Chapter 1
Introduction: The Postcolonial Making of Technology

The years 2007–2008 were a turning point in the historiography of Kenyan technology development. Despite accusations that the country's December 2007 presidential election was fraudulent, Mwai Kibaki was proclaimed the winner and, as a result, Kenya was struck by ethnicized post-election violence.[1] During the uproar, the government decided to ban all live broadcasts for three days. That meant that the only way for citizens to access news about the country's political situation was via the internet (Goldstein and Rotich 2008: 8). Bloggers became an important source of information and a digital civic campaign developed the software *Ushahidi*[2] that allowed everyone with access to the internet to map violent acts and make them transparent (Manske 2014: 14; Ushahidi 2020). While Ushahidi was spreading and the political struggles were dying down, Safaricom, one of the largest mobile network operators, introduced the mobile phone app *M-Pesa*.[3] M-Pesa allows its users to transfer money via SMS and thus transformed the banking sector that had previously precluded many citizens from having bank accounts (Marchant 2015: 8). Today, almost every transaction in Kenya is done via M-Pesa – be it

1 Profound analyses of the post-election violence in 2007–2008, including its causes such as the ethnicization of land conflicts and the consequent societal and political outcomes, are available in an anthology edited by Kanyinga and Okello (2010) and in a Special Issue of the *Journal of Eastern African Studies* edited by Anderson (2008).

2 *Ushahidi* means 'testimony' in Kiswahili.

3 M stands for 'mobile' and *pesa* is Kiswahili for 'money'. In 2022, M-Pesa had 52.4 million active users all over Africa (Statista 2023a) who had earned Safaricom over US$765 million by 2021 (Statista 2023b).

the payment of electricity bills, remittances, or the purchase of a coffee from a street vendor.

These two technologies 'made in Kenya' transformed the country's reputation as a place for technology development; it went from going unmentioned by international media to being one of the main references when talking about innovation 'from Africa'. Not only did international media recognize the cluster of technology developers in Nairobi, so did development agencies, venture capitalists, and international corporations such as Google, IBM, and Microsoft. They all invested heavily in Kenyan startups and technology development workplaces, known as tech hubs (Disrupt Africa 2021: 10; Microsoft 2019; Mwago 2021). These large investments indicate a technocapitalist economy that capitalizes intangibles such as creativity and knowledge to further technoscientific innovation and the development of new technologies (Birch 2017: 440; Suarez-Villa 2001: 4; Wajcman 2006: 14). Between 2015 and 2022, Kenya's startups raised a total of nearly US$1.3 billion, the second-highest amount of investment in Africa after Nigeria, and doubled their annual investment volume from 2021 to 2022 (Disrupt Africa 2022b: 14).[4]

With its fast-growing tech scene, Nairobi is an exemplar for many other places on the African continent: in 2011, a total of five technology hubs existed in four different African countries. Only eight years later, in 2019, there were at least 618 (Giuliani and Ajadi 2019). The term *tech hub* includes incubators, accelerators, university-based innovation hubs, makerspaces,[5] technology parks, and co-working spaces that offer a workplace, business advice, training, and networking to support early-stage entrepreneurial endeavors (ibid.; Friederici 2016: 18). It was in Nairobi that the first and largest technology hub in Sub-Saharan Africa, *iHub*, opened in 2010 and, as the location of the role model for

4 The data is taken from the annual financial reports of Disrupt Africa, a news portal on tech scenes in Africa, and includes only private sector investments, not (development) funding. In Chapter 6, I elaborate that technology developers and startups in Kenya do not benefit equally from the high investment in the country's tech scene. Tech analysts have identified a racial bias in investment: startups with white expat founders or CEOs receiving the most money in Nairobi (Disrupt Africa 2021: 20).

5 A makerspace is a collaborative workshop where members pay a monthly fee to gain access to the available machines – such as saws, 3D printers, and other digital fabrication tools – and further co-working facilities.

'African' innovation, it was soon nicknamed the *Silicon Savannah*.[6] The name stuck and international media coverage of technological success stories from Kenya has continued since then. Mark Zuckerberg's visit to Nairobi's tech scene in August 2016 to learn about technologies that use mobile money transfer made it clear that Nairobi's reputation as a place of technology development had reached global tech gurus.

Kenya's technology developers are surrounded by international journalists, investors, famous tech entrepreneurs, and promising narratives. They all praise digital technologies for breaking with hierarchical structures such as the uneven access to knowledge, the exclusive process of technology development, and the dependence on imports from so-called 'centers' of knowledge production. The current "globalization of Silicon Valley" (Mutua and Alliy 2012: 58) no longer attributes innovation to exclusive laboratories and individual geniuses. Knowledge sharing through co-working, do-it-yourself (DIY) instructions, and the tricks and tips of successful businesspeople promise to empower every person with the chance to change the world with a technological idea, anytime, anywhere (Barbrook and Schultz 1997; Bouncken and Reuschl 2018; Gillies 2011). Kenya's government is also certain that technology development offers new work possibilities and the ability to ultimately "catch up" with the economic development of other countries (MIED 2015: 6).

Against the backdrop of the globally omnipresent promises about improved working and living conditions through new technologies, this book examines what affective and socio-material practices are demanded to gain legitimacy in technology development, particularly of places and bodies that are marked as technologically 'catching-up' and therefore as peripheral to global technocapitalism. I am interested in the affects that drive technology developers' responsibilization to achieve individual, national, and global progress through technologies (Davies 2017; Irani 2019; Lindtner 2013; Sivek 2011). Focusing on technology development in Nairobi, my research considers how actors who have previously been ignored by much of academia *perform technocapitalism*. The majority of research on technology entrepreneurship focuses on Silicon Valley as an exemplar for tech innovation and thus perpetuates the Enlightenment understanding of modernity and progress (e.g., Cringely 1992; Saxenian 1996). Instead, I argue that, especially in contexts

6 Other 'emerging' – or newly discovered by the Global North – technology development locations have also been named after Silicon Valley: Shenzhen is called the *Silicon Valley for Hardware*, Cape Town *Silicon Cape*, and Bangalore *Silicon Plateau*.

that have been positioned at the periphery of technocapitalism, technology entrepreneurs have multiple and contrasting desires for progress.

To elaborate the technoscientific visions, affects, and practices in Kenya, I ask: *What positionalities does Kenya occupy in technocapitalism? How can Kenya be a place for technology entrepreneurship?* And, more specifically: *What affects and embodied practices of knowledge production occur in innovative workplaces in Nairobi? What global technoscientific norms affect makers*[7] *when developing technology?* Finally: *What kind of positionalities and norms of Kenyan science, technology, and innovation are too sticky*[8] *to be re-made and contested?*

I answer these questions by situating Nairobi's technology development sector within historical trajectories of colonial oppression, struggles for economic and epistemological independence, and the global paradigm of technoscientific progress. I claim that Kenya, its technology developers, the innovated technologies, and their users hold a *postcolonial positionality* within global technocapitalism. This means that political actors, investment flows, and development agendas examine and value Kenya's tech scene in terms of Western[9] epistemologies, whereas technology developers feel and handle the material disadvantages of the Global South[10] in their daily lives. I analyze Kenya's dis-

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7 I use technology developers and makers (of technology) synonymously throughout the book. By both terms, I describe people who (entrepreneurially) create technology in places such as makerspaces.

8 As elaborated in Section 1.2, I refer to Sara Ahmed's concept of 'stickiness'. She sees emotions as sticking to some bodies and objects, while sliding over others (2004/2014: 8). As the stickiness of an emotion is shaped by histories of encounters (2004b: 120), emotions organize bodies and create boundaries along historically established power structures (2004a: 33).

9 I understand West as a discursively produced category that differentiates places and cultures based on Enlightenment thinking and a Eurocentric historiography of economic development (Hall 1992/2018: 92). Exoticizing novels, travel reports, academia, and governmental reports demarcated (and still do) an imagined West from other(ed) imagined places such as the East, the Orient, and so forth (Said 1978/1979). Due to colonization and the "globalization of western imperial power … many societies with different historical traditions [were fused] into a history which, … obliged them to follow the same general economic path" (Young 2001: 5). This means Western epistemologies and historiography became globally hegemonic and shape current postcolonial power asymmetries (Hall 1992/2018: 85).

