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Toward a new Theory of the Firm: Warrant, Design and Proposal

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Abstract

In this paper, we posit that blockchain technology and its application challenge the foundations of existing theories of the firm. Utilizing transaction cost economics as a point of reference, we explore how said theory grows obsolete with increasing blockchain adoption and how new theory is needed. At the core of our argument lies the diminution of transaction costs and its effect on the principles of scarcity, boundaries, motivation, size and returns. The paper identifies propositions where blockchain challenges the prevailing theory of the firm. These propositions are used as design criteria for future research agenda intended to contribute toward a new theory of the firm. Four design experiments utilizing application of blockchain are presented as a suggestion for future research.

Keywords: Blockchain, theory of the firm, transaction cost economics

Introduction

"Economic theory has suffered in the past from a failure to state clearly its assumptions. Economists in building up a theory have often omitted to examine the foundations on which it was erected." Coase, 1937, p. 386 (opening remarks)

Coase's (1937) attempt at creating a new theory of the firm was reactionary to the inability of previous theories to aid our understanding of organization. Through challenging previous assumptions, he was able to create the impetus for something new that still hold reverberate within our perceptions of what the firm is. Coase identifies transaction costs as the unit of analysis for a theory of the firm, and through this, previous conceptions of specialization and division of labour were contrasted with the cost of using the price mechanism (i.e. transaction cost).

As for Coase in 1937, we argue that recent years change in technology has had a significant effect on the assumptions that Coase pushed into play. When blockchain technology radically decreases transaction costs to the extent that they are invalid as a unit of analysis, new theory is needed to understand and guide organization. This new theory cannot be built on the notion of transaction costs, i.e. transaction cost economics as a theory of the firm is increasingly irrelevant.

Blockchain technology is seen by many as a disruptive innovation for society in general and the financial service industry in particular (Tapscott & Tapscott, 2016; Yermack, 2017; Zhao et al, 2017; Nofer et al, 2017; Nakamoto, 2008). The combination of radical decentralization of computing, shared asset tracking, governance and selective transparency in trustless settings calls into question what we mean by organisations (Buterin, 2013;Buterin, 2015). While substantial investments may lead to ample digital business opportunities, the current level of knowledge is still surprisingly low (Nambisan et al, 2017; Iansiti and Lakhani, 2017), which continues to create implementation problems. For example, such lack of insight about the nature and role of this technology can lead to not only missed opportunities but also increased risks among firms, institutions, and organizations. Even the core design decisions (Xu et al., 2017; Porru et al., 2017) that have direct impacts to governance (Arruñada and Garicano, 2018) such as characteristics of the chain between permissionless (public) vs permissioned (private, consortium) are always outlined. Indeed, there are indications that blockchain technology may even render some financial institutions completely obsolete (Tapscott & Tapscott, 2016; Trautman 2016; see also Swan, 2017).

Recent research highlights that blockchain offers an alternative market coordination mechanism that goes beyond a production and transactional technology for decreasing transaction/coordination costs (Davidson, De Filipi and Potts, 2018). As such, this new breed of technology calls for an updated theory of the firm which explicates why hierarchical structures erode and usher in distributed innovation (Davidson et al, 2018; Hinings et al, 2018; Nambisan et al, 2017).
To summarize, we argue that transaction cost economics is erected on a foundation consisting of assumptions which today have become obsolete and faulty. As a consequence of blockchain adoption, transaction costs are no longer a valid entry-point for a theory of the firm. The paper is guided by the following research question:

How does Blockchain challenge the core propositions of transaction cost economics and how can this be used as the basis for clinical research?

The paper contributes through offering the start of a structured critique of TCE on the basis of transaction costs rather than opportunism (e.g. Ghosal & Moran, 1996) and through proposing four design experiments where the foundations of TCE may be tested. The paper is organized accordingly: After this brief introduction, the method of the study followed by the results of the first part of the research question are presented. This is followed by a discussion where the design of future research is elaborated upon.

Method

Using inspiration from Cram, Broham and Galupe (2016) and their study of how information systems control is insufficiently addressed within research, we combine the use of a literature review of core transaction cost economics readings with the analytical framework of propositions (See Figure 1). Searching for the core propositions in previous theory and then contrasting these with blockchain technology offers the possibility of challenging underlying theoretical assumptions through new insights through falsification or validation. Continuing with the core propositions, we then derive design criteria for future research, and offer a research proposal guided by action design study methods (Sein et al, 2011).

