Tech Public of Erosion

The Formation and Transformation of the Palestinian Tech Entrepreneurial Public

Boulus-Rødje, Nina; Bjørn, Pernille

Published in:
Computer Supported Cooperative Work: CSCW: An International Journal

DOI:
10.1007/s10606-021-09419-y

Publication date:
2022

Document Version
Peer reviewed version

Citation for published version (APA):
Boulus-Rødje, N., & Bjørn, P. (2022). Tech Public of Erosion: The Formation and Transformation of the Palestinian Tech Entrepreneurial Public. *Computer Supported Cooperative Work: CSCW: An International Journal*, *31*, 299-339. https://doi.org/10.1007/s10606-021-09419-y

Manuscript presentation

Running head: Tech Public of Erosion

Title: Tech Public of Erosion: The Formation and Transformation of the Palestinian Tech Entrepreneurial Public

Authors: Nina Boulus-Rødje (corresponding author) and Pernille Bjørn

Affiliations: Roskilde University and University of Copenhagen (Denmark)

Corresponding author: Nina Boulus-Rødje, Department of People and Technology, Roskilde University, Universitetsvej 1, 10.1, 4000 Roskilde, Denmark. Phone: 5022 1895; Email: ninabr@ruc.dk

Tech Public of Erosion: *The Formation and Transformation of the Palestinian Tech Entrepreneurial Public*

Nina Boulus-Rødje (corresponding author) & Pernille Bjørn
Roskilde University; University of Copenhagen (Denmark)
ninabr@ruc.dk; pernille.bjorn@di.ku.dk

Abstract. Our five-year ethnographic study of Palestinian tech entrepreneurship provides a unique case that examines the interplay between technology, politics and power dynamics. In this paper, we trace the formation of the Palestinian tech entrepreneurial public and analyse how it has transformed from being a counterpublic to serving as a beacon for the development of the Palestinian economy while under Israeli occupation. Despite its apparent success, the foundation of the Palestinian entrepreneurial public is fragile, as it is stuck in a repeat and rewind cycle involving the eternal application of the lean startup approach and the associated business models, which encourage the mimicking of Western design solutions. We develop the concept of a *public of erosion* to characterise how the Palestinian entrepreneurial public has been produced and shaped by the attrition stemming from the interlinked infrastructures created by donor agencies, powerful billionaires, the government and the Israeli occupation. A public of erosion is characterised by heavy dependencies on factors outside its immediate control, and is shaped by processes that constantly dismantle resources, leading to the wearing down of its foundation. The concept of a public of erosion is intended to provide researchers with a new language and a lens to apply when investigating digital technologies in the Global South. Finally, we demonstrate how the current structural conditions result in producing bounty hunters and real estate projects, rather than a strong digital ecosystem necessary for the development of sustainable digital technologies.

Keywords: Counterpublic, Donor fund, Entrepreneurship, Ethnographic studies, Entrepreneurial public, Palestine, Public, Startup, Sustainability, Tech entrepreneurship

1 Introduction

The field of computer-supported cooperative work (CSCW) has a strong tradition of examining how politics and technology intertwine as well as the consequences of that relationship on the conditions surrounding work practices and technology design (Bjørn and Balka 2007; Suchman 1994; Winner 1986). Societies design technologies, which in turn make societies. In this paper we explore a unique empirical case manifesting the intertwined relations between politics and technology, namely the case of tech entrepreneurship in Palestine. Tech

entrepreneurship has been said to serve as an engine for both economic growth and innovative sustainable development (Aldairany and Quoquab 2018), specifically in developing societies. Tech entrepreneurship is seen 'as a key part of the solution to ending poverty and social inequity, promoting women's empowerment, and implementing business solutions to the world's environmental challenges, including climate change' (Bosam et al. 2020, p. 13). For these reasons, recent decades have witnessed the proliferation of startup societies, with tech entrepreneurship becoming a key player in economies worldwide. However, research on tech entrepreneurship remains scarce (Hsiao et al. 2013; Kraus et al. 2019), and the field of entrepreneurship more generally has largely been dominated by studies conducted in the United States (Ulhøj 2005), reflecting a specific social, historical and institutional characteristics of the American entrepreneurial culture typically associated with Silicon Valley.

Although tech entrepreneurship has frequently been viewed as an endeavour that is easily accessible to—and can be replicated by—anyone, anywhere and anytime, recent studies have demonstrated how existing socio-economic inequalities and social injustice are propagated in the entrepreneurial domain, thereby amplifying the reality of uneven possibilities (Csikszentmihalyi et al. 2018; Dillahunt et al. 2018). Similarly, while entrepreneurs have typically been portrayed as generic superstars (Brück et al. 2013)—people who are self-taught, self-reliant and self-employed—they are nevertheless a reflection of their time and place, which shape the types of challenges and opportunities they encounter (Georgieva 2016; Avle et al. 2019). Recently, increased attention has been paid to the entrepreneurship that is unfolding at the margins (Avle and Lindtner 2016; Bjørn and Boulus-Rødje 2018; Irani 2019; Taura et al. 2019), highlighting the significantly different conditions that these entrepreneurs have when compared with the superstars found at the centre. This article extends the literature on entrepreneurship at the periphery by drawing upon our research concerning tech entrepreneurship in the Occupied Palestinian Territory, where entrepreneurs are forced to operate under extremely challenging conditions (Baidoun et al. 2018). Although there has been an increase in studies of entrepreneurship in conflict and post-conflict contexts, such studies rely heavily on secondary data (Aldairany and Quoquab 2018). Our five-year ethnographic study aims to extend the literature by providing new insights that weave the various elements of the Palestinian ecosystem, and closely tracing the changes that have taken place in the Palestinian tech entrepreneurial community over the past decade.

Our study of Palestinian tech entrepreneurship offers a unique case for examining the interplay between technology, politics, and power dynamics, and provides empirical evidence on how systems design spaces in which technologies are developed and designed in turn re-enforce the design of that very system. We use the concepts of *publics* and *counterpublics* to analyse how tech entrepreneurship has transformed into becoming a mainstream majority collective,

which performs the political agenda of tech entrepreneurship as a driver for economic mobility within the Palestinian society. In this way, we join other CSCW researchers in focusing our attention to the resources, processes and activities required for participatory infrastructuring when establishing and sustaining infrastructures and systems over time (Bødker et al. 2017). While the two concepts of publics and counterpublics were originally developed in relation to political collectives (Fraser 1990; Warner 2005), they have been adopted by researchers from the fields of participatory design (PD) (Le Dantec and DiSalvo 2013) and human-computer interaction (HCI) (DiSalvo et al. 2014; Teli et al. 2015), and they have been extended to include other types of collectives. Applying the concepts of publics and counterpublics to our CSCW study allows us to develop new insights into the formation and transformation of the Palestinian tech entrepreneurial public.

The present paper seeks to answer the following research questions: *How was the Palestinian tech entrepreneurial public formed and transformed, and what are its key characteristics?* We find that the tech entrepreneurial counterpublic in Palestine began as a minority comprising fragmented members of different social groups that circulated counter-discourses (Fraser 1990) and alternative ideas about the potential of tech entrepreneurship to generate economic growth. By tracing and documenting the transformation of the counterpublic over time, as well as the collective enrolment of other powerful actors and systems, we demonstrate how the Palestinian entrepreneurial counterpublic eventually became mainstream. Yet, we argue that despite its apparent success, the foundation of the Palestinian entrepreneurial public is fragile, as it is stuck in a repeat and rewind cycle involving the eternal application of the lean startup approach and the associated business models, which encourage the mimicking of Western design solutions. Moreover, we demonstrate how the Palestinian entrepreneurial public has been exposed to a host of powerful external and internal forces (e.g. donor agencies, the Israeli occupation, powerful billionaires, the government and the internal monopoly), which have resulted in wearing down its already temporal and fragile foundation. To characterise the current Palestinian tech entrepreneurial public, we develop the concept of a *public of erosion* to refer to a specific type of public that faces constant dismantlement, which threatens its long-term sustainability. A public of erosion is shaped by constantly shifting and discontinuing processes, dislocating resources, disrupting and dissolving initiatives, and the wearing down of its foundation. This concept is intended to provide researchers with a new language and a lens to apply when examining digital technologies in the Global South. Our empirical case on the transformation of the Palestinian tech entrepreneurial public contributes to the rich work on politics in CSCW by demonstrating and manifesting how the relationship between technology, politics, and power dynamics shapes and is shaped by external and internal infrastructures which makes the Palestinian society.

In the next section, we introduce our conceptual grounding and elucidate the natures of both publics and counterpublics in relation to entrepreneurship at the

margins. Then, we present the political context underlying tech entrepreneurship in Palestine as well as the methods we used to collect and analyse the empirical data. This is followed by the results section, which identifies the transformations and conditions that have surrounded the Palestinian tech entrepreneurial public over the past decade. Finally, we use the concept of a public of erosion to characterise and discuss the consequences of such developments for the Palestinian tech entrepreneurial public and the technologies developed.

2 Conceptual Grounding

To establish the conceptual grounding required to analyse the formation and transformation of the Palestinian tech entrepreneurial public, we draw upon the concepts of publics and counterpublics that originated in the fields of communication and cultural studies (Fraser 1990; Habermas 1991 [1962]; Warner 2005; Roslyng and Blaagaard 2016) and later served as the grounding for research on publics within the HCI (DiSalvo et al. 2014; Teli et al. 2015) and PD (Le Dantec and DiSalvo 2013) fields. We then apply these concepts to our investigation of *the tech entrepreneurial public* by engaging with research concerning entrepreneurship and technology development at the margins (Wulf et al. 2013b; Avle and Lindtner 2016; Bjørn and Boulus-Rødje 2018; Csikszentmihalyi et al. 2018; Dillahunt et al. 2018; Ames 2019; Avle et al. 2019; Irani 2019).

Publics and counterpublics are both cooperative entities, where multiple people are mutually engaged in a common field of work (Schmidt and Simone, 1996). It is exactly this mutual engagement produced by the *interdependence* within the common field of work (Schmidt and Bannon, 1992), which makes the case of the Palestinian tech entrepreneurship important and relevant for the CSCW field. The interdependence produces certain relations and links between the technologies, people, and spaces critical for shaping the nature and foundation of tech entrepreneurship. Interdependence requires articulation work in cooperative activities (Star and Strauss, 1999), as is the case of the Palestinian tech entrepreneurship. However, whereas CSCW studies of articulation work often focus on how individuals engage in cooperative work, for example in healthcare work (Benard, et al. 2006; Boulus and Bjorn 2008; Fitzpatrick and Ellingen 2013) or knowledge work (Boulus-Rødje 2018; Boulus-Rødje and Bjorn 2015), this paper investigates articulation work as the interdependences between actors in publics and counterpublics which makes tech entrepreneurship in Palestine. We extend the previous CSCW and HCI research on tech entrepreneurship (e.g., Bjørn and Boulus-Rødje 2018; Avle et al. 2019; Irani 2019) by applying the concepts of publics and counterpublics as analytical lenses as well as by examining how publics are formed and transformed differently over time depending on the external socio-economic and political conditions.

2.1 Publics and Counterpublics

2.1.1 Publics

The concept of a public refers to a specific configuration of individuals who are connected by a shared desire to address a common issue, including the experienced or anticipated conditions and consequences (Dewey 1927). In other words, a public is formed when a group of individuals come together to confront a common challenge. The prior research on publics addresses participants' effort to enact desired futures and prompt change (Le Dantec and DiSalvo 2013). A public is not exclusively limited to a particular social class, as it comes into being due to a shared desire to break away from existing political arrangements and institutionalised systems (Dewey 1927). While Dewey's (1927) work highlights the plurality of publics and the multiplicity of opinions within a public, Habermas (1991 [1962]) portrays the public sphere as a universal space that is accessible for participation, wherein the participants address the common good and reach a consensus through rational discourse. Habermas' (1991 [1962]) work has been criticised for disregarding the fact that the public sphere is not accessible to everyone. In fact, entry to participate in the public sphere is only granted to particular kinds of collectives and social relations—typically associated with philanthropic, expert, professional and cultural groups (Fraser 1990).

Although Habermas (1991 [1962]) views a public as an expression of rationality, popular will and consensus, Dewey (1927) views a public as an unorganised assembly of many different stakeholders who may all have different interests. Therefore, Dewey's conception focuses on the conditions surrounding the formation of a public. More specifically, a public is formed when issues require its involvement, expression and intervention (Dewey 1927), and it is informed by the specific constitution of itself and its relations with the world (Le Dantec and DiSalvo 2013). A central component of any public is the process involved in identifying and forming attachments, which specifically highlights the dependencies and commitments that occur as a public forms (Le Dantec and DiSalvo 2013).