10 I use the terms Global North and Global South to describe the global economic and political disparities which began to develop with the colonizations by European countries (McGregor and Hill 2009: 473ff.). As this book looks at the current distribution of wealth and power in technocapitalism, I do not limit the Global North to only former

cursive and material positionalities as reciprocally related to the country's situatedness in its past, present, and future. Thus, the country's positions – on the periphery of technocapitalism, yet at the center of African innovation – are relational and performative. Consequently, tech actors have the possibility to re-script their postcolonial positionality by narratively and materially negotiating hegemonic technoscientific norms, national development visions, daily working conditions, and the colonial imaginations of a workplace in Africa.

I furthermore turn attention to the effects of having such ambiguous positionalities and show how technology developers become emotionally invested in technology entrepreneurship and technoscientific progress. Kenyan tech developers enter into caring socio-material relationships to fulfill their ambitions while enduring (neoliberal and postcolonial) turbulences and ambivalence. Due to their postcolonial positionalities, merely promising technoscientific progress is not enough to gain international legitimacy. They have to affectively perform themselves as being worthy of inclusion in the technocapitalist world and, overall, as working in a place that keeps up with other places of knowledge production. As such, actors in Kenya's tech scene eradicate doubts by performing their work in a tangible and bodily perceivable way and making stories about Kenya's tech scene touchable, observable, and understandable for their, mainly white, international investors. As these affective and bodily efforts are necessary to gain investment, I define technocapitalism as an *economy of promises and performances* about technology yet to become.

Overall, I show that future visions depend on the context-specific situatedness of a place. I analyze how histories of colonialism, subsequent development experiments, and present modernist assumptions of economic progress, entrepreneurial selves, and digital technologies unfold within ambiguously desired futures. I argue that *postcolonial technology entrepreneurship* assembles intimate socio-material relations between developers, material, and machines that work hard to achieve seemingly contrary industrialized Kenyan futures.

(European) colonizers, but also include the current powerhouses of technology production, such as South Korea, Singapore, China, and Israel (Statista 2020: n.p.; World Population Review 2021: n.p.). I am aware that the dichotomy engendered by the terms is problematic as it homogenizes different economies and daily lives into two seemingly coherent contexts (McGregor and Hill 2009: 476). Therefore, in this book, I refer continuously to the fact that I am analyzing empirical data anchored in a specific local context, namely Nairobi's tech scene.

There are at least two desired futures: one is that of a decolonized country that has been emancipated from the supremacy of Western knowledge and technology by empowering local tech developers to care for the African[11] continent's needs; the second is that of a future nation that is integrated into the technocapitalist market by achieving global norms of tech development and a national Fourth Industrial Revolution.[12] The ambiguity of Kenya's future visions is paradigmatic for an ever-intensifying entanglement of heterogeneous practices and ambitions within capitalist markets (Berndt and Boeckler 2011; Collier et al. 2017). In this regard, I am especially interested in an ambivalence specific to technocapitalism: while the seductive promise of solving crises of capitalism through (capitalist) technoscience generates economic opportunities for marginalized states, at the same time technocapitalist practices reproduce the exact same global power asymmetries that need to be overcome to solve capitalist crises (Birch 2017: 433; Suarez-Villa 2001: 5). Against this backdrop, I depict technology development in Nairobi neither as an anti-capitalist craft revival such as in post-industrial contexts, nor as a copy of Silicon Valley's innovation culture. Instead, I emphasize what technocapitalism feels like – desiring exciting experiments with digital machinery, envisioning an industrialized and decolonized Kenyan future, and being stressfully self-employed in an exploitative global tech market.

1.1 Situating the Silicon Savannah: Postcolonial Positionalities in Technocapitalism

My research draws on concepts of positionality and affect inspired by feminist and postcolonial theories in geography, science and technology studies (STS), and sociology. Thus, the following pages lay out the theoretical frame for the book. I introduce theorizations on positionality, affect, and embodied work

11 I only refer to 'Africa' as a single location in order to highlight the demarcations that my research partners enact. Throughout this book, I seek to avoid the colonial homogenization of a whole continent into a single context. However, these homogenizations are important to mention as they represent the discursive frames in which my research partners (must) position themselves (see Zanoni et al. 2017: 348; Part I).

12 The Fourth Industrial Revolution describes a worldwide phenomenon of integrating interconnected and automated digital technologies into industrial production facilities (see Chapter 2).

that allow me to research the situatedness of Kenyan technology development and the work that is necessary to position Kenya within technocapitalism.

Positionalities, as carved out by feminist theorists, shape our possibilities to act – for example, the ability to envision futures, to be affected and to affect, or to access a research field (see Section 1.3). Generally, positionalities are defined along socially constructed categories such as gender or race and describe the situatedness of a person or group within a specific context (Rose 1997). Drawing on Eric Sheppard's concept of "geographic situatedness" (2002: 318), I claim that Kenya holds a postcolonial positionality within technocapitalism. By 'postcolonial', I mean the circumstance that although colonization has formally ended in most parts of the world, colonial trajectories, such as Eurocentrism, still produce global epistemological and material inequalities (do Mar Castro Varela and Dhawan 2015: 17). Postcolonial structures in technocapitalism include fiber optic cables that run along old colonial maritime trade routes, value chains that confine the extraction of raw materials to African countries while outsourcing their more profitable processing, investment flows originating primarily in the USA and Europe, and the extraction of local knowledge by multinational tech companies (Bejarano 2021; Kwet 2019; Smith 2022; Wan 2019). Throughout the book, I examine the discourses, affects, and materialities "sticky" (Ahmed 2004b: 120) with postcolonial power asymmetries that shape the work of developing technology. In the case of Kenya's tech scene, its dominant discourses and affects *other* Nairobi as a mere copy of Silicon Valley and thus, exoticize and demean the country as a deficient place that has to catch up through technoscience.

The importance of researching positionalities lies in the fact that Kenyan technology developers experience their geographic situatedness day by day. Not only they themselves, but also media stories constantly compare their technology development circumstances to technoscientific work in Silicon Valley, China, or Southeast Asian countries. Terminology such as *Silicon Savannah*, *to spur*, *leapfrog* or *catch up* indicate these discursive comparisons. Materially, Kenyan technology developers are confronted with resource scarcity and often lament that their work would be easier in a different place. As such, they feel and (rightfully) complain that their postcolonial positionalities within technocapitalism determine their visions, workplaces, technologies, labor, identities, and affects as well as, in general, Kenyan futures.

As positionalities are relational and thus performatively constructed, I emphasize the possibility of shifting positionalities. As such, I understand positionalities, technology, modernity, and progress as bodily and material

achievements and not as essentialized entities (Slater 2014: 153f.). In this respect, my research highlights the performative work of making and scripting Kenya's positionality as a place for technology development, and therefore scrutinizes the unquestioned permanency and stability of center-periphery relations (Chan 2013: xi).

The Situatedness of Technology Development

In order to grasp a place's "positionality within the global economy", Sheppard (2002: 308) draws on feminist theorizations of the relationality and performativity of positionalities and their inherent power asymmetries (Rose 1997: 317) but broadens them by adding a "geographic situatedness" (Sheppard 2002: 318). He states that although the power asymmetries that define a place's positionality are mostly path dependent, positionalities are topological and have multiple scales (ibid.: 324). This means that geographic categories have multiple positionalities just as feminist scholars conceptualize an individual's multiple and variable positionalities ranging "from the body to the world region" (ibid.: 322). Anna Tsing (2000: 330) also writes that geographic positionality is scale-dependent and therefore highly variable: she looks at how scales are made through "planet-wide interconnections" and, according to her, researching the politics of scale-making "requires locating and specifying globalist projects and dreams, with their contradictory as well as charismatic logics and their messy as well as effective encounters and translations".

