therefore trapped (immobile) in their social classes. People get creative to access mobile technologies, but still will have a different kind of access.

Refugees and migrants also deal with issues of immobility as a result of politics and infrastructure. Realizing that mobile phones serve as a powerful resource for migrants, governments such as those of Germany and Denmark are using smartphone data as a method of asylum-evaluation decisions, surveillance, and deportations (Meaker, 2018). As a result, migrants have found creative ways to “digitally hide themselves.” For example, some migrants keep up to thirteen different SIM cards hidden on various parts of their body during travel. As a response, other countries such as Bangladesh have placed SIM card bands for non-citizens in efforts to target (Rohingya) refugee populations (Aggarwal, 2017). The Bangladesh government demands identity cards for the purchase of SIM cards and fines phone companies for not following this ordinance. What seems like the creative move of one part is actually constellated with the moves of the other parts. As the Rohingya find creative ways to coordinate about

migration, governments are finding creative ways to prohibit their uses and in turn their mobility. Consequently, they are unable to coordinate, plan, or navigate. For refugees, mobility is crucial for survival, thus, to survive, mobility unfolds creativity.

Conclusion: Mobile Networked Creativity as a politics of survival

As we have demonstrated, mobile networked creativity is spatiotemporal, networked, and mobile. This approach comes from the idea that creativity emerges from a set of relations that develop and overlap over space and time because of unplanned or emergent exigencies. The examples from Brazil and of refugees and migrants demonstrate how creativity occurs and is practiced to prevent such an amputation from society. It is the very reality of being socially invisible or excluded from the network society (Castells, 2000) that drives creativity. Creativity as a mobile and networked force pushes these practices forward. Migrants and refugees are constantly moving, they are the nomads per excellence (Deleuze & Guattari, 1987), but they are constantly prevented from moving. And this friction becomes then an essential part of the creative process. Similarly, slum dwellers in Rio are not recognized by the government and therefore socially invisible, with very little possibility of social and physical mobility. But their creative practices help them transcend their contiguous space. In all their practices, creativity emerge from a system of power struggles and friction against normative forces.

We understand that our examples are limited to specific spaces and cultural practices. But that was necessary because we argue that mobile networked creativity is essentially a spatiotemporal and cultural process. As such, we needed to ground our theory in narrow examples that are limited in space, time and scope. However, the idea of mobile networked creativity can be applied to many different situations in which creative practices emerge as a

product of a networked sociotechnical process among people using mobile technologies in situations of hardship. Our examples demonstrate that networked resources accessed through mobility and mobile technologies facilitate the creative process and, moreover, that serendipity, which is deeply connected to mobility and location, is what makes creativity situationally unique. Thus, mobility is a source and a reason for creativity. We conclude that creativity is a form of communication, one that details what it takes to survive within a system and or with tools that are not necessarily designed for their survival or use and one that communicates to society that even the disenfranchised have the power to engage.

References:

- Abbate, J. (2000). *Inventing the Internet*. Cambridge, MA: MIT Press.
- Aggarwal, D. (2017). Bangladesh imposes mobile phone ban on Rohingya refugees. *Inshorts - Stay Informed*. Retrieved from <https://inshorts.com/en/news/bangladesh-imposes-mobile-phone-ban-on-rohingya-refugees-1506270453961>
- Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckman (Eds.), *Action-control: From cognition to behavior* (pp. 11-39). Heidelberg: Springer.
- Amabile, T. (1996). *Creativity in context*. Boulder: Westview Press.
- Anderson, N., Dreu, C. K. W. D., & Nijstad, B. A. (2004). The routinization of innovation research: a constructively critical review of the state-of-the-science. *Journal of Organizational Behavior*, 25(2), 147-173. doi:10.1002/job.236
- Anderson, N., Potočník, K., & Zhou, J. (2014). Innovation and Creativity in Organizations. 37. Retrieved from <https://journals-sagepub-com.prox.lib.ncsu.edu/doi/pdf/10.1177/0149206314527128>
- Andrews, J., & Smith, D. C. (1996). In Search of the Marketing Imagination: Factors Affecting the Creativity of Marketing Programs for Mature Products. *Journal of Marketing Research*, 33(2), 174-187. doi:10.1177/002224379603300205
- Aricat, R. G., & Ling, R. (2018). *Mobile communication and low-skill migrants' acculturation to cosmopolitan Singapore*. Lanham: Lexington Books.
- Bar, F., Pisani, F., & Weber, M. (2007). *Mobile technology appropriation in a distant mirror: Baroque infiltration, creolization and cannibalism*. Paper presented at the Seminario