2.1.2 Counterpublics

The concept of a counterpublic was developed as a critique of Habermas' (1991 [1962]) monolithic portrayal of publics. To recognize the multitude of potential publics, as well as the plurality of possible voices and views, Fraser (1990) and later Warner (2005) propose 'counterpublics' as a way of making space for marginalised or disenfranchised people, that is, those whose interests are not expressed by the dominant wider public or institutions. Counterpublics are 'structured by alterative dispositions or protocols' and 'defined by their tension with a larger public' (Warner 2005, p. 56). Counterpublics are not organised by a specific place or institution, but rather by a circulation of discourse and a common

terminology. They are ignited by a shared interest or vision that stands in opposition to the masses (i.e. the pre-given public sphere).

Counterpublics formulate their interpretations of their interests and needs in opposition to those of the majority (Fraser 1990), and they maintain an awareness of their 'subordinate status' (Warner 2005, p. 56) while they oppose constitutional conventions and dominant hegemonic structures. As Fraser (1990, p. 68) explains:

> Counterpublics have a dual character. On the one hand, they function as spaces of withdrawal and regroupment; on the other hand, they also function as training grounds for agitational activities directed toward wider publics. It is precisely in the dialectic between these two functions that their emancipatory potential resides.

The concepts of publics and counterpublics have previously been used to refer to the mobilisation of social movements and/or political formations, for example, a feminist public affairs television show challenging the dominant ideological assumptions (Steiner 2005), the Arab-American press contesting the dominant public discourse regarding Arabs following the 9/11 attacks (Kaufer and Al-Malki 2009), and social movements in Germany (Negt 1993). Over the past decade, the focus of research in this regard has expanded from political activism to digital activism and counterpublics in the digital sphere (Wulf et al. 2013a). A number of studies demonstrate how the internet provides a space and a channel for minorities, marginalised groups and counter-voices typically excluded from the public sphere or dominant discourse (McLean 2018). Some prior studies examine specific online spaces, for example, blogs written by Arab women (Elsadda 2010) or by Muslims living in Germany (Eckert and Chadha 2013), or the comment sections of news websites (Toepfl and Piwoni 2015). Others studies examine digital activism more broadly, for example, Kasm (2018) chronicles the development of an Egyptian non-profit media collective and their use of online digital activism to establish counter-hegemonic spaces and alternative oppositional discursive frameworks exposing state crimes during the popular uprising.

Publics and counterpublics represent useful conceptual lenses for highlighting the dynamic and fluid nature of the Palestinian tech entrepreneurial scene, which is dependent upon, and contingent on, the unstable socio-political and economic conditions resulting from the Israeli occupation. Some studies on counterpublics (e.g. Fraser 1990; Warner 2005) demonstrate a tendency to focus on discourse. We consider that, to fully understand counterpublics, it is critical to include the interplay between discursive spaces and actual practices enacted on the ground. In accordance with this perspective, we examine the ways in which diverse individuals and groups are enrolled in efforts to use tech entrepreneurship as a vehicle for improving the economic conditions in Palestine, in addition to how such efforts result in a gradual change in the dominant and mainstream attitude. In our analysis, we highlight the dependencies and commitments that occur as the tech entrepreneurial public forms and enrols diverse sociomaterial resources. We do so

by tracing the ways in which the conditions transform over time and by unpacking the means of collective expression applied in alternative discursive spaces.

2.2 Entrepreneurship

2.2.1 The Proliferation of Entrepreneurship

Entrepreneurship is currently perceived as the principal driver of innovation and economic growth worldwide (Aldairany and Quoquab 2018). Indeed, the global startup economy continues to grow at an unprecedented speed, and it is thought to have a value of $2.8 trillion (Gauthier et al. 2019). However, opportunities to participate in the global startup economy are not evenly distributed (*ibid.*). Moreover, despite the increase in studies of entrepreneurship, research in this regard remains scarce (Hsiao et al. 2013; Kraus et al. 2019), especially in relation to entrepreneurship at the margins.

Prior research on entrepreneurship has generally focused on examining the various forms of entrepreneurship and identifying the key factors related to success. The social capital theory has proved highly popular (Hsiao et al. 2013; Marvel 2013; Georgieva 2016), as it emphasises how the success of entrepreneurs is not determined solely by their qualities, but also by the social networks and economic structures in which they operate. One of the earlier studies of startups in Europe (Ulijn et al. 2007) identifies the importance of both formal and informal support across organisations, institutions, family and friends, as well as cooperation among startups, as critical. Inspired by the work of Karl Marx and Pierre Bourdieu, researchers distinguish between different types of capital, namely social capital (e.g. personal networks, such as friends, colleagues and more general contracts, which provide access to support and resources), human capital (e.g. personal skills, experience, expertise, reputation and educational background) and financial capital (e.g. cash, bank deposits, investments and credit) (Portes 2000). While most studies keep the different types of capitals separate, some emphasise how they are intertwined (Hsiao et al. 2013). Although the different types of capitals are undoubtedly useful as analytical lenses, we argue that they may not fully capture the infrastructural inaccessibilities that influence entrepreneurial practices. Afterall, the entrepreneurs at the margins, who generally suffer from socio-economic inequalities, are disproportionally disadvantaged when compared with their counterparts at the centre (Dillahunt et al. 2018). Social capital theory appears to assume that the necessary ecosystems and infrastructures are always in place (e.g. legal and technical infrastructures), and thereby does not clearly capture the political forces and power imbalances effecting the capacities and limits of entrepreneurial practices at the margins.

The field of entrepreneurship has largely been dominated by studies conducted in the United States (Ulhøj 2005), which reflect the American entrepreneurial culture typically represented by the Silicon Valley model, including its approaches

and business models. Particularly notable in this regard are the lean startup approach (Blank 2013) and the business model canvas (Osterwalder et al. 2010), which have become the gold standards for all startups and entrepreneurs around the world. The lean startup approach emphasises the importance of determining whether a proposed business idea is viable before beginning product development. This is achieved through testing, experimentation and iterative product releases. It underscores the importance of continuous 'pivoting' and 'scaling' to achieve a 'minimal viable product' (Blank 2013). Despite this emphasis on iterative and continuous deployment, traditional entrepreneurship models and frameworks assume relatively stable and fixed boundaries around a given entrepreneurial opportunity (Nambisan 2017, p. 1034). However, entrepreneurial processes and outcomes are susceptible to constant changes, and neither their processes nor their success can be evaluated by a predefined value proposition or limited by a pre-specified business plan.

2.2.2 Entrepreneurship in Conflict and Post-Conflict Countries

Tech entrepreneurship is also emerging in conflict and post-conflict countries, which are characterised by fragile environments, deficient infrastructures, a lack of trust in people and institutions, systematic violence and a lack of strong governmental institutions. The conditions facing tech entrepreneurs in conflict contexts differ fundamentally from those associated with stable environments (e.g. Silicon Valley), wherein the entrepreneur is depicted as the stereotypical hero who begins his career working in his garage and ends up creating a multinational enterprise (Brück et al. 2013). Nevertheless, an entrepreneur does not need to be socially privileged, but rather to have the ability to think differently and recognise new business opportunities (Georgieva 2016). Entrepreneurships in conflict contexts are portrayed as simple, local and informal businesses, reflecting the coexisting presence of opportunities and the necessity to do business in order to survive. Such portrayals are applicable to the Palestinian context, wherein entrepreneurship has become a necessity for economic survival due to the lack of employment opportunities and the associated high unemployment rate. In such a context, entrepreneurs need to be capable of doing more with less resources (*ibid.*). Yet, tech entrepreneurship can still have a positive influence in conflict and post-conflict countries, for example, changing the relationship between conflicting parties in Rwanda following the genocide (Tobias and Boudreaux 2011) and providing new possibilities for marginalised and otherwise excluded people to participate in the global market (Taura et al. 2019).

Although the challenges encountered in conflict and post-conflict areas depend upon the specific contextual circumstances in different countries, there are a few prominent obstacles present across all contexts. Aside from the well-known constraints that entrepreneurs encounter when starting a venture in any country and context (e.g. financial constraints and risk taking), there are additional obstacles

that play a more crucial role in conflict and post-conflict areas. These include undeveloped markets, educational systems in the process of restructuring and societal distrust (Georgieva 2016), deficient human capital (e.g. educational background and work experience) (Aldairany and Quoquab 2018), older-generation technologies, as well as racial and class discrimination (Avle et al. 2019).

We argue that there are three key challenges that must be addressed when examining entrepreneurship in fragile economies and low-resource environments. The first such challenge stems from dysfunctional infrastructures and poor institutional and legal support (Bjørn and Boulus-Rødje 2018), which give rise to destructive entrepreneurial tendencies prompted by a deficient 'incentive structure' that produces 'conflict profiteers' (Subedi 2013). Therefore, in fragile societies, entrepreneurs depend upon formal and informal institutional support to sustain their economic and social roles (Aldairany and Quoquab 2018). Several studies conducted in African countries reveal that entrepreneurs suffer not only from a lack of institutional support, but also from the structural and systemic elements inscribed within the ecosystem, including the monopolies of big companies, and racial discrimination in terms of access to capital (Csikszentmihalyi et al. 2018; Taura et al. 2019). The second key challenge relates to the seemingly eternal trend of mimicry, whereby highly successful Western apps (e.g. Uber, Airbnb, eBay) are copied and adapted to the local context. It has been said that, due to differences in the socio-political and economic conditions, 'entrepreneurs under harsh situations may not imitate [those] living in developed or even developing countries who have access to funds, support and new technology' (Aldairany and Quoquab 2018, p. 369). Csikszentmihalyi et al. (2018, p. 5) argue that imitation fails in such conditions because it is akin to inventing something that has already been invented and because 'one can imitate the product, but not necessarily the use'. The third key challenge relates to 'early-stage internationalisation', whereby startups directly target the global market, rather than targeting the local market first and then gradually scaling up (Manolova et al. 2014).

3 Empirical Case and Methods

3.1 The Political and Economic Context in Palestine

Palestine represents a unique setting in various ways, as it differs from many other countries in terms of its size, age, disconnected and fragmented geography, poor economy, and distinctive political situation. It has been occupied by Israel since 1948, and it currently represents 'the last occupied country in the globe to date where [entrepreneurs] are required to operate in extremely challenging situations' (Baidoun et al. 2018, pp. 61–62). There are nearly five million Palestinians

(Palestinian Central Bureau of Statistics [PCBS] 2019) spread across the disconnected and fragmented geography that constitutes the West Bank and the Gaza Strip. All movement within the West Bank, as well as that between the West Bank and Gaza and abroad, is fully controlled by the Israeli government, meaning that it is restricted by checkpoints, closed areas, a complex system of permits, identification cards, a separation wall, etc. (Boulus-Rødje et al. 2015).

As an occupied territory, the Palestinian economy depends on Israel. According to the World Bank (2019), the Palestinian economy has witnessed a steep decline in economic growth in recent years, which has hampered its ability to create jobs and raise living standards. Due to the ongoing occupation by Israel, which has resulted in many restrictions and political instability, the Palestinian economy has significantly suffered. When considered alongside the Palestinian Authority's (PA's) fiscal crisis, the internal divide between the West Bank and Gaza (which has produced a dual regulatory framework) and the sporadic donor support, this has resulted in an economy that operates much below its potential (Sabella et al. 2014). In fact, there has been a sharp decline in donor funds (from 32 per cent of the gross domestic product [GDP] in 2008 down to six per cent in 2015), which has significantly weakened the economy (Baidoun et al. 2018). The unemployment rate in the Occupied Palestinian Territory has remained stubbornly high, reaching 30.8 per cent (Bank 2019). The Human Development Index (HDI) value for Palestine is 0.677, which positions the country at 140 out of 189 countries (*ibid.*). The private sector in Palestine is dominated by small- and medium-sized enterprises (SMEs), which account for more than 98% of all enterprises (Bayyoud and Sayyad 2016). Although SMEs form the backbone of the Palestinian economy, their contribution to the country's GDP has been rather weak (*ibid.*). Nevertheless, SMEs are generally viewed as important in relation to creating jobs and reducing dependency on foreign markets (Baidoun et al. 2018). However, the economy remains insufficient to realise economic sovereignty due to the persisting political uncertainty, the small-scale nature of Palestinian entrepreneurship, 'the structural imbalance between a low-cost Palestinian economy and high value Israeli economy; and…individual self-interest trumping national solidarity among Palestinian firms' (Burton 2016, p. 45). Many refer to the signing of the Oslo Accords (1993) as the turning point at which Palestinian nationalistic values of resistance, resilience and perseverance were replaced with individualistic values of materialism and capitalism.