Regarding technology development practices, researching the making of variable scales is a promising approach – especially when the focus is on tech scenes because they embody and materialize global discourses and the requirements of world markets within their daily work (Gibson 2016: 82). By analyzing the construction, representation, and negotiations of spatial categories through practices of technoscience, postcolonial STS questions how scales are made. This sub-discipline claims that "practices of science are always multi-sited" (Anderson 2009: 395) and, therefore, blur and contest dichotomies produced by colonialism (McNeil 2005):

> Attention to the 'complex border zone of hybridity and impurity'[13] should help us to understand how ideas about difference – racial (white/other or *évolué*/primitive), temporal (modern/traditional), class (élite/subaltern) – are enacted, and disturbed, in the performance of technoscience. A postcolonial perspective might show us how scientific and technological endeavours become sites for fabricating and linking local and global identities, as well as sites for disrupting and challenging the distinctions between global and local. (Anderson 2002: 644)

The different scales of technoscientific endeavors show that a place of technology development holds variable and multiple positionalities. In this context, Paul Dourish and Scott D. Mainwaring demand the recognition of "the historical specificities of sites of technology production and use" (2012: 139) in order to grasp the variegated positionalities of a place of technology production, its being more than just a center or periphery. They use the example of iPhones and state that although they are claimed to be designed in California, innovation happens most often during the manufacturing processes that are mainly outsourced to other places of technology production, usually China. Eleanor Marchant (2014) also relativizes the positionality of a center or periphery by comparing technology creation in Nairobi with that in Philadelphia. She analyzes how both center and periphery are contextual by showing that the tech scene in Philadelphia inhabits a peripheral status in the USA although it is located in the Global North (ibid.: 18), whereas Nairobi may be peripheral in the commodity flows of electronic parts (see Chapter 7), but is positioned in the center of international awareness (Marchant 2014: 18). Marchant's take on the "geography of technology creation" (ibid.: 5) shows that places of technology development are context-specific – and thus never generalizable.

Colonial Trajectories in Science and Technology

As Kenyan tech entrepreneurs perform global technocapitalism, they blur the distinctions between the putative centers and peripheries of technology development. The international excitement and wonder about technological in-

13 Kwame Anthony Appiah criticizes the terminology of purity when referring to 'culture'. He claims that discourses of pure and impure cultures legitimated and still legitimize discrimination, exploitation, and violence and that "contamination" would be a better term to describe the "endless process of imitation and revision" of lived cultures (2006: n.p.).

novation from Kenya imply that the existence of a tech sector in an African context must be something special. In this manner, the emergence of creative tech scenes all over the world, and the increasing concentration of technology production in China and Southeast Asian countries challenge the supremacy of the USA and Europe as the centers of knowledge production. Kenya, as the Silicon Savannah, is the role model for technology development in Africa and therefore, constitutes the continent's center of media attention and financial investment (Marchant 2014: 18). However, although Kenya represents the regional center of tech innovation, I argue that complicated commodity imports and Eurocentric discourses have maneuvered the country to the periphery of global technocapitalism.

Materially, the peripheral position of Kenya can be derived from the fact that the commodity flows of essential parts and machines to build technology omit Nairobi's tech developers (see Chapter 7). The centralization of affluent tech industry in only a few places, such as Silicon Valley or Shenzhen, motivates tech companies from all over the world to either move to these clusters – if they can afford to – or they have to remain in a place where access to local resources and success stories are limited (Takhteyev 2012: 9ff.; see Part I). Discursively, the scarcity of (academic) literature about makerspaces and technology development in the Global South illustrates Kenya's peripherality to technoscience. One of the reasons that historical accounts of the emergence of makerspaces, for example, omit places in Sub-Saharan Africa is that these contexts often do not have a long history of institutionalized technology development. Although practices around making and innovating in the Global South have "been going on both well before, and also at the same time, as the [maker] movement's rise in the West" (Braybrooke and Jordan 2017: 30), they have been neglected by the dominant Western narratives around innovations and their origins.[14] Therefore, the genealogies of hacker- and makerspaces focus on tech developers who form a counterculture DIY/repair movement against capitalist structures in post-Fordist environments (Maxigas 2012). This absence of literature around making and technological innovation in the Global South reflects the hegemonic story about the relation between the Global South and technology in general:

14 Although the majority of research on making and entrepreneurship is empirically located in places in the Global North, the community of scholars who provide detailed and contextualized accounts on makerspaces in other regions is growing (e.g., Avle and Lindtner 2016; Bardzell et al. 2012; Irani 2019; Philip et al. 2012).

> The story of the [Global South] and technology if it is told at all is one of transfer, resistance, incompetence, lack of maintenance, and enforced dependence on rich-world technology. Imperialism, colonialism, and dependence were the key concepts, and the *transfer* of technology from rich to poor, the main process. (Edgerton 2007: 92)

Historian David Edgerton (2007) writes that technology is embedded in exploiting and discriminating systems such as colonialism and imperialism. This is another reason why academic accounts of technology development in Sub-Saharan Africa are scarce: because "scholarly histories of technology and the digital are almost all intertwined with Western history, its theories, systems of knowledge production and its subsequent transfer, making it difficult to unravel or identify specific regional African histories and positions" (Bristow 2017: 282). This colonial trajectory within academia results in doubts about the legitimacy of research on technology development outside the Silicon Valley (Takhteyev 2012: 1). Anita Say Chan (2013: 8), for example, was asked why she would research digital culture in Peru, "a South American nation far less attended to for contemporary innovation than for its ancient Incan ruins and high Andean peaks".

Numerous places and people worldwide are not seen as active technological actors because of the Western historization and theorization of (technology) development as linear and teleological (see Chapter 2). For example, until now, people in African contexts have been depicted as passive recipients who lack technological and scientific expertise (Bristow 2017: 284). In this manner, the making of technologies in the Global South is mainly researched as *frugal innovation*, that is, innovation processes that use minimal resources, resulting in low-cost products (Radjou and Prabhu 2015). Terms such as *making* or *innovation* are used when describing practices in the Global North, whereas descriptions of making practices in the putative peripheries of technocapitalism refer to informalized hacks such as the Hindi term *jugaad*[15] (Butoliya 2018) or Kiswahili *jua kali*[16] (King 1996a). This discursive demarcation causes the othering of non-Western practices of technology development. The denial of technoscientific practices in the Global South follows a "logic of lack" (Dourish

15 The Hindi word *jugaad* describes a hack; "an innovative fix; an improvised solution born from ingenuity and cleverness" (Radjou et al. 2012:4).

16 *Jua kali* means 'hot sun' in Kiswahili and is used to describe the informalized sector in Kenya (King 1996a).

and Mainwaring 2012: 136). According to Dourish and Mainwaring, this logic evokes an "evolutionary relationship" (ibid.: 135) between the post-industrial West and other(ed) places, so that innovation and technology is believed to diffuse from a Western center to non-Western peripheries.

Within the Eurocentric teleology, technology represents the inevitable and de-politicizing driver of economic productivity and societal change (Graham et al. 2015: 345; Mavhunga 2017: 8f.). In this regard, development cooperation agencies, private companies, and governments ubiquitously use terms such as *leapfrogging* or *digital divide* to legitimize the investment in technologies as facilitators of development in the Global South.[17] They aim to close the digital divide – a "gap between people and places with regard to their access to … ICTs" (Graham 2011: 213) and other digital technologies – because the divide is claimed to hinder countries from participating fully in the global economy. In this context, technology is supposed to help countries leapfrog, that is, to skip a pre-defined development stage and thus catch up with prosperous economies. For example, the increase in mobile phone usage in many African countries is heralded as leapfrogging the usage of landlines as a communication device (Castells et al. 2007: 216).

Against this background, we see that global technocapitalism and its technoscience is interwoven with colonial trajectories of resource flows and restrictions, and hegemonic norms of scientific work such as the achievement of 'objectivity' through global standardization, and the teleological assumption that technological advance brings societal progress (Barnes 2005: 142; Wynne et al. 2007: 28).

17 The existence of digital divides is also seen in post-industrial contexts, such as the UK, USA, and Germany. Whether in the Global North or South, the numerous projects that aim to close digital divides all define the same populations as the most likely to be excluded from the digital: indigenous peoples, people living in rural areas, less educated and unemployed persons, individuals with low incomes, people with disabilities, women, youths, and children (WebJunction 2019; Good Things Foundation 2018; International Telecommunication Union 2019). In general, digital inclusion agendas have the goal of broadening internet access and fostering digital skills to (re-)integrate citizens into the labor market and improve national workforces (Digital Inclusion Survey n.d.; PricewaterhouseCoopers LLP 2009).

