

Research proposal

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Future-making in an emerging field of science and business – insights from a quantum computing start-up

Note for the reader

This proposal is based on ongoing ethnographic research in a quantum computing start-up. Although the data collection is still in progress, this proposal suggests a one promising theoretical framing, that is, to explore future-oriented sensemaking, or future-making, a recently emerging area of scholarly interest. In other words, by elaborating on the social processes and practices of future-making witnessed in the field, I could potentially augment recent works linking time and agency and contribute to understandings on how entrepreneurs temporally make sense of, and give sense to, the inherently unknown futures (i.e., how they carve out opportunity spaces through temporal work). This brief proposal presents how such paper could be introduced and framed, as well as how I have collected my data so far.

Introduction

Quantum computing is an enigmatic field of science and technology, built around the promise of quantum mechanical appliances that will paradigmatically challenge classical computing and over a long period enable a revolutionary change in the society. Despite the continuous advancements in the field, like the proven experiments to solve previously unsolvable artificial problems, quantum computers continue to have very limited practical applications. Indeed, the field of quantum computing is occupied by several candidates (both major incumbents and start-ups) competing of being the first one to provide a viable quantum computing solution – all of them are having their own future predictions to set and manage expectations about what extent, when, and in what areas in society quantum computers can be applied in the years to come. As an empirical arena characterized by such lack of collectively shared temporal understandings (i.e., contested futures), the field represents a unique venue to increase scholarly understandings about how entrepreneurs temporally make sense of, and give sense to, the inherently unknown futures.

Insights regarding such act of future-making are important for many reasons. Firstly, in such emerging fields, where the future entails genuine novelty, the products of future-making (i.e., the various future-oriented abstractions) are not only stories or images, but ‘engines’ that

play a pivotal role in shaping economic futures (Beckert, 2021). As Borup et al., (2006) put it, such abstractions act as tools to “guide activities, provide structure, attract interest, and foster investment” – and if turned unrealistic, induce phenomena such as hypes. Said differently, such future projections act as ‘protected spaces’ for ventures to use the collected resources to (aim to) perform the futures they imagine. In this way, the ability of entrepreneurs to construct credible imaginaries and align actors behind these portrayals represent their ‘power’ to shape the future (Beckert, 2021). It is, in particular, due to such performative impacts of future-making that makes it among the most important objects of enquiry for scholars in emerging arenas of novel technology (Borup et al., 2006).

Through a processual and multimodal inquiry in QuantumCo, one of the most prominent quantum computing start-ups in the field, this study augments the various scholarly fields paying increasing attention to the process of future-making (Beckert, 2021; Kaplan & Orlikowski, 2013). The processual aspect refers to the longitudinal interest in how an entrepreneurial venture makes sense of, and gives sense to, the future in a dynamic and emerging market environment. In other words, the study yields insights on how a venture is both shaped by future expectations of others (Ancona & Chong, 1996; Emirbayer & Mische, 1998) as well as how it carves out opportunity spaces by constructing own interpretations of the future and makes those meaningful to relevant others (Garud et al., 2014; Weick, 1995). The multimodal approach, in turn, refers to the interest in not only how the future-making is accomplished in discourse and interactions, but also how the perceptions of the future are made visible in specific forms, for example, by using management tools as instruments to ‘equip’ the expectations with institutional legitimacy (Beckert, 2021).

Theoretical background

Sensemaking is the process by which people construct, interpret, and recognize meaningful features of the world (Weick, 1995). This study uses the term future-making to refer to the future-oriented sensemaking process, that is, the act constructing meanings about the future. As central assumptions underlying my theorizing, I consider that such meanings exist in ‘narrative knowledge’ and that the observed entrepreneurs are ‘theorists of a pragmatic sort’ (Cornelissen & Clarke, 2010; Weick, 1995) constructing integrated and sequenced accounts (or stories) about the future (Weick, 1995). In other words, the focus of my analysis is on how the skilled actors self-consciously and through interactions with others develop narrative knowledge about the future – i.e., ‘theorize’ the future and the relationships and opportunities within it (Cornelissen & Clarke, 2010).

Informed by Aristotle, narrative knowledge is about organizing actions and events around plots and themes (*emplotment*) as well as shaping those plots to imitate or represent something (*mimesis*). In this research context, I consider the prior one as the cognitive process in which the venture makes sense of the temporal frames of its own projects whereas the latter one relates to the means of ensuring that the temporal frames presented resonate with the larger stories in that social context. In terms of the first one, much has been said about how actors work with emerging memories from the past and anticipations of the future to give meaning to their projects (Garud et al., 2014; Kaplan & Orlikowski, 2013; Weick, 1995). The flexibility of actors self-deciding how to work with emerging memories and anticipations to give meaning ('temporal plasticity') is shown to allow entrepreneurs in same fields to have very different temporal orientations to support them in their differing aims (Emirbayer & Mische, 1998). In this sense, temporality provides entrepreneurs "additional resources to constitute their opportunities by reflexively shaping their temporal frames" (Garud et al., 2014).