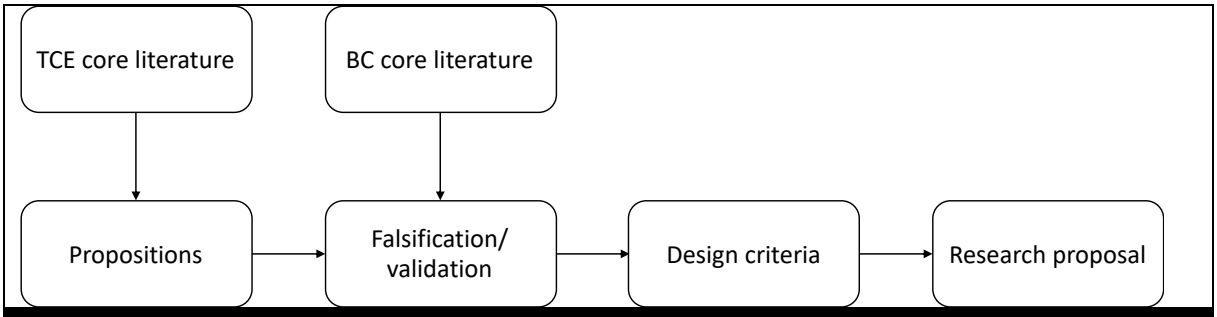

Figure 1. Research approach

Results

The literature review of core readings within TCE (including previous critique of the theory) has resulted in the following five core propositions that we deem challenged by blockchain technology.

Table 1. Overview of principles and blockchain implications

Principle	Proposition	References	Blockchain implication

Scarcity	The firm competes through utilizing buffering or bridging of scarce resources.	Thompson, 1967; Benkler, 2006; Weber, 2004; Tilson, Lyytinen, & Sørensen, 2010; Yoo, Henfridsson & Lyytinen, 2010; Henfridsson et al, 2018	Increased digitalization of assets and resources creates abundance rather than scarcity, attention and orchestration becomes core.
Boundaries	The firm's boundaries are set through the logic of transaction costs.	Williamson, 1981; Williamson & Ouchi, 1981; Raymond, 1998; Williams, 2002; Benussi, 2005; Risius & Spohrer, 2017; Hautz, Seidl, & Whittington, 2017	Diminishing transaction costs result in marginalization as analytical construct for establishing the boundaries.
Motivation	Counteracting opportunism is the underlying principle for designing governance.	Jensen & Meckling, 1976; Williamson, 1981; Krogh et al, 2012; Lerner and Tirole, 2002; Gagné and Deci, 2005; Morris and Mueller, 1992; Markus, 2007; Seidel, 2018	Distributed trust and new forms of trust substitute traditional sources and forms of trust.
Size	The firm's size will continue to increase with the development of managerial techniques.	Coase, 1937; Ekbia & Nardi, 2017; Greenberg & Mollick, 2017	Increased use of micro-tasking and increased granularity (below process level) results in the atoms of value creation becoming smaller, coupled with decreased coordination cost.
Returns	There are increasing returns from economies of scale.	Arthur, 1996; Wiegel et al, 2017; Ravichandran, Han and Mithas, 2017; Cennamo, 2016	Scale is associated with diminishing returns due to inability for flexibility in line with changing market demands.

Due to the space restrictions in this paper, the propositions will not be expanded upon here.

Discussion

"The ship of theory is no longer navigated with the aid of a compass, but rather by looking at the figurehead." Luhmann, 1983, p 988.

As we have proposed in this short paper, blockchain adoption warrants a revisiting of the foundational literature of the theory of the firm. Assumptions are associated with a final date of consumption, and through reinterpreting the underlying assumptions of transaction cost economics we have attempted to offer an initial path towards challenging the past and building for the future.