Emancipatory Struggles over Positionalities

Rather than understanding positionalities as fixed entities, this book shows that the performativity of discourses, affects, and materialities leaves room to re-make positionalities. Here, I am inspired by Mike Crang's concept of "scripting places" in which he claims that images, texts, and practices are able to create and "also rework the actual histories and geographies of places" (2004: 76). In this vein, I analyze the performative work of scripting Kenya's positionality as a place for technology development, and show the possibilities and constraints of technology developers, innovative technologies, and workplaces to articulate a self-determined positionality in postcolonial economies. Thus, I follow Sheppard's call for research into the existence of various positionalities to examine "struggles over meaning", but without restricting my research focus to how seemingly universal values and norms position places into "a common positionality in the space of discourse" (2002: 322). Theorizations of science and technology from African and Latin American contexts emphasize that the colonial history of technology gives reason to scrutinize the claimed universality of Western concepts of science, technology, and their making, and thus, to question the putative stability of technoscientific centers and peripheries (Mavhunga 2017; Medina et al. 2014; Rajão et al. 2014). In this manner, I highlight the visions and possibilities that (still) aim at epistemological, technological, and economic emancipation from Western hegemony by researching the everyday work of technology developers in Nairobi.

The situatedness of technology development is a pressing issue for actors who possess a postcolonial positionality in technocapitalism. In Kenya, the actors in the tech scene (have to) constantly negotiate their positionalities as their places, bodies, and machines are considered technologically deficient. Interestingly, it is mainly research partners in formerly colonized places who talk about their geographical situatedness in colonial pasts and contemporary capitalist technopolitics. Be it Brazil, Peru, India, Kenya, South Africa, Ghana, Jamaica, or China – all of the scholars who pursue research in those countries describe how technology developers, research institutions, and other workplaces of innovation struggle with their peripheral positionality in global economies, technoscientific discourses, and historiography (Avle et al. 2017; Chan 2013; Coban 2018; Irani 2019; Pollio 2020; Takhteyev 2012).

The discursive, material, and affective positioning of countries as places that lack technology and its accompanying (national) progress influences their possibilities and envisioned futures (Sheppard 2002: 307f.; Müller-Mahn 2020:

157). The material constraints that technology developers face at "the so-called peripheries of technological innovation" (Chan 2013: 8) complicate the local development of technology (see Chapter 7) and evoke desires in politicians, investors, and entrepreneurs to abolish peripheral positionalities and bolster national economies (see Chapter 2). As described above, the belief in modernity and progress through technologies is a global hegemony[18] and therefore spurs the aim to be included in global markets. In this manner, Mark Graham (2015: 880) describes how Kenyan tech entrepreneurs primarily problematize their disconnection from global tech markets which prevents them from fulfilling national development. He writes that in the "global margins – the people, places, and processes that have not been able to occupy central positions in transnational networks of production and value creation" (2019: 15), digital technologies are seen as promising tools to change their positionalities.

With my research, I show how technology development functions as a tool to change Kenya's positionality and *center* it within global power structures. This centering involves the Kenyan government's and tech developers' attempts to foster their inclusion within the world tech market, as well as the developers' fight against colonial attributes such as the discursively ascribed peripherality. I argue that Kenyan technology developers, machines, and stories unite to use their central (media) position within Africa's tech sectors to re-script their postcolonial positionality. They strive to change epistemological and material inequality through efforts at market integration *and* decolonial attempts to regain the power of writing one's own story.

The attempt to rework Kenya's postcolonial positionality by merging capitalist and decolonial endeavors with each other hints at the contradictory effects of, on the one hand, transcending boundaries and changing positionalities, but on the other, manifesting and reproducing dichotomies. The ambivalent pursuit of decolonial independence through capitalist technologies creates economic opportunities, but at the same time technology developers have to comply with technocapitalist valorizations that reproduce rather than overcome global power asymmetries. Yuri Takhteyev (2012: 11), for example, shows

18 I use the term *hegemony* to describe sets of ideas that have become the norm through a broad consensus in (civil) society. The majority does not question hegemonic norms; however, the suppression of alternative values and ideas can give rise to activist movements that challenge hegemony. For a detailed discussion of hegemony, see Gramsci (1975/1991-2002).

that developing software in a "wrong place", namely Rio de Janeiro, means pursuing global practices of high-tech work by disengaging with the local context. The valuation of global practices of innovation causes the parallel devaluation of those practices that have been practiced locally for a long time, such as *jugaad* and *jua kali* as explained above. In the case of India, Lilly Irani shows that the global project of "entrepreneurial citizenship" (2019: 22) draws distinctions between innovators and beneficiaries, innovative technology and *jugaad*, and thus, more generally "between those who can govern others and those who must be governed, cared for, and drawn into modernity" (ibid.: 13). Consequently, ascension from the peripheries of technocapitalism "hing[es] on the successful upgrading of individuals into entrepreneurial citizens and on the making of a new kind of professional identity" (Avle et al. 2017: 481).

My research on technology development in Kenya shows that technology and science are sites of hegemony and, at the same time, sites of multiple context-specific productions of globality (Anderson 2002: 651). I show that Kenya's positionalities are socio-material achievements of the technoscientific work that constantly negotiates path-dependencies of colonial histories and current global politics of technocapitalism. As such, postcolonial technology entrepreneurship is a highly ambivalent venture that has to be constantly negotiated affectively.

1.2 Affects at Work: Making Technologies, Stories, and Positionalities

I became aware of the affective and sensory attributes of technology development in Nairobi due to my ethnographic focus on everyday spaces of entrepreneurship (Steyaert and Katz 2004). I followed affects – my bodily sensations, the emotions of my research partners, and the affective language in stories – to be guided to issues "sticky" with strong emotions (Ahmed 2004b: 120). These emotions led me to the most relevant matters of entrepreneurial work in Kenya's tech scene: the (desired) enactment of societal progress and changing Kenya's status in global technocapitalism from postcolonial peripherality to a more central positionality. The embodied affects of making technologies and stories at makerspaces served as analytical tools to grasp how technology developers become invested in norms of entrepreneurial work, technoscientific progress, and social impact.

Based on a spatial, relational, and discursively structured understanding of affect/emotion,[19] I analyze how boundaries are affectively (re-)constructed along norms of technoscientific progress. I show that the affects, bodies, technologies, and narratives in Nairobi constantly negotiate the professionalism of technology, the norms of innovative work, the 'Africanness' of technology, and the 'right' collaborators to work with – whether white visitors, investors, co-workers, or machines. The manifold and ever-changing distinctions and connections between global norms and daily life, between friends and foes, between Africa and the West, and between tinkering and engineering highlight the affective work that is necessary to build technologies, stories, and positionalities. I claim that the technology development sector in Nairobi has brought Kenya to a historical (turning) point: intimate socio-material relations of technology developers, machines, and material re-scripting the country's positionality within postcolonial power asymmetries. As such, I show that structural inequity is negotiated affectively and socio-materially, and emphasize the practices that are demanded of places, bodies, and machines considered technologically deficient.

The Sticky Geography of Affects

Feminist scholars who deconstructed the belief in objective knowledge, claiming that it is always situated and partial, initiated the study of affects (Haraway, 1988). Methodologically, feminist theorists demand that the researcher's positionality in academic accounts should be transparent in order to be aware of "the substance and significance of matter, materiality and the body" (Pedwell and Whitehead 2012: 117) during the research process. However, some feminist scholars, such as geographers of emotions, have been criticized for personalizing research and focusing too narrowly on individuals' emotions (Cadman 2009: 458; Thien 2005: 452). In geography, a debate about emotion and affect has resulted in two disparate fields of research: geographies of emotion and non-representational geographies. The, mostly male, scholars of non-representational (NRT) geographies advocate for a broader theorization of affect, separated from individual and embodied emotions (see Pile 2010; Slaby 2018; Thien 2005). On the other hand, the, mostly feminist, geographers criticize this dichotomous understanding of affect and emotion in NRT "for reproducing an

19 Throughout this book, I will use 'affect' and 'emotion' synonymously due to the theoretical understanding of affect elaborated below.

objective/subjective dualism and downplaying the subjective" (Anderson 2017: 2). Further, they claim that NRT diminishes the insights of poststructuralist accounts on power and discursive representation (Schurr and Strüver 2016: 90f.).