3.2 Methods and Data Analysis

In this paper, we draw upon our ethnographic study of the tech entrepreneurial community in Palestine to examine the transformations and characteristics of the tech public. Our ethnographic approach follows contemporary CSCW research methods (Blomberg and Karasti 2013; Bjorn et al. 2015), whereby the explored

phenomenon is both examined from the ground (Wulf et al. 2013b) and as a multi-sited entity (Marcus 1995; Hine 2007; Williams et al. 2014). Between June 2014 and October 2019, we have travelled to Palestine on an annual basis. This resulted in six fieldtrips, with the length of our stay varying between one week and two months (see Table 1). It is important to state that our ethnographic work continued also in between the field trips, through the various conferences we participated in and the workshops we organized, as well as through the continues interactions and engagements with informants over different types of digital media including, but not limited to emails, online meetings, and online research workshops. Further, we have continuously followed different news groups, Facebook groups, and other relevant online communities – as well as official online sites, documents, and reports. Therefore, while the core component of our ethnographic work took place during the fieldtrips to Palestine – the contextual nature of the empirical work includes the collection of other types of materials and engagements. All the different materials and activities have played a crucial role in contextualizing our findings and ensuring that these are founded upon solid grounds. It is also important to mention that during this 5-year period, we have participated in two different research projects which included researchers from Palestine and Israel, and we are currently part of a third research project with local Palestinian researchers.

Table 1 Overview of Data Sources 2014–2019.

	Interviews		**Info rma nts**	**Conferences**	**Workshops**	**Locations visited**
	Ind.	Grp.				
2014	7	0	7		• Workshop 1 - Copenhagen with *researchers from Jerusalem, Haifa and the United States.*	Ramallah Jerusalem
2015	21	1 (2 ind.)	23	Conference - Ramallah	• Workshop 2 - Jerusalem with researchers from *Jerusalem, Haifa and the United States.* • Workshop 3 - Oslo with *European researchers.*	Ramallah East Jerusalem Oslo
2016	6	1 (2 ind.)	8			Ramallah Al-Bireh
2017				Conference 2 - Hebron		Hebron
2018	5	1	7	Conference 3 - Ramallah	• Workshop 4 - Ramallah with *Palestinian and European researchers.*	Ramallah
2019	8	3 (3 + 3 + 2 ind.)	16		• Workshop 5 - Ramallah with *Palestinian and European researchers.* • Workshop 6 - Glasgow with *international researchers.* • Workshop 7 - Copenhagen (Denmark) with researchers from *West Bank + Gaza.*	Ramallah Bethlehem Glasgow (Scotland)
Total	48	6	61	3 conferences: • 2 Ramallah • 1 Hebron	7 workshops: • 2 West Bank, 1 Jerusalem, 1 Oslo, 2 Copenhagen. • With researchers from *Ramallah, East Jerusalem, Haifa, West Bank and Gaza.*	Ramallah East Jerusalem Al-Bireh Bethlehem Hebron
	53					

During the fieldtrips to Palestine, we interviewed tech entrepreneurs and observed and experienced their working conditions. These fieldtrips included visits to incubators, innovations hubs, business accelerators, hacker- and makerspaces

and open network events. Over the years, we have been privileged to develop unique relationships with the informants. Thus, the later interviews developed into reflective conversations (Bjorn and Boulus 2011) in which we, together with the informants, explored and reflected upon the various transformations that have taken place in the tech entrepreneurial sector in Palestine over the past decade. While the interviews from 2019 proved instrumental in relation to this paper, our current work has been impacted and shaped by the empirical research that we have conducted over the past five years.

By 2020, we had conducted 53 formal interviews (six group interviews) with informants from 20 startups as well as representatives from two venture capitalist (VC) firms and two hacker/makerspaces. We also interviewed representatives from open innovation network organizations and three incubators/innovation hubs/business accelerators in Ramallah, Bethlehem and East Jerusalem. Furthermore, we interviewed one representative from a legal body as well as four representatives from the Higher Council of Innovation and Excellence (HCIE). In addition, we interviewed other informants (e.g. academics) who are knowledgeable about the tech startup sector in Palestine. The interviews were conducted in English, Arabic and Hebrew. All the interview transcripts were translated into English. In total, 44 interviews were fully transcribed. The interviews with the academics were audio recorded but only partly transcribed, as they were often shaped as discussions. To preserve the informants' anonymity, all the names used in this paper are pseudonyms, except for the names of public officials.

We organised and participated in seven workshops, interacting with international researchers from the United States, Europe and the Middle East and North Africa (MENA) region, as well as with Palestinian researchers from the West Bank (Ramallah and Hebron), Gaza and Israel (Haifa and Jerusalem). There were between 12 and 25 participants involved in each workshop, which took place in the West Bank, Jerusalem (Israel), Oslo (Norway), Glasgow (Scotland) and Copenhagen (Denmark). Further, we participated in three conferences, where we were invited as speakers and contributors. All conferences had between approximately 70 and 200 participants.

During the conferences, we met with key international and Palestinian scholars from different disciplines who are conducting different types of research regarding technology and Palestine. Aside from presenting our research findings and receiving feedback from various researchers, attending these conferences gave us the opportunity to extend our network of informants, as we met new key actors (policymakers, lawyers, educators, entrepreneurs, funders, international and local researchers) who work with technology development in the MENA region. Furthermore, attending and organising these conferences and workshops has had an impact on the framing of our research. Indeed, our focus has gradually developed from examining micro-level local issues (i.e. managing the collaborative practice of an outsourcing company under highly challenging political conditions) (Boulus-

Rødje et al. 2015) to zooming out to meta-level infrastructural inaccessibilities impacting entrepreneurial practices in general (i.e. institutional, financial, educational, human resources and IT infrastructures) (Bjørn and Boulus-Rødje 2018). Finally, our current focus traces the changes in the entrepreneurial ecosystem, as well as the structural, politic, economic and technological conditions that surround it, and discusses the ways in which such developments can be rendered more sustainable.

We began our analytical process during the reflective interviews we conducted in 2019, tracing the transformations of the tech public *from the early days* in which tech entrepreneurship entered the West Bank and offered an opportunity for economic growth *until the present day*. Over the years, as we visited the West Bank and conducted interviews and informal conversations with an increasing number of entrepreneurs, we began to witness incremental, yet still very important, changes in the tech entrepreneurial scene. We used these observations to contextualise our reflective interviews and prompt our informants to reflect upon the changes. Thus, our analytical process began during the planning stage of our fieldtrip in 2019. Further, we wanted to include additional perspectives in our research, so we extended our pool of informants from tech entrepreneurs to include representatives from governmental and legal organisation. By including such perspectives, we were able to challenge as well as confirm our earlier observations and findings, and we also used this material to develop a timeline of the transformation together with the informants.

The scaffold for the timeline presented in the findings section of this paper was created after one of the first interviews conducted during our last fieldtrip. We drew a map visualising the timeline, which indicated the developments and transformations of the tech public in Palestine and showed it to various informants during the subsequent interviews. This timeline sparked critical discussions and helped to concretise the entrepreneurs' reflections on the changes that have taken place over the past decade. Moreover, it enabled us to receive feedback, proposals for improvements and confirmation of existing details. Following our return to Denmark, all the interviews were transcribed and imported into NVivo. Inspired by grounded theory and its inductive approach (Strauss and Glaser 1967), the first author worked systematically through the interview transcriptions, the fieldnotes and the timeline created with the informants and generated open codes (using NVivo). This initial open coding helped to identify emerging themes and patterns within and across the data (e.g. bounty hunters, donor funds, incubator explosion, mimicking Western apps, business model canvas, outsourcing, legal framework, etc.), and it ultimately resulted in the first version of the timeline.

The timeline was presented to Palestinian academics, decision makers and relevant actors from the entrepreneurial sector during a workshop held in Copenhagen during December 2019. More specifically, we presented our timeline mapping activities within the Palestinian ecosystem and identifying areas for

further development, and we received feedback on it. Further, we used the workshop to hold hands-on sessions in which participants were given cases containing concrete local problems and asked to reflect upon how tech entrepreneurship and innovation could help to tackle such problems. This was followed by brainstorming sessions intended to explore ideas for moving toward a more sustainable approach based on insights from the literature and our own research. After the workshop, we began synthesising the data, using thick descriptions (Randal et al. 2007) and analytical memos to analyse the data, focusing on the characteristics of the development and transformation of tech entrepreneurship in Palestine. We used axial codes (e.g. initiatives/developments, funds, natures of digital services/solutions, business models and approaches, characteristics of Palestinian entrepreneurs) to identify similarities and differences in the characteristics (e.g. structural conditions) as well as in their impacts across the three phases. During this work, we use the concepts of publics and counterpublic as analytical lenses, which led to the development of our concept 'a public of erosion'. This concenpt characterises the specific kind of tech entrepreneurial public that emerged during the early years and developed into its current configuration. In the following section, we will present these findings, which we will then further discuss and develop.

4 Findings

Over the past five years of our research, we have had a unique opportunity to witness first-hand the gradual transformation of the Palestinian tech public. It is not a political public, but rather one that is driven by the promise of technological innovation to generate economic growth. After all, tech entrepreneurship is considered one of only a few sectors capable of surviving under the occupation, where the mobility of both humans and things is hampered by checkpoints, soldiers, travel permits, a separation wall, etc. In this section, we trace and unpack the major changes that have taken place in the tech entrepreneurial scene in Palestine since 2004, which have shaped the tech public into its present configuration. We have chosen to report our findings following the chronological structure of the timeline we have developed. Such a timeline capturing historically and thoroughly these developments is practically non-existing. Therefore, capturing and documenting these developments is utterly important for our research, as making this visible and documenting these changes is part of our interventions. Furthermore, this structure following chronological reporting and identifying the major developments is designed to support our research question, capturing the key characteristics of the ways in which the tech entrepreneurial public in Palestine was formed and transformed.

Analysing our empirical data, we identified three main phases that reflect distinct transformations in the tech entrepreneurial public: The early years (2004-

2009); the golden years (2010-2018); and present and future (2019-). *The early years* are characterized by tech entrepreneurship which is predominantly based upon traditional business models and outsourcing whereby Palestinian software developers work "remotely" for their Israeli counterparts. *The golden years* are characterized by the high popularity of the Business Model Canvas (BMC) and competitions, resulting in the production of the so-called 'bounty hunters'—individuals who master the profession of winning competitions, but whose ventures fail to sustain themselves and achieve a meaningful impact. The *present and future* phase is characterised by the involvement of governmental entities in tech entrepreneurship, followed by a repeat and rewind cycle of previous initiatives, events and activities. By using a timeline to structure the findings section, we demonstrate how despite the seemingly successful rise of initiatives from additional actors, greater efforts must be made if tech entrepreneurship is to be made sustainable.

4.1 The Early Years (2004–2009)

4.1.1 The Traditional Business Model

The first wave of entrepreneurial tech endeavours in Palestine can be traced back to 2004, when the Palestine Information and Communication Technology Incubator (PICTI) was founded. The PICTI was the first non-profit incubator built to support the growth of the information and communications technology (ICT) sector in Palestine. Among other enterprises, it incubated Yooyaland, a successful educational website. Trying to recall that period, Firas explains: 'I don't think people were even calling them startups', while Naji adds: 'at that time, I don't think many people understood what was needed for entrepreneurship. What does the whole process [require]? What does it mean?'

At that time, tech companies were following the traditional business model, whereby investment amounted to a certain value, which provided the investor with a percentage of the company based upon its total value. As Firas explains:

> the investment model that people used was a traditional one. I give you money, which basically amounts to a…percentage of the company depending on the capital of the company. So [if] you invested $10,000 in the company, I'll put another $10,000 and I will get 50%.

The traditional business model implies that companies follow a cashflow revenue model, since the investment depends upon earning money from the product. Several startups earned their main revenue through charging customers for using their products via SMS systems designed to compensate for the lack of 3G and payment gateways in Palestine (e.g. Souktel and Jobs.ps). Gradually, the outsourcing business began to enter the ICT sector in Palestine, driving the tech community forward.

4.1.2 The Era of Outsourcing

During the period 2005–2008, software development outsourcing began to play a major role in the IT sector in Palestine. The leading companies in this regard included Asal, Exalt and Gh.os.t. These outsourcing companies—or offshoring partners—all worked for Israeli companies with access to international clients. The outsourcing sector as a whole was expected to reduce unemployment, but also to equip Palestinian engineers with greater experience and knowledge capital through their exposure to the Israeli tech ecosystem.

> It was the hope that whatever experience people got from outsourcing would be enough to kickstart an ecosystem for startups. I remember that I was in one of the meetings for the USAID [United States Agency for International Development, a donor agency], and basically the narrative was always 'the target for this year is to get like 1000 engineers to be ready to be hired by intel' and in the Israeli branches. And the idea was that in the long run, with these people interacting with the Israeli ecosystem, they would gain enough experience to enable them to kickstart something (Firas).

These expectations in relation to the outsourcing sector were not fully met. In reality, Palestinian developers did not acquire sufficient multidisciplinary knowledge and experience to spark a generation of independent startups, as the tasks that were being outsourced were mostly non-innovative and repetitive, entailing a narrow focus and fewer opportunities to acquire multidisciplinary knowledge. Afterall, the outsourcing sector typically focuses on servicing, not on innovating. Further, at that time, the outsourcing sector was not competitive enough when compared with the situation in other regions (e.g. Eastern Europe or India). Naji recalls the period in which he was an IT manager and explains: 'our biggest issue was in sales. If you don't attend any expos [and] don't meet with any clients, you don't have any real value proposition to offer when compared with other companies.' Indeed, during our 2015 interviews, we heard similar concerns regarding the failure to meet clients and the lack of knowledge about the market. For example, Naji recalls that most developers working in the outsourcing sector 'are very good technically but really bad in sales', while Amer (a VC) notes that they are 'cost competitive in development, in the "kitchen" […] [But] I don't except anybody from the technical team to understand…how the clients are being brought in, or to have anything to do with the market.'