The problem (and the actual strength) of foundational theories is that they reverberate across time through becoming rationales and building blocks in subsequent theories and frameworks. Hence, we see the need for a substantial work on the archaeology of ideas (Brown, 2004; Foucault, 2013), tracing the impact of TCE into subsequent theories. If the underlying assumptions in TCE prove false, then it is likely that the utility of theories built on this foundation may prove sub-optimal. This results in the necessity for opening up the black boxes of theories and frameworks, a true Herculean feat. Failure to do so will result in the sediments

of governance and control in organizations remaining institutionalized in configurations that hinder rather than facilitate success.

On the basis of the five identified principles and propositions, we propose four design experiments to test said propositions through blockchain applications. The experiments have been identified by the researchers and discussed in dialogue with industry representatives for feasibility and relevance. The four experiments have been selected for covering both innovation and efficiency aspects according to ambidexterity theory (March, 1991; Raisch & Birkinshaw, 2008), and for the organizational internal- and external divide. In the configuration of the blockchain design space for each experiment, we have strived for covering all aspects of the taxonomy presented by Xu et al, (2017).

Table 2. Design experiments and corresponding propositions.

Design experiment	Description	Proposition(s)	Core references
Crowd-based shareholder activism	The design idea is to utilize blockchain infrastructure for creating an app where the financial fund managers invite their clients to take part in general assembly voting. This transforms the fund's clients from passive to (more) active owners, introducing a new notion of shareholder activism through proxy. The app allows for clients accessing and sharing information and pre-assembly voting in relation to a selection of firms where the fund holds equity. Both tokenized and non-tokenized corporate governance solutions will be evaluated.	Scarcity, boundaries, motivation	Jensen and Meckling, 1976; Gleasure and Feller, 2016; Goranova et al (2016); Selander and Jarvenpaa, 2016
Dynamic pricing of digital services	The design idea is to utilize blockchain infrastructure for creating an app that utilizes the crowd-based sharing of data from insurance-clients to form the basis for dynamic pricing of services by direct sharing of personal data while maintaining privacy. This shifts the focus from a decoupling of client behavior to pricing, towards opening up for clients affecting the price through their behavior. The app allows for clients sharing their behavioral data and increasing their understanding of how said behavior impacts the pricing of services.	Scarcity, boundaries, motivation	Kaufmann, Clemons and Dewan, 2005; Lang and Vragov, 2005; Beverungen, Böhm and Land, 2015; Bolton & Lemon, 1999; Trabucchi, Buganza & Pellizzoni, 2017; Wulf, Mettler and Brenner, 2017; Baird & Raghu, 2015; Sia, Soh and Weill, 2016
Payment regulation compliance	The design idea is to utilize blockchain infrastructure for creating a service that allows for compliance with emerging regulation (especially PSD2 and GDPR). Through creating a payment service agnostic backbone for payment information built on blockchain, the emphasis is shifted away from banks having to adopt their infrastructure stack towards compliance to utilizing said service. The experiment will tackle issues dealing with combining the immutability of blockchain technology with the compliance requirements of processes of anti-money laundering and know-your-customer: these include investigating in detail anonymous account transfers and GDPR-secured rights such as right to be forgotten.	Boundaries, size, returns	Neyer, 2017; Cortet, Rijks & Nijland, 2016; Kisin & Manela, 2016; Ayadi, Naceur, Casu & Quinn, 2016
Asset ownership contracts	The design idea is to utilize blockchain infrastructure for creating an app that expands the mortgage institutions offering through a new service handling home-ownership contracts by	Boundaries, size, returns	Akerlof (1970); Spence (1973); Stiglitz (1975); Coase (1937), Williamson (1975);

	releasing verification records and event status information without compromising the original documents. Through creating a service that can integrate the transfer of ownership in association with the bank transactions, the loan institutions expand their service offering towards the clients, while at the same time decreasing integration and transaction costs. The experiment will be based on an existing project at Lantmäteriet (Landregistry in the Blockchain), with the intent of finding a solution that integrates blockchain into the banks' operations.		Benkler (2006); Davidson et al. (2016); Xu et al (2017)

The design experiments have been identified through a direct dialogue between researchers and practitioners and are currently in the pipeline for acquiring funding. The studies will be carried out during 2019-2022, and our hopes is to expand the idea into being a stomping ground for blockchain design experiments carried out by other researchers. If we are able to scale the underlying idea of testing the principles and propositions in the dominant theory of the firm, we hope to be able to swifter move towards actually designing a new theory of the firm informed by blockchain.

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