- sobre Desarrollo Económico, Desarrollo Social y Comunicaciones Móviles en América Latina, Buenos Aires.
- Bar, F., Weber, M., & Pisani, F. (2016). Mobile technology appropriation in a distant mirror: Baroquization, creolization, and cannibalism. *New Media & Society*, 18(4), 617-636.
- Brass, D. (1995). Creativity: It's all in your social network. In C. Ford & D. Gioia (Eds.), *Creative Action in Organizations: Ivory Tower Visions & Real World Voices* (pp. 94). Thousand Oaks: SAGE Publications, Inc.
- Brennan, A., & Dooley, L. (2005). Networked creativity: a structured management framework for stimulating innovation. *Technovation*, 25(12), 1388-1399.
doi:10.1016/j.technovation.2004.08.001
- Castells, M. (2000). *The Rise of the Network Society*. Oxford: Blackwell.
- Copestake, J. (2016). Refugee inventor builds electric bike. *BBC News*. Retrieved from <https://www.bbc.com/news/av/technology-35871803/the-disabled-refugee-inventor-who-built-an-electric-bike>
- Cropley, D., & Cropley, A. (2010). Functional creativity: 'Products' and the generation of effective novelty. In J. Kaufman & R. Sternberg (Eds.), *Cambridge Handbook of Creativity Research* (pp. 301-317). Cambridge: Cambridge University Press.
- Davis, F. (1989). Perceived usefulness, perceived eas of use, and user acceptance of information technology. *MIS Quarterly*, 13(1), 319-339.
- de Souza e Silva, A. (2006). From cyber to hybrid: Mobile technologies as interfaces of hybrid spaces. *Space and Culture*, 3, 261-278.
- de Souza e Silva, A., Damasceno, C. S., & Bueno, D. (2019). Generic Phones in Context: The circulation and social practices of mobile devices in Rio de Janeiro. In R. Wilken, G.

- Goggin, & H. Horst (Eds.), *Location Technologies in International Context* (pp. 158-172). New York: Routledge.
- de Souza e Silva, A., Duarte, F., & Damasceno, C. S. (2017). Creative Appropriations in Hybrid Spaces: Mobile Interfaces in Art and Games in Brazil. *International Journal of Communication, 11*, 1705-1728.
- de Souza e Silva, A., & Frith, J. (2010). Locative mobile social networks: Mapping communication and location in urban spaces. *Mobilities, 5*(4), 485-506.
- de Souza e Silva, A., Sutko, D., Salis, F., & de Souza e Silva, C. (2011). Mobile phone appropriation in the favelas of Rio de Janeiro, Brazil. *New Media & Society, 13*(3), 411-426. doi:10.1177/1461444810393901
- Degele, N. (1997). Appropriation of Technology as a Creative Process. *Creativity and Innovation Management, 6*(2), 89-93. doi:10.1111/1467-8691.00054
- Deleuze, G., & Guattari, F. (1983). *A thousand plateaus* (B. Massumi, Trans.). Minneapolis: University of Minnesota Press.
- Deleuze, G., & Guattari, F. (1987). *A Thousand Plateaus: Capitalism & Schizophrenia* (B. Massumi, Trans.). Minneapolis: University of Minnesota Press.
- Donner, J. (2005, May 26-30). *The rules of beeping: Exchanging messages using missed calls on mobile phones in sub-Saharan Africa*. Paper presented at the 55th Annual Conference of the International Communication Association.
- Dourish, P. (2003). The Appropriation of Interactive Technologies: Some Lessons from Placeless Documents. *Computer Supported Cooperative Work (CSCW), 12*(4), 465-490. doi:10.1023/A:1026149119426