According to the Palestinian Information Technology Association (PITA)—a non-profit organisation that supports companies working in the IT sector in Palestine—there are around 10–12 outsourcing companies out of 250 (Palestinian Market Development Programme 2014), with Asal being the oldest (20 years old) and the largest, which employ 250–300 employees. This is much less than the expectation articulated by USAID during the early days. Rather than functioning as a kick-starter in relation to the Palestinian tech sector, outsourcing has become a competitor that poaches good developers. As Fadi explains: 'Now [in 2019] outsourcing is booming here. [It is] tak[ing] the best developers. So, it is not [so

easy] to find someone to develop a product for you.' During this period, outsourcing companies employed the most skilled technical people in Palestine, which reduced the already limited pool of talent.

4.2 The Golden Years: 2010–2018

The second wave emerged during the period 2010–2018, following the establishment of the first VC, accelerator and various bottom-up initiatives. Further, donor agencies began to play a powerful role in the sector, impacting the pioneers of the Palestinian tech community.

4.2.1 The Era of Business Models and Business Plan Competitions

In 2004, Leaders, an international network that specialises in innovation and economic development projects in developing economies, was established.[1] This bottom-up initiative founded a small incubator in Ramallah designed to support outsourcing services (e.g. IT and translation services). In 2010, they launched their first tech entrepreneurship project.

In 2011, Sadara Ventures, the first Palestine-based VC, was founded by Yadin Kaufmann (an Israeli-Jewish investor) and Saed Nashef (an Israeli-Arab entrepreneur). They received funds from, among others, the Google Foundation and Cisco (Curley 2012) and raised a total of $70 million in VC funding.[2] In 2012, they made their first investment in Yamsafer (a hotel booking platform, akin to Booking.com and Expedia, which targets Arab-speaking travellers). Later, Sadara invested in five other startups, including Souktel (an app matching employers with jobseekers, akin to LinkedIn but operating via SMS), WebTeb (a medical and health portal in Arabic), Freightos (an offshoring logistics company), Pinch Point (a Palestinian gaming studio) and social Dice (a recruitment service).

In 2013, the first Palestinian accelerator, FastForward, was established (by Leaders) to provide seed capital to startups. Gradually, an ecosystem of funding became available for tech entrepreneurs. Some of this funding involved seed capital (e.g. Ibtikar Fund, Arabreneur, Bader), some private equity (e.g. Siraj Fund Management Company, Abraj Capital and Palestine Investment Fund) and some was targeted toward SMEs and micro-credits (e.g. Sharaket-Palestine Investment Fund, Bank of Palestine, FATEN). Palestinian entrepreneurs no longer had to rely on what Ammar describes as the '3Fs', referring to 'family, friends and fools'.

These developments were followed by a wave of events focusing on startups and entrepreneurship and 'emerging organically' (Fadi) from the ground through

[1] http://leadersinternational.org.

[2] Sadara Ventures. See https://www.sadaravc.com.

the activities of civil society. Among the earliest pioneer initiatives were eZone, the Ramallah Open Coffee Club, Gaza Sky Geeks, PalGeeks and Peeks, and Startup Weekend Ramallah. Very quickly, entrepreneurship became the new buzz word. As Firas explains:

> So, basically, you had this kind of movement and events coming up. Everyone became an entrepreneur in Palestine […] This was an uprising...Some people called it a 'bubble', the 'buzz', and we had so many people, whether they were NGOs [non-governmental organisation] or funds, VC funds, early-stage funds going into the space [organising] events. [Those were] the early days [where] everyone and his sister was running an event about entrepreneurship and bringing someone from Google, or I don't know where, to give lectures.…It picked up and we had the first wave of startups.

Firas describes a group of people gradually emerging as a bottom-up collective *movement*, coming together and organising activities to promote the new tech entrepreneurial sector. This movement was seen as an 'uprising', referring to the way in which the group rose up as a counterforce opposing traditional business and the market.

During this period, business model pitching and business plan competitions were the main focus. VCs, NGOs, donors and other types of funders and organisations, as well as incubators and accelerators, all organised competitions. At the same time, nearly every university established a programme specifically designed to provide students with training that focused solely on pitching business models and creating business plans. This training was typically followed by competitions and rather generous awards (e.g. Birzeit University handed out a total of €1 million for a funded project). There was hope that the flourishing number of incubators, accelerators, VCs, entrepreneurs, startups, funds, events and training programmes, as well as the birth of this new movement of tech entrepreneurs, would lay the groundwork for the establishment of a strong ecosystem in Palestine. This hope, however, did not fully materialise due to a number of factors, one of which relates to the donor agencies that have become the lifeline for tech entrepreneurship in Palestine.

4.2.2 Donor Funds: Competitions and Strings Attached

Most funds that support the entrepreneurial sector in Palestine come from donor agencies or corporate social responsibility (CSR) programmes. This type of funding comprises short-term, one-off payments with strings attached, which depend on the donor's or CSR programme's constantly changing agenda (e.g., e-learning, female empowerment or entrepreneurship). The current focus of donors has led 'all…organisations [to focus] solely on entrepreneurship. So, universities, civil society and governments all think of entrepreneurship. They all perform the same activities. They do bootcamps, business plans, etc.' (Naji). In other words, all initiatives are dedicated solely to entrepreneurship, and they all tend to replicate the same types of activities. This time-limited, project-based framework, as well as the

constantly changing agenda, makes it utterly challenging for entrepreneurs to pursue long-term visions and achieve a meaningful impact. In fact, Fadi—an entrepreneur who has worked with various agencies—reports that even when they asked the donor agencies to build upon previous projects in order to establish continuity across projects, entrepreneurs were discouraged from doing so and advised to see new initiatives as separate projects. These structural and economic conditions render it difficult to build sustainable technological innovations and, therefore, lead to the design of technologies that are not necessarily built to last.

Entrepreneurs are required to navigate donors' changing agendas, which raises questions regarding the lack of effort on the part of the PA to streamline such agenda with respect to long-term strategies and plans. As Tawfik notes: 'I have to blame the government here for not being able to streamline the donor system in this country. They've failed to provide [the donors] with some…clear action plan about who to help.' Naser expands on this issue:

> they [the PA] can lobby with the donors. They can impose something on the World Bank, for example, [rather than] giving them the space to do whatever they want. [As a matter of a fact,] they [the donor agencies] would love to receive feedback. I was in a meeting with the World Bank in which they presented some strategy, asking for feedback. When it was the Minister of IT's turn to talk, his only comment was 'I didn't see or hear anything from the presentation. Send me a soft copy, or a hard copy'.

The lack of a national vision for ICT and entrepreneurship is problematic, and it is related to the fact that most public Palestinian institutions prioritise and focus on the political situation stemming from the Israeli occupation.

Donor agencies not only set the agenda for projects, but also typically ensure that various strings are attached. These strings concern not only to the types of technologies to be purchased and the people to be hired, but also the entire content of the project. As Naji explains: 'most of these projects…impose design. Like the new World Bank Project. It's $13 million. Their terms of reference are ready.' Majd explains this issue further:

> the practice lead from the VC [firm] comes and says, 'you should do this, because we did it in Haiti or the Caribbean, and it worked'…[So] we have to do what the Caribbean people did […] From their point of view, they come in and have an idea of what works […] So they say, 'This worked [elsewhere], why don't you try it?'. But it is experimenting because the conditions in the Caribbean are different than the conditions here.

The above quotation illustrates the limitations imposed on entrepreneurs through pre-defined terms of references. Such limitations lead to frustration on the part of entrepreneurs, who are asked to replicate and imitate projects implemented in other countries with completely different contexts. While there are similarities across developing countries, there are also important contextual differences.

4.2.3 Bounty Hunters Produced by the Donor System

The increase in the number of competitions offering donor funds has led to the birth of an entirely different type of entrepreneur, namely 'bounty hunters', people who have mastered the profession of cutting and pasting of business plans, winning competitions and receiving donor funds. Firas explains this phenomenon:

> Let's say that you have an NGO that has a fund for startups. So, they run a competition [and provide funds for] $10,000…or $50,000 [...] So, you have these entrepreneurs [who] get the money and spend it in three or four months during the programme on salaries and whatever. And the [funder] doesn't really care about the future of the startup because their job is done […] Then, they [the entrepreneurs] come up with another idea… for [another] three or four months. […] What is weird is that it became so efficient for both parties: the funders and the entrepreneurs. Because the funders got so used to these people, they'd just give them what they wanted. And for funders…it's more about [producing] reports…So, if you get people to understand the game, it becomes easier for both sides. [Eventually], you end up with this small ecosystem within the bigger ecosystem of abusing funds.

Bounty hunters, or 'donor school graduates', are experts at filling in application forms for aid agencies, although they are not necessarily successful in terms of establishing sustainable startups.

The rise of 'bounty hunters' has had several critical consequences. First, the focus of entrepreneurs has changed, as 'donor aid becomes the goal…Rather than what the country really needs' (Fadi). Second, entrepreneurs are distracted from focusing on solving local problems and achieving a sustainable impact. Third, because all entrepreneurs have to compete for the same limited resources, there is now increased individualism, which has damaged the collective culture. Fourth, bounty hunters consume some of the available funds, thereby limiting the funds available for people with actual and risky ideas for innovative startups. Fifth, the situation has led to the loss of many talented entrepreneurs, who left the country in disappointment and bitterness. As Firas notes:

> …that has happened with some of my friends. They will work for three months and then the guy says 'You know what? That was it!' [the fund has been used up]. So, most of the talent ended up leaving the country […] They left because of bitterness. So, basically, you lost your job and figured out that the whole entrepreneurship thing is more a game for some people to make money, and you end up wondering 'What are the options now?' You get an opportunity outside Palestine and you leave. Honestly, more than half of the people who were here when we started the whole thing…are outside [the country] now.

Many of the pioneers who were actively involved during the early years found themselves in the unfortunate position in which they became victims of the endeavours of the bounty hunters.

While the first-generation of entrepreneurs had a sincere and genuine desire to be part of the global tech world, the newer bounty-hunter generation is driven by a desire to accumulate short-term profit. Although donor funds are typically awarded to developing countries to help them become self-sufficient, the funds provided to

Palestinian entrepreneurs are not sufficient to support a sustainable and strong entrepreneurial sector. The bounty hunters are predominantly concentrated in Ramallah, and they have been criticised for being a 'closed club'. Shadi explains that, for the members of this 'VIP club', the donor system is a 'shopping boutique […] as they are not really interested in achieving any real change on the ground'. He further explains that these bounty hunters have become 'decoration' and that donors take 'them to ceremonies and invite them onto the stage [to give brief speeches]. But the effect [of their technology] on the ground is zero.' Bounty hunters have become a theatrical spectacle, as they are invited to 'decorate' the celebratory and ceremonial space temporarily erected by the donor in order to showcase their success in the region. In other words, no sincere relationship is formed between the donor agencies, those who receive the funds and their projects. It should be noted here that the founders of startups who are invited to these ceremonies are constantly being replaced by new people, as they are unable to sustain themselves in the long term. The emergence of this unproductive and unfortunate environment characterised by endless short-term competitions and projects has disrupted the sincere grassroots, bottom-up entrepreneurial counterpublic that emerged during the early years. Moreover, it has distracted entrepreneurs from the original vision of using tech entrepreneurship to solve local problems.

4.3 Present and Future (2019 onwards)

Over the past ten years, the main VC in Palestine, Sadara Venture, has had six startups in its portfolio, none of which have managed to exit. Two of the startups closed (Pinch Point and Social Dice), while two others still exist, albeit with unclear future (WebTeb and SoukTel). The only two companies in Sadara's portfolio that still exist are Freightos and Yamsafer. Freightos remains strong as an offshoring company. Its chief executive officer (CEO), Zvi Schreiber, is an Israeli entrepreneur with large capital and networks of global customers. Yamsafer—the superstar of Palestinian startups—managed to secure funds in addition to the seed funding received in 2015. However, it has encountered severe challenges that pose a threat to its existence. Over the past few years, Yamsafer has attracted global competitors, for example, Booking.com and Expedia, who suddenly announced their intention to establish a presence in the Middle East. Contrary to expectations, none of these global players have acquired Yamsafer, the local startup. Therefore, Yamsafer had to change its business model, shifting from targeting affordable hotels in the Middle East to targeting high-end hotels. This, however, meant that the company entered a new market, which is associated with different challenges. The first such challenge concerned fierce competition from billion-dollar companies based in the Gulf, including the Tayyar group (owner of 'El Mousafer', which means, similarly to 'Yamsafer', 'the traveller')—a large Saudi company—

that provides a wide variety of services in addition to hotel booking. During our last fieldtrip in September 2019, we saw indications that Yamsafer is assumed to shut down in the near future. Yet, as this has not been made official, nearly all entrepreneurs continue to refer to Yamsafer as the most successful startup in Palestine.