The scholars I refer to in this book predominantly draw on Sara Ahmed's conceptualization of affect, claiming that affect and emotion signify the same thing. According to her, an "analytic distinction between affect and emotions risks cutting emotions off from the lived experiences of being and having a body" (2004a: 39) on the one hand, while, on the other, a distinction risks the assumption that emotions come from within individual bodies (Ahmed interviewed in Schmitz and Ahmed 2014: 97; Ahmed 2004b: 117). Therefore, research that follows Ahmed analyzes both – the emotional dimension of daily life as well as the discursive dimension, power-laden structures and representations that drive collective affect (Schurr and Strüver 2016: 94). To examine the body in the context of power structures, Margaret Wetherell (2012: 19) understands affects as discursively structured:

> An affective practice is a figuration where body possibilities and routines become recruited or entangled together with meaning-making and with other social and material figurations. It is an organic complex in which all the parts relationally constitute each other.

The emphasis on the 'figuration' of bodies, practices, discourse, and materiality underlines the relationality of affects and the inseparability of "language and representation from materiality and corporeality" (Militz 2017: 25). Affect's relationality means that an emotion is not only a bodily experience "inherent to a body or an object but is being activated in encounters with different bodies and objects" (ibid.: 22; Ahmed 2004/2014: 6).

However, within affective encounters, bodies and objects possess different capabilities to affect and to be affected. These capabilities are dependent on the bodies' and objects' "racialized, gendered and sexualized markedness" (Tolia-Kelly 2006: 215). This means the feeling that "a certain body (marked through signs of gender, sexuality, race, etc.) … [has] about another (differently marked) body is not simply a matter of individual impressions" (Laliberté and Schurr 2016: 74). Instead, the feeling is evoked by a "contact [that] is shaped by past histories of contact" (Ahmed 2004/2014: 7). In this respect, encounters between different entities not only produce connective relationality, but also have dividing and differentiating effects. For example, Ahmed asks "What do emotions

do?" (ibid.: 4) and analyzes how emotions shape "the surfaces or boundaries of bodies and worlds" (2004b: 117) and, as such, create insides and outsides.

One of Ahmed's most important concepts, to which I will refer throughout this book, is the 'stickiness' of emotions. She uses this term to explain *how* boundaries, such as stereotyping dichotomies, are drawn. As explained above, Ahmed (2004/2014: 4) sees emotions not as residing in bodies, but circulating between them. By analyzing the work that emotions do, she highlights that, in their movement, emotions stick to some bodies and objects, while sliding over others (ibid.: 8). She argues that every encounter comprises sideway movements that establish "'sticky' associations between signs, figures, and objects" (2004b: 120), for example, "dirt, the roach, the Black body", and backwards movements in which histories make associations sticky (2004a: 33). These sticky emotions bond figures to each other and create coherences (2004b: 119). As such, sticky emotions organize bodies and therefore create boundaries between collectives, for example, as people who are "hated or loved, as giving pain or pleasure" (2004a: 33). The analysis of the movement and stickiness of emotions aims to foreground "how we become invested in social norms" and eventually to answer why norms stay stable and social transformation is hard to achieve (Ahmed 2004/2014: 11f.).

The point that "affective relations organise bodies and objects across space and time" (Militz 2017: 21) directs geographical research to analyze the spatialization of affects. For instance, Elisabeth Militz looks at how "the circulation of national affects between different bodies and objects … engenders feelings of national belonging and alienation and connects some bodies and objects while disconnecting others" (ibid.: 22). And Sunčana Laketa (2018) conceptualizes the term 'sticky spaces' by analyzing how the affects of discursive and non-discursive practices in a school and on a main street in Mostar (re)produce ethnic difference. Kate Cairns (2013) explicitly combines economic circumstances with affects and labels her approach *emotional geographies of neoliberalism*. She researches the imagined futures of students at a rural school in the USA and combines the situatedness of that place with the affectivity of neoliberalism as the dominant discourse. As such, she is interested in how "young people encounter neoliberal notions of flexibility, mobility, and self-improvement from a specific location – one marked by whiteness, economic hardship, and classed narratives of 'rural decline' – which calls upon distinct forms of self-work", arguing that critiques of neoliberalism have to include affects to understand the "practice of self-making that is deeply felt" and "how risk and uncertainty are managed in place" (ibid.: 343).

In this book, I emphasize how the sticky affects of (post)colonial oppression and desires of emancipation organize the bodies and technologies at innovative workplaces in Nairobi. I argue that hegemonic discourses, material commodity flows, and (post)colonial affects position Kenya's tech scene and its actors as an *other,* as a periphery to global technocapitalism (see Ahmed 2004a: 33). For instance, the feelings of excitement, empowerment, wonder, and unexpectedness associated with technology development in Kenya depict its tech scene as a surprising phenomenon. These recurrent affects portray Kenya as a place that has to catch up in terms of technology, its national economy, and societal issues and thus draw boundaries between Kenya and other places of technology development (see Part I).

I claim that the postcolonial positionality of Kenya affectively limits the possibilities of developers and their technologies. Global technocapitalism demands that technology developers in Kenya have to first convince international supporters and investors of the value of their work in order to be able to affectively and socio-materially re-script their positionality. In this regard, I show that technology developers, narratives, and prototypes use international attention in order to shift boundaries and create identities: media attention centers Kenya's discursive positionality, investors' awareness changes material peripherality, and the building of a tech community creates a caring identity of Kenyan makers. The affects and embodied work of making technologies and telling stories about them show that positionalities are constant works in progress.

Affects and Work(place)

In Nairobi, a workplace such as a makerspace is where technology developers make prototypes and stories to enact and feel futures of independence and industrial revolution. Thus, it is where technology is developed to re-script Kenya's postcolonial positionality. Highlighting the normative affectivity at innovative workplaces, I argue that technocapitalism is an *economy of promises and performances*. Thus, Kenyan technology developers are required to strategically stage (over) optimistic technoscientific promises (Wynne et al. 2007: 24) and furthermore, bodily and affectively perform their audiences' expectations in order to gain legitimacy with actors both outside and inside the country. Only by promising and performing their envisioned futures along hegemonic norms of technoscience and exoticized imaginations of Africa are Kenyan tech

developers able to gain the crucial support needed to enact their work (see Part I).

Despite the affectivity of making technologies, the academic literature on makerspaces typically does not look at the everyday work and working bodies, but has an empirical focus on the political implications of entrepreneurial making in post-industrial contexts, for example, the reproduction of capitalist modes of production. However, Andrew Pickering (1995), for example, scrutinizes this political-economic stance of the majority of research on technology and labor. He analyzed David F. Noble's (1984) account of the introduction of the first numerically-controlled machine tools at the General Electric Aero Engine Group in Massachusetts in the early 1960s and showed that the industrial workplace remains a "key arena for Marxist studies of technology" (Pickering 1995: 158) because Computerized Numerical Control (CNC) machines serve as the "principle exemplification of the Marxist deskilling book"[20] (ibid.: 170). Pickering criticizes how Noble's Marxist-inspired account assumes a "stable set of actors: the dominators (capitalists/management) and the dominated (wage labor)" (ibid.: 171) who "can only waver between enduring limits" (ibid. 174). Likewise, geographers who coined the *Geographies of Making* distance themselves from labor geographies which "have often been dominated by the big stories, the epic struggles that occupy workers' minds, most often while their hands are occupied by manual tasks" (Carr and Gibson 2017: 4). Scholars who criticize the exclusive focus on the meta level of labor argue that huge constructs and promises about technology and labor:

20 Drawing on Karl Marx, Harry Braverman (1974) formulated the "deskilling thesis" claiming that various technological introductions to the industrial workplace continuously replace and deskill workers; for example, the assembly line replaced craftwork and the CNC machine replaced skilled machinists. According to Marx, machinery produces the capitalist relation that causes the "technical subordination of the workman to the uniform motion of the instruments of labour" (1867/2011: 463). Braverman's exegesis of Marx that focuses on the 'replacement argument' has often been criticized. Paul S. Adler (1990), for example, writes that "while agreeing with Braverman that Marx seems to have believed that capitalist development does embody a distinctive underlying skill trend, I argue that in Marx's theory this trend may not have been deskilling but quite the opposite—upgrading" (ibid.: 781). He refers to Marx's model of social change to show that deskilling is a short-term and local effect of power asymmetries in capitalism, but "nevertheless [represents] eddies in the broader current of a long-term skill-upgrading trend" (ibid.: 783).