In terms of the latter one, it is well-established that entrepreneurs are not constructing these temporal frames in a vacuum. Indeed, the temporal sequence of events of an entrepreneurial narrative will have to resonate with the lived experiences and anticipations of not just the entrepreneurial team, but also of others (Garud et al., 2014). This means that entrepreneurs must entrain themselves into broader ecosystem rhythms while simultaneously providing a sequence of anticipated events (i.e., pacing) to which their stakeholders can be come entrained (Ancona & Chong, 1996). Such entrainment is, moreover, not only about the 'what' but also about the 'how'. This means that the manifestation of various 'contested futures' occurs by using particular templates – such as technology roadmaps or business plans. These templates can be considered as institutional conventions, acting as 'legitimate means' (i.e., devices) to construct credible narratives about the future: projective stories entailing a protagonist (the organization), events, and a plot to inform about what the future will look like (Beckert, 2021). Besides text, these templates often leverage compelling visuals, such as pictures (e.g., map), notations (e.g., legend), and numbers (e.g., models) to plot the future in such compelling ways that audiences may have difficulties in separating between 'information' (i.e., accurate map) and socially constructed arguments.

This entrepreneurial act of constructing narrative knowledge about the future (in terms of *emplotment* and *mimesis*) acts as the cornerstone of the study. This is carried out through a processual investigation on how a quantum computing start-up makes sense of, and gives sense to, temporal distances and the related opportune moments (*kairos*) in an emerging market.

Data collection

The ethnographic data collection at QuantumCo has been ongoing since April 2021. As assumed by many contemporary ethnographers, I have embraced a participatory role in the field, that is, performing the activities that were central to the lives of those studied. By enacting as both researcher and situated actor (i.e., engaged scholarship), I have been able to participate in the daily routines of this setting, develop ongoing relations with the people in it, and observe all the time what is going on. Since the beginning, I positioned myself as an ‘apprentice’ in their business team, allowing a close collaboration and observation to learn as much as possible. I have conducted observations around 10h per week, with the aim to ‘cast my nets’ broadly and initiate connections across the company. Data collection has occurred mostly at the company’s premises but also remotely via virtual team meetings due to the COVID-19 pandemic. Besides attending formal meetings, I have also took part in other aspects of their life including lunch and coffee breaks. Moreover, I have had a broad access to supporting documentation that was produced both before and during my time at the field. In total, the fieldwork has ben spread across 60 days totaling more than 250 hours of field observations.

Rather than emphasizing the task of ‘writing it down’, my strategy has been to ensure the highest quality of relationship with the people I am seeking to know and understand. My priority has been in ‘getting into place’ and figuring out – holistically and intuitively – what these people are up to. Hence, any anticipation of writing fieldnotes has been postponed as diluting the experimental insights. I have made jottings by writing down keywords, and whenever possible, capturing interesting dialogue – conversations that occurred in my presence or that members reported having had with others – as accurately as possible. Choosing what to note down has not a process of sampling according to some fixed-in-advance principle, but rather, both intuitive of what might possibly be made interesting or important to future readers, and empathetic, reflecting my sense of what is interesting or important to the people I am observing (Emerson et al., 2011).

In the evenings, after leaving the research setting, I have traced down my own activities and observations in a chronological order, recalling noteworthy events in the sequence in which I observed and experienced them. The primary goal in writing up the fieldnotes has been to capture real-time descriptions of the unfolding events in a regular and systematic way (i.e., record slices of life on page). As a result, I have now sustained a cohesive narrative of ‘what has happened’ – i.e., a description of particular characters, events, and dialogue summaries moving in time as actions progressed. In addition to writing down what I have heard, I have also paid attention to what I have sawn and what I have felt. In particular, the capturing of the

visual conceptualizations of the different future projections has turned out as a significant enabler to allow the embracement of a multimodal approach in the data analysis.

Data analysis

I plan to analyze the data using abductive analysis (Tavory & Timmermans, 2014), that is, explaining how I produced theoretical intuitions ('hunches') and developed them through a systematic analysis of variation throughout fieldwork. After all, I entered the research setting with an explorative and open-ended approach, informed by a broad interest in how the company operates, makes sense, and gives sense in such complex, uncertain, and ambiguous operating environment. The focus on future-making was not the only analytical focus, but something that in some point started to seem so persuasive that I have become continuously more concerned, and sensitive about it. In any case, the resulting findings should be, hence, considered as an outcome of a continuous reflexive and dialectical interplay between theory and data in which the inquiry both emerge from the data, but also feed back into the creative process of discovery (Emerson et al., 2011).

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