The entrepreneurial idea and vocabulary have now spread from the counterpublic to the wider public, including the PA at the governmental level. This represents a crucial development because some entrepreneurs feel that 'the government has been largely absent' from the sector (Yasser). This interest has led to the establishment of a new ministry, namely the Ministry of Empowerment and Entrepreneurship. Further, President Mahmoud Abbas established the Higher Council of Innovation and Excellence (HCIE) in 2012 to serve as a cross-sectorial body that oversees the innovation and entrepreneurial ecosystem. Linked directly to the president's office, its board of directors is composed of innovation-related institutions (i.e. the presidential office, government ministries, universities, NGOs, research centres, bank associations, business-people's associations and industry associations). By gathering representatives from 44 associations and 22 ministries, the HCIE sees itself as a 'one-stop shop' (Adnan Samara, President of the HCIE) that helps entrepreneurs to navigate through the ecosystem. As part of its wide range of services, the HCIE offers different types of funds for startups, and they are currently drafting a 'national innovation strategy' as well as working on a policy scheme to draft legislation for startups. They are also in the process of building the HCIE's headquarters, which is estimated to cost $20 million (group interview with the HCIE). While most entrepreneurs welcome and highly appreciate the various initiatives implemented by the HCIE (specifically the drafting of a legislation scheme for startups), they are not entirely clear as to the purpose, goals and visions of the HCIE.

The establishment of new governmental institutions is highly appreciated; however, there are concerns with regard to board members lacking the appropriate qualifications to lead such a complex endeavour and to the inclusion of so many institutions and stakeholders. The HCIE is currently working on several important initiatives. Yet, there are still some entrepreneurs who fear that entrepreneurial initiatives will end up, once again, being converted into real estate projects, wherein the focus is on erecting elegant buildings, rather than on building a fertile ecosystem.

The current ecosystem comprises various structural and systematic elements, including the monopolies of big companies. For example, Paltel—a Palestinian telecommunications company whose chairman is Sabih al-Masri, a Palestinian billionaire—has a monopoly over the internet. Despite the fact that fibre optic cables have been installed in Palestine, they will not be allowed to replace Paltel's asymmetric digital subscriber line (ADSL) throughout the country so long as the al-Masri family 'controls half of [the Palestinian] economy' (Naser). Palestinian

entrepreneurs are forced to navigate in a landscape that is dominated by monopolies and competition between powerful Palestinian billionaires on the one side and donor agencies on the other side.

Two new centres have recently been established, namely the Tech-hub and the Techno Park. The Tech-hub belongs to Bashar al-Masri, a relative of Sabih al-Masri, who is also a Palestinian billionaire. It is located in Rawabi, a $1.4 billion modern city (Jacobs 2018) located just 20 minutes outside of Ramallah, and has recently been promoted as *the* Palestinian startup city (Nassar 2020). In an effort to attract more people to the Tech-hub, Asal (which has connections to the al-Masri family) moved its offices to Rawabi. Competing with Rawabi's Tech-hub is the new Techno Park at Birzeit University, which was awarded $12 million by the Indian government.[3] The price of renting this modern and environmentally friendly innovative space remains unaffordable for Palestinian entrepreneurs, so they are currently trying to bring in multinational companies and, to date, have managed to convince Exalt to move to the Techno Park. While the focus on buildings and land has been unmistakably clear, this is not necessarily the case when looking at the content of the programs. Salim, the director of an innovation and entrepreneurship unit, explains that 'if you ask universities…they will tell you it's a real estate project'. However, similar to the centres of excellence that were built in universities during the early days, there is a strong focus on the buildings and less of a focus on the actual content of the educational programmes.

Arguably, tech entrepreneurship in Palestine is currently stuck in a repeat and rewind cycle. There has been an 'explosion' of events organised by tech entrepreneurs, governmental institutions, universities, stakeholders from the private and public sectors, incubators and accelerators (e.g., Startup Cup, Palestine Business Innovation Day, ExpoTech, hackathons, competitions, etc.). Further, the number of incubators, tech hubs, tech parks, etc. is still increasing. As Naji notes: 'Every day you hear about a new incubator…There are now more than 40 incubators in the country […] And they all do the same thing.' Salim expands on this issue:

> Repeating the same…content […] Business model canvas […] It's the same training. Sometimes it's the same trainer…So even entrepreneurs are fed up…and there is an oversubscription of this. So, if you run a workshop in Ramallah, it won't succeed, because people are so saturated.

The entrepreneurial public has now reached a level of saturation due to being stuck in a repeat and rewind cycle, organising similar events, repeating the same content and even inviting the same trainers. History seems to be repeating itself because, similar to the original centres of excellence built during the so-called 'golden years', new buildings are being erected, while there remains a lack of programmes, adequate content and a sustainable future.

---

[3] https://economictimes.indiatimes.com/tech/ites/india-palestine-ink-pact-for-setting-up-of-techno-park-in-ramallah/articleshow/55158699.cms

The entrepreneurial counterpublic has transformed. The original pioneers of the counterpublic were in their 30s and 40s, and they had gained experience from the job market. They were highly educated and had been exposed to living and working abroad. They had returned to Palestine following the signing of the Oslo Accords, with a strong belief in the potential of technology as a driver for changing the Palestinian economy and allowing Palestinian entrepreneurs to participate in the global tech market, thereby changing the negative image of the country. Regrettably, the strong passion and drive seen during earlier times have been lost and dismantled, and half of the first generation of entrepreneurs have now left the country. This represents an unfortunate and worrisome phenomenon whereby Palestine is constantly losing talent. Moreover, many of those who have not immigrated appear to have lost their optimism and belief in the entrepreneurial sector in Palestine.

5 Discussion

Through the result section we presented a timeline of how tech entrepreneurship was created and transformed over the years, highlighting three critical transformations which the Palestinian tech entrepreneurial public have undergone. We will now examine the characteristics of these transformations through the lenses of public and counterpublics, and discuss their consequences by developing the concept of a tech public of erosion.

5.1 Tech Entrepreneurship Becomes an Inevitable Enchantment

The dream of using tech entrepreneurship as a path toward economic mobility in Palestine partially emerged from a relatively small group of young and tech-savvy individuals, who, just a decade ago, were united in their desire to confront the common challenge (Dewey 1927) of building a self-reliant economy while under occupation. The pioneer counterpublic of entrepreneurs from 'the early days' (1st phase) marked itself off from the dominant wider public and institutions (Fraser 1990; Warner 2005) through members' shared belief in tech entrepreneurship and its ability to generate economic growth and help reduce the unemployment rate. At that time, such beliefs—held by the counterpublic—were distinct from the constitutional conventions and dominant structures (Warner 2005), which were highly sceptical when it came to the risky and non-traditional tech sector and its intangible products (i.e. software and applications). This was specifically evident in the absence of governmental support to change the legal framework for entrepreneurs in Palestine at that time. Elsewhere (Bjørn and Boulus, 2018), we unpacked and analysed the various challenges related to the legal framework, and demonstrated how that these are leading most entrepreneurs to register their startup outside Palestine.

During the early days, most pioneers of the tech entrepreneurial counterpublic either worked or studied abroad and returned to their homeland with the sincere desire to achieve changes in Palestinian society in order to usher in a better future. Living abroad had exposed them to different ways of thinking, working and living, thereby equipping them with the entrepreneurial ability to think differently and recognise new opportunities (Georgieva 2016). This early generation of entrepreneurs dedicated their efforts to developing tech innovations capable of addressing concrete local problems, for example, an online job portal listing jobs when newspapers were prohibited in Gaza or apps that helped NGOs to carry out their duties in conflict areas.

This counterpublic, which represents the first wave of tech entrepreneurs in Palestine, grew alongside the wave of outsourcing, whereby leading companies established their offices in Ramallah. The high expectations regarding the outsourcing sector's ability to produce a new generation of entrepreneurs, who could then establish their own independent tech startups, have not materialised. Instead, the outsourcing sector has placed itself in direct competition with the entrepreneurial counterpublic, rendering it difficult to find skilled software developers and engineers willing to work on projects outside the growing and increasingly powerful outsourcing sector, which has hampered the design and development of new innovative technologies. Instead of producing a bridge for tech savvy Palestinians, outsourcing became an entity that is neither able to engage in the political situation (Boulus-Rødje, Bjørn, and Ghazawneh, 2015), nor to develop new knowledge and innovations to support the Palestinian society. Further, working in the outsourcing sector neither exposes Palestinian tech entrepreneurs to international customers nor provides them with the necessary experience in sales and marketing, since their access to the world is fully dependent on Israel. Consequently, while the original vision of entrepreneurship involved building a self-reliant economy, the outsourcing sector largely depends on Israeli companies and their international clients.

During the 'golden years' (the 1st phase), funding opportunities for Palestinian entrepreneurs increased, which led to the emergence of a new generation of funders and investors that replaced the original 3Fs. The traditional business model was replaced by business model canvas mantra such as 'fall fast' and exist strategies. Thus, although Palestinian tech entrepreneurs are constantly encouraged to develop technologies that can scale globally due to the small market in Palestine, participating in the global market represents a significant challenge due to the lack of access to the market and customers. The outsourcing era did not produce the international bridges. Due to more funds being available, the number of accelerators, incubators, innovation hubs and centres of excellence began to increase. The entrepreneurial counterpublic began to gradually grow, occupying more space in the city and gaining greater visibility. The counterpublic functioned both as a space of withdrawal and a training ground (Fraser 1990), enabling the

mobilisation of more social groups and igniting alternative dispositions regarding tech entrepreneurship. After nearly a decade of local grassroots initiatives during 'the golden years' (2nd phase) and the 'present' (3rd phase), the Palestinian government took to the stage and tech entrepreneurship was framed as a path to success embedded in documents, discourses and strategies. This was manifested in the increased number of, incubators, accelerators, BMC workshops and seminars, etc. Similar to charismatic technologies, the emergent tech entrepreneurial public produced a powerful cultural vision and discourse during 'the golden years' founded on strong narratives concerning economic growth and peace, which made the future of tech entrepreneurship appear to be an inevitable enchantment (Ames 2019). The counterpublic transformed into a public, and entrepreneurship was no longer merely concerned with solving local problems as in its original configuration. Instead, it has become the means of achieving the dream of economic independence. *In sum, one of the consequences of the transformation of Palestinian tech entrepreneurs into a public, is that is became an enchantment without local grounding in solving societal challenges.*

5.2 The Impact of Structural Conditions on Entrepreneurial Practices and Technology Design

Similar to the situation in other countries in conflict and post-conflict contexts, Palestinian tech entrepreneurs suffer from a lack of access to social, human, and financial capital (Portes 2000). Nevertheless, being located in an occupied territory presents Palestinian entrepreneurs with additional structural conditions that constrain their entrepreneurial practices and the technological solutions they develop (e.g. access to basic infrastructures depends on Israeli policies) (Boulus-Rødje et al. 2015). Many startups and outsourcing companies purposefully chose to hide the location of their offices so as to avoid the negative image of the country and the perceived risk associated with doing business in an occupied territory (Bjørn and Boulus-Rødje 2018). As a result, Palestinian entrepreneurs have a weak presence and visibility in the global startup scene, which makes it harder to establish an international customer base as well as more challenging to attract the international knowledge, expertise and investors that could strengthen their human capital and provide funding opportunities that would counterbalance the donor system. Furthermore, even when Palestinian entrepreneurs do manage to attract international investors or tech experts, they still depend on Israel, which controls the flow of people across the borders. The conditions resulting from the occupation, therefore, have a clear impact on the types of technologies that Palestinian tech entrepreneurs develop as well as on the intended users. Given Palestinians' lack of control over their own borders and their unstable business conditions, it is no surprise that the types of technologies and services being designed conform to the donor agencies' agendas and/or the ones outsourced to Palestine. Thus, even though

Palestinian entrepreneurs are encouraged to scale globally, it can be said that they are in practice forced to stop by locally, since geographic mobility, economic growth and digital flows are all controlled and constrained by Israeli policies (Boulus-Rødje et al. 2015).

In addition to these structural conditions, Palestinian tech entrepreneurship suffers due to the inaccessibility of fundamental infrastructures. Palestinians face ongoing limitations on the telecommunications sector and internet infrastructures, which result in what has been termed a 'digital occupation' (Tawil-Souri 2012). Although 3G was introduced worldwide over a decade ago, it was only made available to Palestinians in 2018, following more than three years of negotiations with the Israeli government (Bjørn and Boulus-Rødje 2018). The lack of access to 3G led to the design of several digital products based on SMS services. Similarly, the design and development of digital products is also strongly affected by the inaccessibility of global digital platforms, such as Amazon, PayPal and the iOS AppStore, which constrains the ability of tech entrepreneurs to monetise and distribute their digital products to local Palestinian customers (*ibid.*). While some tech entrepreneurs developed creative alternative forms of payment structures (e.g. subscription membership or SMS payment structure), others give up on targeting Palestinian customers and focused instead on foreign customers. It is, therefore, no surprise that three of the most successful apps in Palestine were designed for NGOs or foreigners (e.g. Yamsafer was designed for Palestinians in the diaspora and international customers, while Jobs.ps and RedCrow were originally designed for NGOs). The inaccessibility of online payment gateways and global distribution platforms encourages Palestinian tech entrepreneurs not to focus on the local Palestinian customer base.