> will not unfold in discourse alone; [they] will take place — or not — on the shop floor and be created and put to work by real people and their *living laboring capacity*, within real labor relations, using and creating real technology in all its *sociomateriality*. (Pfeiffer 2017: 120)

The research shift to the workers themselves and their affective labor dismantles the often linear and predictable Marxist narrations on science and technology development. Therefore, feminist and cultural geographies' perspectives, in particular, inspire this book to grasp the affective entanglement of making's local embeddedness and its global aspirations of technoscientific progress (e.g., Carr and Gibson 2017; Crang 1994; McDowell 2009).

I target "such undertheorized areas as affect, intimacy, and perception" (Waldby et al. 2006: 3) in studies of science and technology to highlight the bodily and affective work of technology development. Thus, my ethnographic research responds to the call of 'workplace geographies' not to fall for grand narratives of labor transformation and its location-independent knowledge workers, but to closely examine the workplace, its identities, bodies, and emotions in order to show the entanglement of the intimate and the global in the workplace (Crang 1994; McDowell 2009). As for workplaces in the 'new economy', such as home offices, co-working spaces, and others that are determined by digital technologies, Melissa Gregg (2011: 5) advocates for research into the intimate relationships between white-collar employees and their work, writing that the focus on affects in the workplace highlights how easily intimate emotions and relationships become capitalized. In the case of entrepreneurial making of technologies, Sarah R. Davies (2017: 113f.) also emphasizes the commercialization of emotions. She notes that her research partners have never built things out of monetary interest, but always out of personal passion and enthusiasm. Although the emotions of work life, such as stress or the desire for a work-life balance, seem global, Carla Freeman (2014: 7) claims that emotions have distinctive meanings in different contexts. In this respect, geographies of making examine the interweaving of "macroeconomic forces" (Gibson 2016: 82) with local context specificities. They include the economic contexts of the sensory parts of (manufacturing) work in their analyses because "labor process[es] and [the] accompanying embodied skills, technologies, machines and materials [intersect] with the logics of cultural capitalism" (ibid.). In this regard, a workplace such as a makerspace consists of relationally constituting parts: designers, developers, technologies and

their prototypes, users, materials, legislations, context-specific histories, and discourses situate the work of making in unique ways (Philip et al. 2012: 8).

My research at innovative workplaces in Nairobi shows that technology developers become emotionally invested in technology entrepreneurship and technoscientific progress and that they (have to) enter caring relationships to fulfill their ambitions and withstand (neoliberal) turbulences and ambivalence. Further, I highlight the affects and discourses that normalize the, often precarious, norms of tech work (Cockayne 2016: 469): Kenyan technology developers are situated within the master narrative of technoscientific progress that stipulates a utopian belief in revolutionary societal change through technology. 'New work' methods such as 'design thinking' and rapid prototyping promise infinite creativity and make every technology developer want – and have – to work fast, flexibly, and self-responsibly. Specific to places with a history of colonialism, Kenyan technology developers are confronted with exoticizing norms. This means that the technologies made in Nairobi only gain legitimacy if they benefit marginalized communities, especially the rural poor (see Chapter 6).

The depiction of the explicit and implicit normativity of discourses, affects, and technologies (see Suchman 2009: 9; Weber 2007: 360, 364f.) offers insights into the daily negotiations between global norms of innovative work and context specific challenges to entrepreneurship, and between the tech developers' dependence on capital from the Global North and the wish for emancipation from it (see Parts I and II). Thus, the occurring affects and embodied practices at makerspaces illuminate the (re-)production and contestation of technology production's norms while bodies relate to digital machinery. Overall, I argue that the work of postcolonial technology entrepreneurs is charged with tensions between neoliberal aspirations, capitalist world markets, and the decolonial motivations that they have to handle and withstand on a daily basis at their workplaces.

1.3 Methods and Sites: An Ethnography of Tech Entrepreneurship

I paid (auto-)ethnographic attention to the workplaces of technology development in Nairobi in order to extend geographic scholarship on "digital economies at global margins" (Graham 2019) which has hitherto mostly considered the meta level, such as the role of information and communication technologies for development (Kleine and Unwin 2009; Verne 2014), connec-

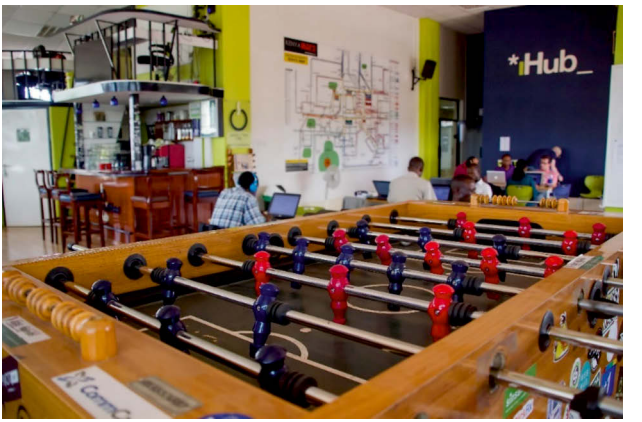
tivity through underwater fiber optic cables (Graham and Mann 2013), effects of platform work on digital labor (Anwar and Graham 2021), infrastructural context specificity of smart urbanism (Guma 2022), and the overall potentials and dangers of digitization (Doevenspeck and Hollstegge 2019).[21]

Due to my research interest in the physical efforts and affects that tech developers (have to) invest in performing technocapitalism, I carried out three research visits between 2015 and 2017, working alongside technology developers, startup founders, journalists, and researchers for about six months in total. My workplaces were primarily located in the first makerspace in Kenya (Figure 1), Gearbox, and the most famous technology hub on the African continent (Figure 2), iHub. The repeated research stays gave me fruitful insights into the fast dynamics of Nairobi's tech scene. During each visit, I was researching amidst (mostly) different co-workers as the business models and prototypes of startups, premises of workplaces and individual job positions changed quickly. These changing settings gave me the opportunity to examine entrepreneurial work and its innovative workplaces from various angles. For example, I was able to accompany Kenya's first makerspace, through its first construction, to its operation and functioning, to its second construction because of its move to a bigger space as a way to further professionalize its aims. Thus, I gained insights into the making of hardware, that is, the affective relationships between makers and machines while realizing an innovative idea, and into the norms of what a globally comparable makerspace 'should' look like and how its employees 'should' work.

21 A small number of ethnographies of digital practices and technologies in African contexts exist. See Jack and Avle (2021), Pollio (2020), and Tristl (2023).

Figure 1: Work at a CNC machine in Kenya's first makerspace, 2016 (author's photo).

Figure 2: Co-working space in Nairobi's most famous tech hub, 2015 (photo courtesy of Abu Okari).



I use *work* as the methodological lens of my research to understand what kind of work makes and maintains Kenya's positionality as a place for technology entrepreneurship. *Participant observation* (Crang and Cook 2007) and *working participant observation* (McMorran 2011; 2012) were the key methods

used.[22] I used participant observation to look 'behind' the glossy reports and visitor tours and researched daily life practices, including the "boring things" (Star 2002: 108) and "the obvious" (Law 2006: 10). I worked in several co-working spaces, attended numerous events such as hackathons, competitions, and panel discussions, and participated in introductory trainings for every machine used in the production line of a printed circuit board (PCB) to observe the manifold tasks that technologists have to accomplish to transform an idea into reality.