- Farman, J. (2014). Creative misuse as resistance: Surveillance, mobile technologies, and locative games. *Surveillance & Society*, 12(3), 377-388.
- Fortunati, L. (2018). Robotization and the domestic sphere. *New Media & Society*, 20(8), 2673-2690. doi:10.1177/1461444817729366
- Fortunati, L., & Taipale, S. (2017). A different glimpse into mobilities: On the interrelations between daily spatial mobility and social mobility. *The Information Society*, 33(5), 261-270.
- Frouws, B., Phillips, M., Hassan, A., & Twigt, M. (2016). Getting to Europe the Whatsapp Way: The Use of ICT in Contemporary Mixed Migration Flows to Europe.
- Gahan, P., Minahan, S., & Glow, H. (2007). A creative twist: Management theory, creativity and the Arts. *Journal of Management & Organization*, 13(1), 41-50.
doi:10.1017/S1833367200003898
- Glăveanu, V. P. (2014). *Thinking through creativity and culture: toward an integrated model*. New Brunswick: Transaction Publishers.
- Glăveanu, V. P., Hanson, M. H., Baer, J., Barbot, B., Clapp, E. P., Corazza, G. E., . . . Sternberg, R. J. (2019). Advancing Creativity Theory and Research: A Socio-cultural Manifesto. *The Journal of Creative Behavior*, 0(0), 1-5. doi:10.1002/jocb.395
- Glăveanu, V. P., & Sierra, Z. (2015). Creativity and epistemologies of the South. *Culture & Psychology*, 21(3), 340-358. doi:10.1177/1354067X15601196
- Guimarães, A., Leitão, L., & Soares, P. R. (2019, 14 June 2019). Polícia recebe relatos de roubos de patinetes no Rio mesmo com tecnologia de rastreamento. *Globo.com*. Retrieved from <https://g1.globo.com/rj/rio-de-janeiro/noticia/2019/06/14/policia-recebe-relatos-de-roubos-de-patinetes-mesmo-com-tecnologia-de-rastreamento.ghtml>

- Hafner, K., & Lyon, M. (1998). *Where wizards stay up late: The origins of the Internet*: Simon and Schuster.
- Hannam, K., Sheller, M., & Urry, J. (2006). Mobilities, immobilities and moorings. *Mobilities*, 1(1), 1-22.
- Hayward, P. (1990). *Culture, Technology & Creativity in the Late Twentieth Century*: Indiana University Press.
- Ilahiane, H., & Sherry, J. (2008). Joutia: street vendor entrepreneurship and the informal economy of information and communication technologies in Morocco 1. *The Journal of North African Studies*, 13(2), 243-255.
- Isaac, H., Leclercq, A., & Besseyre des Horts, C.-H. (2006). Adoption and appropriation: towards a new theoretical framework. An exploratory research on mobile technologies in French companies. *Systèmes d'Information et Management*, 11(2), 9.
- Isaacson, W. (2014). *The innovators: How a group of inventors, hackers, geniuses and geeks created the digital revolution*: Simon and Schuster.
- Johnson, S. (2010). *Where good ideas come from: The natural history of innovation*. New York: Riverhead Books.
- Kaufman, J. C. (2015). Creativity Is More Than Silly, More Than Art, More Than Good: The Diverse Career of Arthur Cropley. *Creativity Research Journal*, 27(3), 249-253.
doi:10.1080/10400419.2015.1063879
- Kelly, K. (2010). *What technology wants*. New York: Viking.
- Latour, B. (1996). On Actor-Network Theory: A few clarifications. *Soziale Welt*, 47, 369-381.
Retrieved from <http://www.jstor.org/stable/40878163>