While digital infrastructures are undeniably crucial, equally important in relation to developing sustainable IT solutions are regulations and political mobilisations (Dourish 2010; Nuseibeh 2016). One of the biggest challenges faced by Palestinian tech entrepreneurs concerns the country's outdated legal framework, which is mostly designed for small family businesses and so fails to protect startup founders and investors, leading to various challenges (e.g. ownership of shares, equity investments and intellectual property rights) (Baidoun et al. 2018; Bjørn and Boulus-Rødje 2018). Consequently, most Palestinian startups register their companies abroad (typically in Delaware in the United States). Further, the inaccessibility of the legal framework and the lack of a strong ecosystem leave Palestinian startups vulnerable when they scale and begin to compete with global international companies, as was the case with Yamsafer and the fierce competition it faced from three powerful regional and global companies.

The inaccessibility of such crucial technical and legal infrastructures, as well as its challenging impact on entrepreneurial practices at the margins, have not been directly addressed in prior CSCW research. Several CSCW and PD researchers working within the field of participatory infrastructuring have called attention to

the resources, processes and activities that go into establishing and sustaining infrastructures and systems over time (Bødker et al. 2017). It has been argued that, to achieve sustainable infrastructures and IT solutions, we should conceptualise design processes as taking place in a multi-dimensional space and unfolding differently depending on the contextual conditions surrounding the IT projects (Meurer et al. 2018). *In sum, these structural conditions (e.g poor or inaccessible infrastructures, platforms, and legal framework) which have serious consequences on the technology design and practices that are made possible, have not transformed significantly throughout the 'early', 'golden' and 'recent' years (the three phases mapped in the findings section).*

5.3 Built on elusive agendas and concepts: Lean Startup, Mimicking and Donor Profiteers

The goal of achieving sustainability is further challenged by the constant replications of the lean startup approach, including its emphasis on 'minimal viable product', 'pivoting' and 'scaling' (Blank 2013). During the 'golden years', there was a considerable increase in the number of innovation hubs, incubators, accelerators, centres of excellence at universities, etc., all providing training and coaching in the lean startup approach and business model canvas (Osterwalder et al. 2010). As these approaches and models became the global standard, they were quickly adopted and replicated in Palestine, shaping the way in which tech entrepreneurship is produced. Palestinian tech entrepreneurs were trained to use these business models, with the underlying idea of viewing Palestine as a 'testbed' for iterative experimentation and for ensuring a viable business model, before they were ultimately 'scaled' to the Arab world or globally. However, the idea of using Palestine as a 'testbed' was based upon a false premise and ignored the above-mentioned contextual conditions where fundamental infrastructures are entirely absent (Bjørn and Boulus-Rødje 2018).

Despite the inapplicability of the lean startup model to the Palestinian context, investors, VCs, managers and trainers constantly emphasise the importance of 'testing' and 'scaling' before targeting the 'global market' (Boulus-Rødje et al. 2015). This pattern of 'early-stage internationalisation' has also been observed in other vulnerable economies (e.g., Bulgaria) (Manolova et al. 2014). Our data, however, demonstrate how this approach is not sustainable in conflict contexts such as Palestine. Thus, we echo Freeman et al.'s (2018) call to move away from replicating Western models and instead find ways to cultivate and leverage regional advantages while solving local problems. In line with the work of Nambisan (2017), we argue that ensuring the sustainability of tech entrepreneurship requires shifting the focus away from pre-defined fixed plans and toward leveraging the potential of continuously evolving value propositions and re-scoping locally grounded opportunities (e.g. green IT, agriculture and education).

As demonstrated in the findings section (4.2.3), the emphasis on the lean startup approach and business plans across the entire entrepreneurial ecosystem has produced 'bounty hunters', rather than innovative entrepreneurs. These 'profiteers' from the donor school (Subedi 2013) have mastered the art of filling in application forms for foreign aid agencies and producing business cases with clearly defined customer segments, precise market predictions and evaluations of predefined value proposition. Such destructive entrepreneurial tendencies typically arise in contexts characterised by dysfunctional infrastructures and poor institutional and legal support (Baidoun et al. 2018; Bjørn and Boulus-Rødje 2018).

These tendencies distract from the concrete needs of the country, leading to a focus on how best to satisfy the donor agencies. Funding from donor agencies, coupled with the application of business models, awards and competitions, anaesthetises the Palestinian tech entrepreneurial ecosystem, eroding the original aim of collaborating to achieve the shared goal of economic independence. This has led to the current condition, with many initiatives operating in silos, all competing aggressively for the same resources and funds, unable to promote long-term sustainability or achieve a meaningful impact on the ground. After all, key to sustaining any public over time is the development of commitments to socio-material and technical resources and experiences (Le Dantect and DiSalvo 2013). Currently, there are various disconnected short-term attachments to different resources and processes.

A few studies and reports have warned against heavy dependence on donor agencies and the impact of such dependence on entrepreneurial activities in fragile economies (Subedi 2013). Funds from international aid agencies exhibit a temporary and volatile nature (Nuseibeh 2016), which may distort the market by focusing on certain projects at the cost of other, perhaps more promising, initiatives. For example, the World Bank (2018) has warned against the promotion of a supply-driven, rather than a market-driven, approach to entrepreneurship development, which results from the significant presence of donor and publicly financed initiatives. These destructive tendencies affect the priorities and focus of tech entrepreneurial interventions. Csikszentmihalyi et al. (2018), who examined the power dynamics of donor agencies, found that they tended to fund projects intended to solve social problems but that were not economically viable. It is difficult to say whether a similar pattern can be seen in Palestine, although it is certainly clear that most funds are awarded to startups that mimic existing products, claim to demonstrate the ability to scale and apply the lean startup approach and the associated business models. Thus, solving local problems or proposing innovative and risky ideas are not the kinds of projects that have typically been funded. As previously mentioned, Palestinian tech entrepreneurs are advised by investors to go to Silicon Valley if they wish to invent and innovate, as well as to mimic and copy Western apps if they wish to ensure sustainable entrepreneurship in Palestine and the Arab world.

The current funding model inevitably has an impact on the development of digital products. It is, therefore, not surprising that mimicking existing apps (e.g. Uber, Airbnb, eBay) and adapting them to the Arab or Palestinian context became immensely fashionable during the 'golden years.' In fact, half the startups in Sadara's portfolio are based on mimicking Western apps and adapting them to the Arab context (Yamsafer, WebTeb and Souktel). Mimicking Western products and services strengthens the entrepreneur's business case in the eyes of those investors and donor agencies whose main focus is on minimal viable product, rewards on investment and marked predictions. Hence, from a business point of view, the mimicking approach implies a lower risk than developing new innovations, which relies heavily on a critical mass of early adopters and a mature market to sustain the startup. However, Aldairany and Quoquab (2018) argue that entrepreneurs who live in harsh conditions rarely benefit from imitating ideas from developed (or even *developing*) countries due to the radical differences in the socio-political and economic conditions (e.g. access to funds, support and resources) affecting the possibilities and constraints relevant to entrepreneurs. It has been said that, while a product can certainly be cut and pasted, this does not necessarily imply that the user can also be automatically imitated (Csikszentmihalyi et al. 2018). We argue that the mimicking approach is limited, as it brings only temporary benefits and fails to achieve a long-term sustainable outcome. The most recent incidents involving Yamsafer illustrate the limits of mimicking, as this highly popular 'unicorn' startup has successfully scaled but proven unable to withstand competition from large global/Western companies (Expedia and Booking.com) or regional companies (the large Saudi company El Mousafer).

While competition between smaller startups and larger global companies is common in this sector, Palestinian startups have a weak ecosystem when it comes to competing with, for example, startups in Saudi Arabia, where the government has mobilised substantial financial resources and introduced policies to support tech entrepreneurship and digital businesses (WAMDA 2018). Clearly, Palestinian entrepreneurs encounter both internal obstacles, such as weak institutional and legal frameworks, *and* external obstacles, such as a lack of political and economic stability, caused by Israel's occupation and control of all marketing and exports, which results in Palestinians lacking the management skills and marketing capacities necessary to enter the global market (Bayyoud and Sayyad 2016). *The tech entrepreneurial public in Palestine which have transformed during the golden years, was built upon elusive agendas and concepts, replicating, and mimicking Western approaches, ideas and products which are neither grounded in local problems nor take into account the unique nature of tech innovation under occupation.*

5.4 The Tech Entrepreneurial Public as a Public of Erosion

The dream of a strong Palestinian tech entrepreneurial sector did not appear out of nowhere. Rather, it was produced, reinforced and manifested by various external and internal political and economic conditions present during the past decade. The focus on entrepreneurship reached its peak during President Obama's visit to Israel and Palestine in 2013. Due to the focus of the Obama administration on entrepreneurship, it is not surprising that donor programmes, specifically USAID—one of the largest donor agencies in Palestine—tended to promote business models and ideologies that originated in the United States. Thus, the original dream of tech entrepreneurship in Palestine, which was fundamentally concerned with establishing economic independence under the current status quo of occupation, had a normative aspect (Ames 2019) produced by donor funds, which had a direct impact on actions on both the individual and group levels. The normative aspect was materialised through mimicking Silicon Valley's ideologies via the production of funding opportunities directed toward knowledge, qualifications and competence development according to the lean startup approach. The seemingly eternal application of the lean startup approach and the replication of business models, coupled with the mimicking of Western apps and the donor system, produced a fragile foundation for tech entrepreneurship characterised by erosion.

Traditional entrepreneurship models have had a tendency to view entrepreneurial activities as having relatively fixed boundaries, with success being determined by the entrepreneurs' ability to execute well-defined business plans (Nambisan 2017). However, entrepreneurial activities in conflict contexts require the sporadic and constant re-scoping of opportunities, forking and merging to accommodate fundamental challenges (*ibid.*). Indeed, in the case of the few Palestinian startups that have managed to sustain themselves for a reliantly long period of time (e.g. Jobs.ps and RedCrow), the key to sustainability has been the ability to be amenable to dynamic and emergent changes and to facilitate a constantly evolving value proposition grounded in solving concrete local problems.

While the Palestinian tech entrepreneurial public has transformed from being a counterpublic to becoming part of the mainstream public, enrolling greater numbers of groups of collectives and succeeding in turning the attention of the government and public officials toward the entrepreneurial sector, there is still a very long way to go when it comes to establishing a strong ecosystem in Palestine. According to the World Bank (2018), there has been a 34 per cent growth in the rate of startup creation since 2009, while the Palestinian ecosystem comprises highly educated founders and has one of the highest rates of female entrepreneurs (higher than New York and Singapore). However, the World Bank (2018) also points out that founders tend to be young, with little managerial experience, and that while early stage seed funding is available, investments supporting the growth and scaling of startups are limited. Further, there has been a severe decrease in donor funds since President Donald Trump decided to cease all funding for Palestine in 2018 (more

than $200 million). This, coupled with the PA's fiscal crisis, the internal divide between the West Bank and Gaza, as well as the sporadic donor support, has resulted in an economy that operates much below its potential (Sabella et al. 2014).

Currently, there is an explosion of incubators, accelerators, tech hubs and techno parks, all replicating the same activities, pitching and business plans, bootcamps and awareness, competitions and awards. The tech entrepreneurial public is now stuck in a rewind and repeat cycle, inviting the same international and national presenters and recycling the same topics. This cyclic storm generated by temporary and short-term donor funds risks dissolving the original tech initiatives implemented by the pioneers of the movement. Moreover, there is a high risk that promising entrepreneurial projects and initiatives will turn into real estate projects involving green and smart, yet empty, buildings. Due to lacking united and collaborative efforts on the part of all relevant stakeholders, the Palestinian entrepreneurial ecosystem risks both the wearing down of its foundation and attrition through abrasions. According to the Global Startup Ecosystem Report (Gauthier et al. 2019, p. 6), '…while one needed to open a laptop to join the tech revolution, to join the Global Startup Revolution, one needs an ecosystem! ...more than 70% of the Success Factors…depend on the ecosystem'.

The Palestinian tech entrepreneurial public remains unable to fulfil its emancipatory potential (Fraser 1990), as it is constantly exposed to a storm of uncoordinated and fragmented efforts that operate in silos, distract from concrete national economic challenges and threaten the long-term sustainability of the tech entrepreneurial public. Dindler and Iversen (2014) identify various ways of sustaining design initiatives, including maintaining, scaling, replicating and evolving. In the Palestinian context, it is possible to identify many replicating, repeating and rewinding disconnected initiatives, although the socio-political and economic structural conditions and inaccessible infrastructures fail to support any long-term processes, such as maintaining, scaling and evolving. The pioneers behind the tech movement in Palestine are now being challenged by competitive forces, including bounty hunters and the outsourcing sector.