As an intern at the makerspace, I used working participant observation, a method developed by Chris McMorran (2012: 490) who claims that "geography's engagement with participant observation–particularly around questions of embodiment, labour, and work–has indeed been limited". During the months of my internships, it was my priority to do whatever work came up – be it writing blog articles, carrying machines, or brainstorming about new projects to build. During these work activities, I used my white, cis-female and able-bodied form as a multi-sensory research instrument (Longhurst et al. 2008; Schurr and Strüver 2016: 88; Vannini 2015: 321). Thus, auto-ethnographic experiences of the smells, sounds, and socio-material intimacies at innovative workplaces, such as the constant noise of metalwork, smells of hazardous chemicals, or the overall distractions of other co-workers, relaxing couches, or coffee bars, and how they affect the work being done are included in my research analysis. The fact that I was exposed to similar working conditions as the tech developers allowed me to more easily understand and discuss sensitive topics such as stress, fear, passion, anger, and love while developing hardware and to expand them with my own sensory knowledge (Carr and Gibson 2017; Ehn 2011; Farias and Wilkie 2015). Furthermore, I observed and participated in the storytelling practices that a makerspace needs to carry out in order to position itself in the global sphere of technology development, for example, presenting tech projects to visitors, writing blog articles, and marketing

22 As the insights from my (working) participant observation represent the main body of data, references to my research diary and vignettes about the affective work of technology development characterize this book. I use the term *vignette* to describe longer paragraphs of ethnographic data that either merge several research diary entries into one story, assemble and relate different situations to each other, or simply narrate research situations in a more elaborate and affective way than my actual notes do. The topics of my vignettes represent moments or stories that were pivotal for my analyses and interpretations.

companies (see Chapters 4, 5, and 6). Such practices – the participation in numerous events during the week and the work on public relations – are part of the everyday life of tech entrepreneurs, although often neglected by scholars of entrepreneurship. Overall, my focus on everyday work illuminated the ways in which technology developers become emotionally invested in global norms of technology entrepreneurship.

Throughout all the research visits, I worked predominantly with the staff and members of the tech hub and makerspace and had little access to the people who managed the workspaces. Therefore, I also conducted interviews with stakeholders who were not part of my daily participatory research: political and juridical actors, famous hardware makers and entrepreneurs, and leading technology experts in the Kenyan tech scene. The topics of the interviews ranged from personal motivations, the specificities of developing hardware in Kenya – such as the national patenting system, the governmental visions about the national manufacturing sector and a Fourth Industrial Revolution, and overall questions on the role of the state, market, and other tech scenes, such as Silicon Valley, in Nairobi's tech development sector. The interviews allow insights into just how discursively structured and highly normative Kenyan tech entrepreneurship is.

As a white visiting researcher, I had epistemic privilege by being able to decide on categories and interpretations, the use of research data and the ability to withdraw myself from work with my research partners (Decoloniality Europe 2013; Staeheli and Lawson 1995: 332). Therefore, I implemented a continuous exchange about my research foci and insights with my research partners and organized at least one *focus group discussion* (Longhurst 2016) each visit in an attempt to scrutinize and deconstruct my privileges. In general, the focused discussions opened up my research methods and analytical frame to my research partners, with whom I worked closely over the three years, so that they could make adjustments or criticize the research endeavor. Additionally, the discussions constitute important empirical data and led to a more profound understanding of specific topics.

Relational Positionalities: A Caring Yet Exploitative Researcher

My ethnographic research approach emphasizes the ambiguity and processuality of the positionalities of researchers, research partners, technologies, companies, and nations (England 1994; Law 1994; Ouma 2012; Taylor 2011). Focusing on the feelings and bodies of everyday labor exposes, on the one

hand, how affects (re)produce social and geopolitical positionalities (Ahmed 2014/2004; Pedwell and Whitehead 2012: 120) and, on the other hand, how these can change through the construction of fragile and temporary relationships (Laliberté and Schurr 2016: 75; Thrift 2003: 108). Thus, my research interest lies in the relational and shifting character of positionalities – for example, Kenya's shift from the periphery of technocapitalism to the center of 'African' technology development, or the change in my positionality from an exploitative researcher to a caring person as elaborated in the following.

My first research stay in Nairobi's tech scene showed me that my whiteness, my initial lack of knowledge about tech development, and my profession of someone who asks many questions equated me with the predominantly white visitor groups who visit the tech scene on a daily basis. As those visitors usually do not have any prior knowledge of technology development, Kenyan techies perceive them as exploitative of their knowledge and work time (see Section 4.2). Thus, I had to prove that I was not an exploitative visitor by showing that I understood the ethos of innovative workplaces, namely sharing knowledge. "What do you make?" was the first question I was asked by every co-worker I got to know at the makerspace. Makers want to figure out what knowledge or skill they can learn from each other. Thus, I often elicited surprised faces when I answered that I was a social scientist without any technical background. However, to gain the legitimacy to work at a makerspace, it was essential that my presence somehow benefit the community. As such, I was often asked to perform short pitches about myself, so that the co-workers could inquire and evaluate how/whether my knowledge could be of any use for them. The explicitly articulated demand 'to give something back' to the Kenyan community of tech developers shows that knowledge sharing is of the utmost importance and a strategy to protect oneself from extractive visitors.[23]

23 The differing skillsets of an ethnographer and their research partners represent a common negotiation in participatory research. Often, ethnographers lack the expert knowledge of their research partners – whether scientific professionals or bearers of traditional knowledge. Thus, the ethnographer (even if inhabiting white privileges) is confronted with their irrelevance compared to local authorities, elites, and experts (Williams 2018: 200). In this regard, Caroline Faria and Sharlene Mollett (2016: 88) state that "our own privilege as scholars from the global north cannot be assumed" because "not all our participants … are among the oppressed" and they call for the acknowledgment of a variety of agencies to complicate and disrupt "our understanding of power in the field" (ibid.). Logan D.A. Williams (2018) calls the variety of agencies in global research relationships *superpositionality*. She uses this term to describe her multiple

I experienced how affects can shift positionalities when my positionality of being an exploitative visitor to Nairobi's tech scene changed to that of being a caring person to my research partners. Feminist scholars have already described positionalities as relational, performative, and multiple. Thus, positionalities are often hard to grasp because relationships are seldom a mere "relationship of difference" nor about people "being in the same position" (Rose 1997: 313). This is why Gillian Rose (ibid.: 313ff.) emphasizes the in-betweenness, processes of (dis-)connection, and the performative negotiations within (research) encounters. My choice of working participant observation and my efforts to satisfy the requirements of my research partners were driving factors in building caring relationships. By giving feedback on design drafts, on applications for hackathons, and on advertisement brochures, conducting an interview-based evaluation of a makerspace, supporting the makerspace's public relations team, etc., I could share knowledge and mutually endure workloads and stressful moments (e.g., Research Diary, November 9, 2015; June 20, 2016; March 23, 2017; April 20, 2017). In this vein, a research partner of mine compared me with Mark Zuckerberg to describe two visitors having a different impact. While the media attention that (famous) visitors trigger has a positive impact on the tech scene in Nairobi, the research partner made the point that she needs someone who 'scratches her back', meaning the support of a person who cares about her personal concerns and daily work (makerspace employee, Interview, April 24, 2017). Co-working, care, friendship, and often womanhood blurred the critique of white privileges and formed spaces of connection and in-betweenness.

Despite discussing how I was perceived – as an exploitative visitor or as a caring co-worker – the fact remains that I was a white visitor to Nairobi's tech scene. After a couple of months of participatory work, I returned to Germany to sit in my office and evaluate the gathered data. Race and its oppression and privileges are 'sticky' (Ahmed 2004/2014). That means affective work can nudge positionalities towards a desired direction, only to discover that some positionalities and affects stay stuck to certain bodies and places. Thus, positionalities are a constant work in progress, but shaped by bodily encounters that are

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positionalities as she was "studying down" to people "with less privilege and power" in the Global South, "studying through" because she traced out "ideologies and discourses that shape policies and practice", "studying sideways" because she researched with knowledge producers that worked in a similar way than her own and also "studying up" to research high-tech elites (ibid.: 206).

embedded in "histories of contact between racialized, gendered, sexualized, and otherwise differentiated bodies" (Laliberté and Schurr 2016: 74). Technocapitalism is structured along historically manifested categories of race and colonial imaginations (see Section 4.4), so that sticky affects and positionalities of oppression cannot be transcended simply through friendship and care.