- Leenders, R. T. A. J., van Engelen, J. M. L., & Kratzer, J. (2003). Virtuality, communication, and new product team creativity: a social network perspective. *Journal of Engineering and Technology Management*, 20(1), 69-92. doi:10.1016/S0923-4748(03)00005-5
- Lehtonen, T.-K. (2003). The Domestication of New Technologies as a Set of Trials. *Journal of consumer culture*, 3(3), 363-385. doi:10.1177/14695405030033014
- Meaker, M. (2018, 2018/07/02/). Europe is using smartphone data as a weapon to deport refugees. *Wired UK*. Retrieved from <https://www.wired.co.uk/article/europe-immigration-refugees-smartphone-metadata-deportations>
- Mumford, M., & Gustafson, S. (1988). Creativity syndrome: Integration, application, and innovation. *Psychological Bulletin*, 103(1), 27-43.
- Paulus, P. (2002). Different ponds for different fish: A contrasting perspective on team innovation. *Applied Psychology: An International Review*, 51(1), 394-399.
- Perry-Smith, J. E., & Shalley, C. E. (2003). The Social Side of Creativity: A Static and Dynamic Social Network Perspective. *The Academy of Management Review*, 28(1), 89-106. doi:10.2307/30040691
- Removing Barriers: The Path towards Inclusive Access*. (2018). Retrieved from https://d3n8a8pro7vhm.cloudfront.net/handicapinternational/pages/5144/attachments/original/1537200854/Jordan_Removing_Barriers_2018_Report_Final_web.pdf?1537200854
- Rogers, E. (1962). *Diffusion of Innovations* (Fourth ed.). New York: The Free Press.
- Runco, M. (2007). *Creativity: Theories and themes: Research development and practice*. Burlington: Elsevier Academic Press.

- Runco, M., & Jaeger, G. J. (2012). The Standard Definition of Creativity. *Creativity Research Journal*, 24(1), 92-96. doi:10.1080/10400419.2012.650092
- Runco, M., & Richards, R. (1997). *Eminent Creativity, Everyday Creativity, and Health*: Greenwood Publishing Group.
- Shalley, C. E., Zhou, J., & Oldham, G. R. (2004). The Effects of Personal and Contextual Characteristics on Creativity: Where Should We Go from Here? *Journal of Management*, 30(6), 933-958. doi:10.1016/j.jm.2004.06.007
- Steiber, A., & Alänge, S. (2013). A corporate system for continuous innovation: the case of Google Inc. *European Journal of Innovation Management*, 16(2), 243-264. doi:10.1108/14601061311324566
- Sternberg, R. J. (2018). A triangular theory of creativity. *Psychology of Aesthetics, Creativity, and the Arts*, 12(1), 50-67. doi:10.1037/aca0000095
- Turkle, S. (1995). *Life on the screen: Identity in the age of the Internet*. New York: Simon and Schuster.
- Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User Acceptance of Information Technology: Toward a Unified View. *MIS Quarterly*, 27(3), 425-478. doi:10.2307/30036540
- Weiner, R. (2000). *Creativity and Beyond: Cultures, Values, and Change*: SUNY Press.
- Wirth, W., Von Pape, T., & Karnowski, V. (2008). An Integrative Model of Mobile Phone Appropriation. *Journal of Computer-Mediated Communication*, 13(3), 593-617. doi:10.1111/j.1083-6101.2008.00412.x
- Wreen, M. (2015). Creativity. *Philosophia*, 43(3), 891-913. doi:10.1007/s11406-015-9607-5

Endnotes

¹ A few regular passengers affirm this was because the bus company wanted to cut expenses. Popular press sources note that the bus company went bankrupt. See: <https://oglobo.globo.com/rio/linhas-de-onibus-desaparecidas-na-urca-voltarao-circular-neste-sabado-23048964>.

² Frowns et al. (2016) report that, at the time, Derky had over Facebook 58,000 followers.

³ Following Kelly (2010) and Turkle (1995) we see technology and humans not as separate entities, but co-constitutive of each other. We create our technologies and they create us, in an ongoing and recursive process.

⁴ We could also extend this network to WhatsApp designers, employees of cell phone companies, etc., but this analysis is outside the scope of this paper, as we are focusing on the smaller localized networks.

⁵ In Afro-Brazilian candomblé religion, pai-de-santo is the priest who receives the spirits from beyond. In a similar fashion, the cell phone pai-de-santo “just receives” calls.