Despite increased governmental involvement (e.g. the establishment of the HCIE and the new Ministry of Empowerment and Entrepreneurship), there seems to be a disconnection between the governmental initiatives and the local needs of tech entrepreneurs on the ground. While discussions at the governmental level (e.g. in national forums) are generally concerned with advanced technologies (e.g. artificial intelligence, virtual reality, big data), there appears to be a tendency to focus solely on technology, which disregards the current condition in Palestine, where digitalisation and technological integration are minimal and fragmented. A more fruitful approach to borrowing pre-defined lists of advanced technologies and IT solutions involves turning the process around, beginning by identifying local challenges and then developing appropriate IT products and services. This would imply, for example, discussing the digitalisation of data before building big data

centres, or building a database of local issues encountered across the various municipalities that could be solved by entrepreneurs, rather than creating a database of projects and startups replicating existing databases.

Finally, the Palestinian tech entrepreneurial public is also hampered by powerful Palestinian billionaires (e.g. the al-Masri family) and monopolies over the internet. Similar power dynamics have been observed in studies concerning countries in Africa, where discriminatory access to capital and data was controlled through the monopolies of big companies and donor agencies (Csikszentmihalyi et al. 2018; Taura et al. 2019). Being stuck between the dominant donor agencies and the powerful Palestinian billionaires has transformed the tech entrepreneurial public into a public of erosion.

A public of erosion refers to a specific type of public that faces constant dismantlement, which challenges its long-term sustainability. The Palestinian entrepreneurial public is characterised by erosion, as it is produced and shaped by the attrition and abrasion of donor agencies and their agendas, the bounty hunters produced by donor agencies, the political condition of occupation, the internal monopolies of powerful Palestinian billionaires and political parties, and competition from the outsourcing sector.

A public of erosion is shaped by constantly shifting and discontinuing processes that re-disrupt and dissolve initiatives and also dislocate and break down resources into smaller independent parts, which results in the wearing down of the foundation and attrition through abrasions. Similar to when the erosion of land occurs in nature, not all soil dissolves. Rather, erosion shakes the foundation and leaves traces on the land. If the land is strong and protected, for example, by plants, the effects of erosion will not be so damaging as on unprotect land. The same can be said of the Palestinian tech entrepreneurial public, which has been exposed to a storm of powerful external and internal forces (donor agencies, occupation, monopoly, competition), shaking and wearing down its already fragile and unprotected foundation, which has lacked sufficient governmental and institutional support. Like the erosion of land, the Palestinian tech entrepreneurial public will not completely disappear. Rather, the current entrepreneurial public will leave traces in the Palestinian ecosystem, where new initiatives can then grow. The public of erosion will continue to exist, perhaps not with the same magnitude, people or places, and perhaps under a different agenda.

6 Conclusion

The Palestinian tech entrepreneurial counterpublic has transformed into a public that is currently being exposed to constant erosion. Erosion is produced and shaped by the attrition and abrasion of international donor agencies and their shifting agendas, the restrictions associated with the Israeli occupation, the internal monopolies of Palestinian billionaires and political parties, as well as competition

from both the outsourcing sector and bounty hunters, which are consuming the limited talent and funds available within the country. The original vision concerning technology and innovation has been swept away by Western tech entrepreneurial ideals that position scaling and exit strategies as the sole purpose and goal. Since 2004, no Palestinian tech startup has succeeded with an exit strategy. Thus, while the practice of mimicking Western apps enables the easier production of business models and the application of the lean startup approach, which is favoured by donors, it does not necessarily create long-term sustainable tech startups that can grow and help to support an independent economy.

Despite the various external and internal obstacles, there are promising initiatives currently being implemented by some within the tech entrepreneurial community, which aim to neither mimic existing products nor apply the lean approach, but rather focus on solving local problems on the ground. Yet, the constant erosion of their entrepreneurial initiatives challenges their ability to sustain such entrepreneurial endeavours. While the tech entrepreneurial counterpublic has transformed into a public those endeavours are acknowledged and supported both internationally and locally within Palestine, the type of support and the initiatives are uncoordinated, fragmented and detached from the actual needs of tech entrepreneurs. Thus, we view the current tech entrepreneurial public in Palestine as a public of erosion, which is built on a fragile and unsustainable foundation. As a public of erosion, it faces constant dismantlement, shifting and discontinuing processes, dislocating resources, as well as disrupting and dissolving initiatives, which results in its foundation being worn down.

If entrepreneurship is to be sustained in Palestine, the conditions for innovation and the construction of a new market need to change. Despite the fact that there are many factors beyond the control of Palestinians (e.g. the occupation), there are nevertheless many promising areas for national internal initiatives. While it is positive that many initiatives are taking place on the horizontal scale, such initiatives will not lead to sustainable tech entrepreneurship if they continue to be organized and carried out in silos. Further, attention should be paid not only to the existing horizontal processes and the micro-dynamics of participation, collaboration and local mutual learning, but also to the vertical processes taking place across the wider levels of political and organisational authorities and practical arenas (Bødker et al. 2017). This includes the processes involved in the development of a stronger digital ecosystem, greater involvement on the part of the private sector, support for local initiatives and online payment gateways provided by financial institutions, as well as greater collaboration between universities and the private sector.

While this paper might not be a traditional ethnographic CSCW paper (Bannon et al. 2011), it engages with a fundamental area of interest within the field of CSCW, which examines the interlinked relationships between technology, politics and work (Suchman 1994; Tellioğlu and Wagner 2001), thereby generating novel

insights into a unique case in which the political and economic circumstances highly impact the conditions surrounding both entrepreneurial work and technology development. Although the concept of a public of erosion emerged from the Palestinian context, we believe that it can be fruitfully applied to a wide range of technological spaces within the Global South, where publics are constantly exposed to powerful and destructive forces, which wears away their foundations. Future research in CSCW and related fields should explore further the various emancipatory potentials of tech entrepreneurship in conflict and post-conflict areas, as well as in other overseen places around the globe.

7 Acknowledgements

We would like to thank the group of Palestinian tech entrepreneurs, who have kindly welcomed us to the field; taken the time to talk to us and allowed us to revisit them over the years. Without them, mapping the formation and transformation of the tech entrepreneurial community in Palestine would have not been possible. We would also like to thank the various key stakeholders and scholars for the valuable discussion during the many conferences and workshops.

8 Funding and/or Conflict of interest/Competing interests

This work was partially supported by the FESTEM—*Fostering Entrepreneurship in Science, Technology, Engineering and Math*—an Erasmus+ project for promoting entrepreneurship in higher education programmes. The authors do not have competing or conflict of interest to declare.

9 References

Aldairany, Shaza; and Farzana Quoquab (2018). Systematic review: Entrepreneurship in conflict and post conflict. *Journal of Entrepreneurship in Emerging Economies*, vol. 10, no. 2, pp. 361–383.

Ames, Morgan G. (2019). *The Charisma Machine: The Life, Death, and Legacy of One Laptop Per Child*. Cambridge: MIT Press.

Avle, Seyram; Julie Hui; Silvia Lindtner; and Tawanna Dillahunt (2019). Additional labors of the entrepreneurial self. In A. Lampinen; D. Gergle; and D. A. Shamma (eds): *Proceedings of the ACM on Human-Computer Interaction,* vol. 3, no. 218, pp. 1–24.

Avle, Seyram; and Silvia Lindtner (2016). Design(ing) “Here” and “There”: Tech Entrepreneurs, Global Markets, and Reflexivity in Design Processes. In:

CHI'16. Proceedings of the Conference on Human Factors in Computing Systems. San Jose, New York: ACM Press, pp. 2233–2245.

Baidoun, Samir; Robert Lussier; Maisa Burbar; and Sawsan Awashra (2018). Prediction model of business success or failure for Palestinian small enterprises in the West Bank. *Journal of Entrepreneurship in Emerging Economies,* vol. 10, no. 1, pp. 60–80.

Bannon, Liam; Kjeld Schmidt; and Ina Wagner (2011). Lest we forget: The European field study tradition and the issues of condition of work in CSCW research. In S. Bødker; N. O. Bouvin; V. Wulf; and L. Ciolfi (eds): *ECSCW'11. Proceedings of the European Conference on Computer Supported Cooperative Work, Aarhus, Denmark, 24–28 September 2011*. New York: Springer, pp. 24–28.

Bayyoud, Mohammed; and Nermeen Sayyad (2016). Challenges in financing small and medium enterprise in Palestine. *Business and Economic Journal,* vol. 7, no. 2.

Benard, Valérie; Myriam Lewkowicz; and Manuel Zacklad (2006). Beyond electronic patient's file: Assisting conversations in a healthcare network. In P. Hassanaly et al. (eds): *COOP 2006: Cooperative Systems Design: Seamless Integration of Artifacts and Conversations - Enhanced Concepts of Infrastructure for Communication [Proceedings of the 7th International Conference on the Design of Cooperative Systems, 9-12 May 2006, Carry-le-Rouet, France]*. Amsterdam:IOS Press, pp. 7-22.

Bjorn, Pernille; and Nina Boulus (2011). Dissenting in reflective conversations: Critical components of doing action research. *Action Research*, vol. 9, no. 3, pp. 282–302.

Bjorn, Pernille; and Nina Boulus-Rodje (2015). The multiple intersecting sites of design in CSCW research. *Computer Supported Cooperative Work*, vol. 24, no. 4, pp. 319–351.

Bjørn, Pernille; and Nina Boulus-Rødje (2018). Infrastructural Inaccessibility: Tech Entrepreneurs in Occupied Palestine. *ACM Transactions on Computer-Human Interaction (TOCHI)*, vol. 25, no. 5, article no. 26.

Bjørn, Pernille; and Ellen Balka (2007). Health care categories have politics too: Unpacking the managerial agendas of electronic triage systems. In: *ECSCW'07: Proceedings of the Tenth European Conference on Computer Supported Cooperative Work, Limerick, Ireland, 24-28 September 2005.* London: Springer, pp. 371-390.

Blank, Steve C. (2013). Why the lean start-up changes everything. *Harvard Business Review*, vol. 91, no. 5, pp. 63–67.

Blomberg, Jeanette; and Helea Karasti (2013). Reflections on 25 years of ethnography in CSCW. *Computer Supported Cooperative Work (CSCW)*, vol. 22, no. 4, pp. 373–423.

Bosam, Niels; Stephen Hill; Aileen Ionescu-Somers; Donna Kelley; Jonathan Levie; and Anna Tarnawa (2020). *Global Entrepreneurship Monitor: 2019/2020 Global Report*. London: Global Entrepreneurship Research Association.

Boulus-Rødje, Nina. (2018). In search for the perfect pathway: Supporting knowledge work of welfare workers. *Computer Supported Cooperative Work (CSCW),* vol 27, no. 3-6, pp. 841-874.

Boulus, Nina; and Pernille Bjørn (2008). A cross-case analysis of technology-in-use practices: EPR-adaptation in Canada and Norway. *International journal of Medical Informatics*, vol. 79, no. 6, pp. 97-108.

Boulus-Rødje, Nina; and Pernille Bjørn (2015). Design challenges in supporting distributed knowledge: An examination of organizing elections. In *CHI'15: Proceedings of the Conference on Human Factors in Computing Systems, Seoul, Korea.* 18- 23 April, 2015. New York: ACM Press, pp. 3137-3146

Boulus-Rødje, Nina; Pernille Bjørn; and Ahmad Ghazawneh (2015). "It's about business not politics": Software development between Palestinians and Israelis. In N. Boulus-Rødje; G. Ellingsen; and T. Bratteteig (eds): *ECSCW'15. Proceedings of the European Conference on Computer Supported Cooperative Work, Oslo, Norway, 19–23 September 2015.* London: Springer.

Brück, Tilman; Wim Naudé; and Phillip Verwimp (2013). Business under fire: Entrepreneurship and violent conflict in developing countries. *Journal of Conflict Resolution*, vol. 57, no. 1, pp. 3–19.

Burton, Guy (2016). Assessing Palestinian Economic Exchange across the Green Line. *Middle East Critique*, vol. 25, no. 1, pp. 45-62.

Bødker, Susanne; Christian Dindler; and Ole Sejer Iversen (2017). Tying Knots: Participatory infrastructuring at work. *Computer Supported Copperative Work (CSCW)*, vol. 26, nos. 1-2, pp. 245-273.

Csikszentmihalyi, Christopher; Jude Mukundane; Gemma F. Rodrigues; Daniel Mwesigwa; and Michelle Kasprzak (2018). The space of possibilities: Political economies of technology innovation in sub-Saharan Africa. In *CHI'18: Proceedings of the Conference on Human Factors in Computing Systems, Montreal, Canada, 21–26 April, 2018.* New York: ACM Press, Paper 306, pp. 1–13.