1.4 Book Overview

My analysis of the situatedness of technology development in Kenya has three objectives. First, to highlight the discourses, affects, materialities, and bodies that shape the power asymmetries of Kenya's positionality in technocapitalism. Second, to carve out the affective and socio-material practices in innovative workplaces that drive the entrepreneurialization of national progress, development agendas, and decolonial emancipation. Third, to ask what kind of positionalities and norms of Kenyan technology can and cannot be performatively (re-)made. The research focus on workplaces sheds light on the daily promises and performances that create, reproduce, and contest norms and visions of how to be innovative in an African context. In addition, the technology developers' emotional investment in the achievement of their desired futures becomes visible. Overall, this book demonstrates that making technologies in Kenya entails not only collaborative and loving work between co-workers, machines, and material, but also strenuous efforts of positioning within workplace hierarchies, technocapitalism, and colonial legacies.

The book has eleven chapters and two Parts, each of which begins with an argument-related literature review and theoretical reflections relevant to its chapters. Following this introductory Chapter 1, which lays out the theoretical and methodological frame for the whole book, Chapter 2 contextualizes the daily work of technology developers in Nairobi by analyzing Kenya's current manufacturing policies and the postcolonial histories of economic policies and entrepreneurship in Africa. I first present the historical persistence of the belief in economic progress through industrialization and technology, and second, the discursive staging of technology entrepreneurs as the main drivers of Kenya's national progress. The (historical) policy analysis explores how Kenya aims at industrialization as it tries to integrate into global economies and thus achieve societal transformation. I argue that although the utopian belief in industrialization, technology, and entrepreneurship persists, a shift has occurred in the current attempt to industrialize. The means of production are

supposed to be digital technologies, so that Kenya is aiming at a Fourth Industrial Revolution. Additionally, it is no longer the state which fosters industrialization nor the informal poor who have to undergo entrepreneurial training; rather it is well-educated technology developers who are responsibilized to realize the industrialization of Kenya. Carving out the neoliberal circumstances at stake, the chapter further points to the postcolonial specific in Kenya's ambition of technology development. Nairobi's tech entrepreneurs unite neoliberal logics with decolonial endeavors to create a pan-African identity of tech developers, transforming their societies for the better, and liberating the country from exploitative (post)colonial structures, such as the supremacy of Western technology and knowledge. As such, I define *postcolonial technology entrepreneurship* as neoliberal, but politically inflected work that performatively (re-)makes (peripheral) positionalities in technocapitalism.

Chapters 3, 4, 5, and 6 make up Part I of the book's ethnographic analyses. All examine the streamlined storytelling in and about Kenya's tech scene. Whereas Chapter 3 analyzes the content of published stories and the affects evoked by them, Chapters 4, 5, and 6 look at the socio-material practices of storytelling and highlight the economic necessities of tech development that shape how stories are told. In Chapter 3, I analyze the content, structure, and contexts of Nairobi's tech stories and depict them as totalizing narrations that are normative and affective. It becomes clear that each story is the same, no matter whether it is a journal article, a blog entry, or a marketing slogan. With each telling and leaving out of the same content, the story becomes singularized and powerfully materializes norms of technology development which affects the story's readers, storytellers, and protagonists. On the one hand, the story reproduces the "master narrative of technoscientific progress" (Davies and Horst 2016: 33) that understands technology as an apolitical and ahistorical tool of societal change and on the other, it reproduces colonial imaginations of a place in 'Africa' that exoticizes technology, its users, and developers. As such, the single story depicts technology development as a linear and teleological process of revolutionary, but smooth transformations while historical and political contextualization and the daily lives of tech developers are missing. I feed this discursive analysis with my research partners' feelings evoked by the materialized norms of how to work entrepreneurially and develop technology in postcolonial Kenya. Daily feelings include excitement, self-fulfillment, anxiety, pressure, and anger about the norms of working quickly, flexibly, and genially, about innovations that have to have social impact for national progress, and technology users who are supposed to be marginalized and impoverished

Kenyans. Overall, I argue that the norms and affects materialized and circulated by the streamlined tech story narrow the possibilities of technology developers and their technologies. The story 'narratively closes' (McNamara 2017: 272) Kenya's global positionality as an *other* of Western technology development and pushes its tech entrepreneurs into the inevitability of societal development through technoscience.

Chapters 4, 5, and 6 explore three storytelling practices to understand why the tech stories are told as analyzed in the previous chapter, and with what affective investments storytellers (have to) tell the streamlined story. I show that the daily practices of guiding visitors in Chapter 4, writing newsletters in Chapter 5, and branding technologies in Chapter 6 are ambiguous and emotionally strenuous as they are involved in the neoliberal making of technology. On the one hand, storytelling serves as a tool for empowerment by furthering a caring community of tech developers, refuting colonial stereotypes of African contexts, and re-scripting Kenya's positionality to a more elevated status in the global economy. On the other, it also has to attract (international) investors, and so storytellers strategically stage optimistic technoscientific promises and bodily perform the audiences' expectations. Therefore, I argue that techno-capitalism is an *economy of promises and performances*, which requires affective and bodily efforts by Kenyan technology developers. Storytellers have to endure discomforting feelings while being watched and objectified during visitor tours, the stressful but invisibilized work of constantly searching and 'caring' for the (suitable) content of newsletters, and the reluctant branding that resonates with the essentializing and discriminating imaginations of funders from the Global North. The daily negotiations between the storytellers' own visions and the (mostly external) expectations of technology development in Kenya emphasize that storytelling practices are affective and embodied negotiations over representations and positionalities. Overall, the analysis of storytelling practices illustrates that the decolonial attempt to become independent of centers of technology development, while at the same time seeking financial support from their actors, is paradigmatic for the entanglement of market logics and political endeavors in postcolonial technology entrepreneurship.

In Part II of the book, I delve into the work of actually building technology by focusing on the predominant affects felt by tech developers in makerspaces. Chapter 7 illustrates the hustle to handle the scarcity of resources to prototype technologies and the lack of state support and thus, explains why makerspaces in Nairobi are the only places that offer the possibility to rework Kenya's positionality through the 'professional' making of technology. In the

following chapters, I examine in depth the emotions of love and fear to show the preciousness of building technological products. In Chapter 8, I show that the love for digitalized machinery and aesthetic prototypes expresses the love for a liberation from postcolonial power asymmetries that hinder the country's inclusion in global technocapitalism. Chapter 9 focuses on the fear of failure that shows that technology developers are committed to the important tasks of achieving national progress and enacting technoscientific modernity while being confronted with context-specific challenges to prototyping. The fear of failure and the love for professional products highlight that making practices in postcolonial contexts are sticky with racialized national pasts, current global inequalities, and futuristic visions of an independent country. Furthermore, in both chapters I highlight that the transformation of an abstract idea into a marketable product needs socio-technical care and calculations. As such, the making of technologies in Nairobi shows the affective practices of bodies and machines in resource-constrained contexts where technology development is not a self-evident practice. Thus, I claim that the calculated and careful making of technological products in Kenya cannot be compared with the commonly researched post-industrial contexts where making represents a tinkering, anti-capitalist, or leisure time activity. Chapter 10 sheds light on those aspects of work that are incalculable and not cared for in Kenyan co-working places. I reveal the hierarchies within makerspaces and startups to offer insights into the makers' appropriation of prototyping methods to not only use technology development to rework Kenya's positionality within global technocapitalism, but also to position themselves within their workplace.

In Chapter 11, I conclude that technocapitalism is an economy of promises and performances in which tech scenes that represent a postcolonial *other* – a periphery in global tech markets – have to convince others of their work's worth by affectively and socio-materially re-scripting their positionality. As such, the situatedness of Kenya's tech scene amidst colonial histories and the global politics of technoscience determines tech development as convincing only when it reproduces hegemonic norms of technoscience and imaginations of an impoverished African context, pursues technoscientific perfection, and invites others to gaze at Kenyan tech development. I call the most prevalent affective practices to perform technocapitalism and gain investment, a *performance of poverty* and a *performance of professionalism*. The narrative and material reproduction of the belief in societal transformation through globally standardized technologies affectively limit the tech developers' possibilities for action and force them to comply with (Western) norms of technoscientific

progress and the (colonial) affects that other Kenyan technology development. In addition to the reproduction of oppressive structures, I show that the performativity of building technology and telling stories gives space for moments of decolonial agency and emancipation. In this regard, Kenyan techies care for technologies and the stories about them because they cater for the needs of their local communities, counter colonial imaginations of a passive and non-technological Africa, and decolonize Kenya from the epistemological and technological supremacy of the West.