Curley, Nina (2012, December 19). Palestinian SMS Platform Souktel Raises $1 Million from Sadara Ventures. *Wamda*. https://www.wamda.com/2012/12/palestinian-sms-platform-souktel-raises-1-million-from-sadara-ventures. Accessed 20 April 2020.

Dewey, John (1927). *The public and its problems: An essay in political inquiry*. University Park: Pennsylvania State University Press.

Dillahunt, Tawanna R.; Vaishnav Kameswaran; Desiree McLain; Minnie Lester; Delores Orr; and Kentaro Toyama (2018). Entrepreneurship and the socio-technical chasm in a lean economy. In *CHI'18: Proceedings of the Conference on Human Factors in Computing Systems, Montreal, Canada, 21–26 April, 2018.* New York: ACM Press, Paper 240, pp. 1–14.

DiSalvo, Carl; Jonathan Lukens; Thomas Lodato; Tom Jenkins; and Tanyoung Kim (2014). Making public things: How HCI design can express matters of concern. In *CHI'14: Proceedings of the SIGCHI Conference on Human Factors in Computing Systems, Toronto, Canada, 26 April- 1 May 2014.* New York: ACM Press, pp. 2397–2406.

Dourish Paul (2010). HCI and environmental sustainability: the politics of design and the design of politics. *In DIS' 10: Proceedings of the 8th ACM Conference on Designing Interactive Systems, Aarhus, Denmark,* 16-20 August 2010, New York: ACM Press, pp. 1-10.

Eckert, Stine; and Kalyani Chadha (2013). Muslim bloggers in Germany: An emerging counterpublic. *Media, Culture & Society*, vol. 35, no. 8, pp. 926–942.

Elsadda, Hoda (2010). Arab women bloggers: The emergence of literary counterpublics. *Middle East Journal of Culture and Communication,* vol. 3, no. 3, pp. 312–332.

Fitzpatrick, Geraldine; and Gunnar Ellingsen (2013). A review of 25 years of CSCW research in Healthcare: Contributions, Challenges, and future agendas. *Computer Supported Cooperative Work (CSCW)*, vol. 22, no. 4, pp. 609-665.

Fraser, Nancy (1990). Rethinking the public sphere: A contribution to the critique of actually existing democracy. *Social Text,* vol. 25–26, pp. 56–80.

Freeman, Guo; Shaowen Bardzell; and Jeffrey Bardzell (2018). Bottom-up imaginaries: The cultural-technical practice of inventing regional advantage through IT R&D. In *CHI'18: Proceedings of the Conference on Human Factors in Computing Systems, Montreal, Canada, 21–26 April, 2018.* New York: ACM Press, Paper 325, pp. 1–11.

Georgieva, Neli Vladova (2016). *How is high-tech entrepreneurship able to grow in Sofia, Bulgaria? A social capital perspective.* Master's dissertation. Raboud University Nijmegen: Blekinge Institute of Technology.

Habermas, Jürgen (1991 [1962]). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society*. Cambridge: MIT Press.

Hine, Christine (2007). Multi-sited ethnography as a middle range methodology for contemporary STS. *Science, Technology & Human Values*, vol. 32, no. 6, pp. 652–671.

Hsiao, Yung-Chang; Shih-Chang Hung; Chung-Jen Chen; and Tse-Ping Dong (2013). Mobilizing human and social capital under industry contexts to pursue high-tech entrepreneurship. *Innovation*, vol. 15, no. 4, pp. 515–532.

Irani, Lilly (2019). *Chasing Innovation: Making Entrepreneurial Citizens in Modern India*. Princeton: Princeton University Press.

Jacobs, Harrison (2018, 22 October). A Palestinian-American billionaire thinks activists boycotting Israel are going about it all wrong. *Business Insider.* https://www.businessinsider.com/masri-activists-boycotting-israel-2018-10?r=US&IR=T. Accessed 20 April 2020.

Kasm, Saeb (2018). Redefining publics: Mosireen, state crime and the rise of a digital public sphere. *State Crime Journal*, vol. 7, no. 1, pp. 100–140.

Kaufer, David; and Amal Mohammed Al-Malki (2009). The War on Terror through Arab-American eyes: The Arab-American press as a rhetorical counterpublic. *Rhetoric Review*, vol. 28, no. 1, pp. 47–65.

Kraus, Sascha; Carolin Palmer; Norbert Kailer; Friedrich Lukas Kallinger; and Jonathan Spitzer (2019). Digital entrepreneurship: A research agenda on new business models for the twenty-first century. *International Journal of Entrepreneurial Behavior & Research*, vol. 25, no. 2, pp. 353–375.

Le Dantec, Christopher; and Carl DiSalvo (2013). Infrastructuring and the formation of publics in participatory design. *Social Studies of Science*, vol. 43, no. 2, pp. 241–26.

Manolova, Tatiana S.; Ivan M. Manev; and Bojidar S. Gyoshev (2014). Friends with money? Owner's financial network and new venture internationalization in a transition economy. *International Small Business Journal*, vol. 32, no. 8, pp. 944–966.

Marcus, George E. (1995). Ethnography in/of the world system: The emergence of multi-sited ethnography. *Annual Review of Anthropology*, vol. 24, no. 1, pp. 95–117.

Marvel, Matthew R. (2013). Human capital and search-based discovery: A study of high-tech entrepreneurship. *Entrepreneurship Theory and Practice*, vol. 37, no. 2, pp. 403–419.

McLean, Nyx (2018). Rethinking publics and participation in a digital era: A case study of HOLAA! and African queer women's digital interactions. *Agenda*, vol. 32, no. 2, pp. 70–75. 20 April 2020.

Meurer Johanna; Claudia Muller; Carla Simone; Ina Wagner; and Volker Wulf (2018). Designing for sustainability: Key issues of ICT projects for ageing at home. *Computer Supported Cooperative Work (CSCW)*, vol. 27, no 3, pp. 495-537.

Nambisan, Satish (2017). Digital entrepreneurship: Toward a digital technology perspective of entrepreneurship. *Entrepreneurship Theory and Practice*, vol. 41, no. 6, pp. 1029–1055.

Nassar, Jack (2020, 4 January). Start-up city…Rawabi! *This Week in Palestine*. https://www.thisweekinpalestine.com/wp-content/uploads/2020/01/002.pdf. Accessed 20 April 2020.

Negt, Oskar; and Alexander Kluge (1993). *Public sphere and experience: Toward an analysis of the bourgeois and proletarian public sphere*. Minneapolis: University of Minnesota Press.

Nuseibeh, Hasan (2016). *An Information and Communication Technologies for Development (ICT4D) Decision Framework for Building an Information Economy in Developing Countries: The Case of Palestine.* Ph.D. dissertation. University of South Florida: Information Systems and Decision Sciences.

Osterwalder, Alexander; and Yves Pigneur (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Hoboken: John Wiley & Sons.

Palestinian Central Bureau of Statistics (2019). Population. http://www.pcbs.gov.ps/site/lang__en/881/default.aspx#Population. Accessed 15 April 2020.

Palestinian Market Development Programme (2014, November). MNRs outsourcing to Palestinians: Market System Analysis. http://home.pita.ps/wp/wp-content/uploads/files/Studies/004-mnesotpmaes.pdf. Accessed 20 April 2020.

Portes, Alejandro (2000). Social capital: Its origins and applications in modern sociology. *Annual Review of Sociology*, vol. 24, no. 1, pp. 1-24.

Randall, Dave; Richard Harper; and Mark Rouncefield (2007). *Fieldwork for design: Theory and practice.* London: Springer.

Roslyng, Mette Marie; and Bolette Blaagaard (2016). Networking the political: On the dynamic interrelations that create publics in the digital age. *International Journal of Cultural Studies*, vol. 21, no. 2, pp. 124–138.

Sabella, Anton R.; Wojdan A. Farraj; Maisa Burbar; and Dana Qaimary (2014). Entrepreneurship and economic growth in West Bank, Palestine. *Journal of Developmental Entrepreneurship*, vol. 19, no. 1.

Schmidt, Kjeld; and Liam Bannon (1992). Taking CSCW Seriously: Supporting Articulation Work. *Computer Supported Cooperative Work (CSCW)*, vol. 1, nos. 1-2, pp. 7-40.

Schmidt, Kjeld; and Carla Simone (1996). Coordination Mechanisms: Towards a Conceptual Foundation of CSCW System Design. *Computer Supported Cooperative Work (CSCW)*, vol. 5, no. 2, pp. 155-200.

Star, S. Lee; and Anselm Strauss (1999). Layers of Silence, Arenas of Voice: The Ecology of Visible and Invisible Work. *Computer Supported Cooperative Work (CSCW)*, vol. 8, no. 1, pp. 9-30.

Steiner, Linda (2005). The feminist cable collective as public sphere activity. *Journalism*, vol. 6, no. 3, pp. 313–334.

Strauss, Anselm L; and Barney Glaser (1967). *The discovery of grounded theory: strategies for qualitative research.* Chicago: Aldine.

Subedi, D. B. (2013). Pro-peace entrepreneur or 'conflict profiteer'? Critical perspective on the private sector and peacebuilding in Nepal. *Peace & Change*, vol. 38, no. 2, pp. 181–206.

Suchman, Lucy (1994). Do categories have politics? *Computer Supported Cooperative Work (CSCW)*, vol. 2, no. 3, pp. 177–190.

Taura, Nasiru D.; Elvira Bolat; and Nnamdi O. Madichie (eds.) (2019). *Digital Entrepreneurship in Sub-Saharan Africa Challenges, Opportunities and Prospects*. Cham: Palgrave Macmillan.

Teli, Maurizio; Silvia Bordin; Maria Menendez Blanco; Giusi Orabona; and Antonella De Angeli (2015). Public design of digital commons in urban places: A case study. *International Journal of Human-Computer Studies,* vol. 81, pp. 17–30.

Tellioğlu, Hilda; and Ina Wagner (2001). Work practices surrounding PACS: The politics of space in hospitals. *Computer Supported Cooperative Work*, vol. 10, no. 2, pp. 163–188.

Tobias, Jutta M.; and Karol C. Boudreaux (2011). Entrepreneurship and conflict reduction in the post-genocide Rwandan coffee industry. *Journal of Small Business & Entrepreneurship*, vol. 24, no. 2, pp. 217–242.

Toepfl, Florian; and Eunike Piwoni (2015). Public spheres in interaction: Comment sections of news websites as counterpublic spaces. *Journal of Communication*, vol. 65, no. 3, pp. 465–488.

Ulhøj, John Parm (2005). The social dimensions of entrepreneurship. *Technovation,* vol. 25, no. 8, pp. 939–946.

Ulijn, Jan; Dominique Drillon; and Frank Lasch (2007). *Entrepreneurship, Cooperation and the Firm: The Emergence and Survival of High-Technology Ventures in Europe*. Cheltenham: Edward Elgar Publishing.

WAMDA (2018). *Tech entrepreneurship ecosystem in the Kingdom of Saudi Arabia*. https://s3-eu-west-1.amazonaws.com/wamda-prod/resource-url/2018_KSA_Report_Digital_Version_OC%26C_Updated.pdf. Accessed 3 April 2020.

Warner, Michael (2005). *Publics and Counterpublics*. New York: Zone Books.

Williams, Amanda; Silvia Lindtner; Ken Anderson; and Paul Dourish (2014). Multisited design: An analytical lens for transnational HCI. *Human-Computer Interaction*, vol. 29, no. 1, pp. 78–108.

Winner, Langdon (1986). Do Artifacts have politics? *The Whale and The Reactor: A Search for Limits in an age of High Technology.* L. Winner. Chicago: University of Chicago Press, pp. 19-39.

World Bank (2019). Palestinian Territories. http://pubdocs.worldbank.org/en/394981554825501362/mpo-pse.pdf. Accessed 20 April 2020.

World Bank (2018). Tech Startup Ecosystem in West Bank and Gaza: Findings and Recommendations. http://documents1.worldbank.org/curated/en/715581526049753145/pdf/126144-replacement-WBG-ecosystem-mapping-digital.pdf. Accessed 20 April 2020.

Wulf, Volker; Konstanttin Aal; Ibrahim Abu Kteish; Meryem Atam; Kai Schubert; Markus Rohde; George Yerousis; and David Randall (2013a). Fighting against the wall: Social media use by political activists in a Palestinian village. In *CHI'13: Proceedings of the Conference on Human Factors in Computing Systems, Paris, France, 27 April- 2 May 2013.* New York: ACM Press, Paper 325, pp. 1979–1988.

Wulf, Volker; Kaoru Misaki; Meryem Atam; David Randall; and Markus Rohde (2013b). “On the ground” in Sidi Bouzid: Investigating social media use during the Tunisian revolution. In *CHI’13: Proceedings of the Conference on Human Factors in Computing Systems, Paris, France, 27 April- 2 May 2013*. New York: ACM Press, Paper 325, pp. 1409–1418.