POINT OF VIEW

Towards a digital twin of a holacratic organization: a point of view on Lyytinen et al. (2023)

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Abstract

This point of view paper challenges and extends Lyytinen et al.'s (J Organ Des https://doi.org/10.1007/s41469-023-00151-z, 2023) conceptualization of Digital Twins of Organizations (DTOs) as highly complex models including multiple organizational facets like agency, conflict, and emergence. They argue that the journey to achieving a fully functional DTO is a long way. However, we suggest a more parsimonious approach, focusing on leveraging digital trace data on the four universal problems of organizing: task division, task allocation, provision of rewards, and provision of information. Using the specific context of a holacratic organization, we argue that some organizations already produce extensive digital traces that can be leveraged to construct a DTO that is fit-for-purpose. We propose that existing data-science methods like predictive models, matching algorithms, clustering algorithms, and association rule mining can be employed to transform these digital traces into actionable insights for decision-makers. This approach not only addresses the complexity concerns raised by Lyytinen et al. (J Organ Des https://doi.org/10.1007/s41469-023-00151-z, 2023) but also offers a near-term pathway for holacratic organizations to benefit from DTOs as decision-support tools.

Keywords Digital twins · Organization design · Digital trace data · Holacracy

JEL Classification M1 · M10 · M19

Introduction

In this paper, we respond to Lyytinen et al. (2023) discussion of the possibilities and limits of DTOs. We concur with them that a DTO can be defined as a regularly synchronized, two-way interacting digital representation of an organization. The main purpose of such a representation is to orient and support the organization design process defined as "the ongoing search for a set of solutions to the two universal problems of organizing, i.e., how to divide labor and integrate it again in ways that meets a specific set of constraints and specific goals" (p. 28). Lyytinen et al. (2023) argue that a DTO must include "models that embody basic organizational properties" (p. 18). More specifically, they

suggest that any DTO must explicitly model agency, conflict, learning and forgetting, hidden interdependencies, multiple realities, and emergence. To develop such a DTO would, of course, be very demanding and complex. Indeed, a key takeaway from Lyytinen et al. (2023) seems to be that "organization designers are a long way from digital paradise" (p. 36). And this is where we will try to challenge and expand their argument.

The approach outlined by Lyytinen et al. (2023), requires scholars to first develop a fully specified model that represents how organizations function in general. We, however, suggest to make use of fine-grained trace data to generate a more "situated explanation" (Grisold et al. 2023) of how design decisions influence each other as well as organizational-level outcomes in a specific organization. That is, we suggest to build a DTO primarily from historical data rather than generalizable theory. Importantly, this approach is only feasible in organizations that already have comprehensive and accurate digital trace data on design decisions and regularly measure organizational-level outcomes.

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To illustrate the feasibility of our approach, we will propose a concrete pathway to develop a useful DTO for a holacratic organization (Robertson 2015). Holacratic organizing emphasizes both radical decentralization and high degrees of formalization (Lee and Edmondson 2017). This is a fitting context for our purposes for two reasons. First, the high degree of formalization implies that digital trace data will be available on many of the decisions that pertain the fundamental problems of organizing (Martela 2019). Second, the fact that holacratic organizations are radically decentralized suggest that this trace data should be both up to date and accurate since everyone in the organization relies on this information in their decision-making (e.g., Schell and Bischof 2022; Weirauch et al. 2023).

A practical approach to a digital twin of an organization

While Lyytinen et al. (2023) argue for a DTO that is based on a generic model of organizations, we suggest a more parsimonious approach that differs in two main aspects. First, by "using digital trace data to address real-world problems" (Grisold et al. 2023: 2) of a specific organization, instead of aiming to develop a generic model of how organizations work in general, we enable the creation of a model based on historical data. We argue that digital trace data on organization design decisions can already be a sufficient basis for developing a DTO. It provides the depth and accuracy needed for a dynamic representation of an organization. It also allows for a focus on the idiosyncratic features of an organization, which increases its usefulness as an organization design tool.

Second, instead of basing this model on a theory of how agency, conflict, etc., are causally related, we propose to only model those aspects of the organization that are of essence for an organization designer. More specifically, we follow Puranam et al. (2014) in assuming that the design of an organization has to provide an answer to four universal problems of organizing: task division, task allocation, provision of rewards, and provision of information. Task division involves breaking down complex responsibilities into smaller units that are assigned to specific individuals or teams. Decisions that establish an organizational chart or implement Standard Operating Procedures (SOPs) are typical solutions to this problem. Task allocation is the delegation of tasks to individuals and groups. Project plans or work schedules are typical solutions. By deciding on schedules, specific responsibilities are allocated to specific actors, often laying out what needs to be done, when, and by whom. The provision of rewards deals with the problem of mapping a set of rewards to (groups of) actors in order to motivate them to cooperate in accomplishing the organizational task.

Addressing this problem involves decisions on criteria for assessing how well employees have completed their tasks, which can then feed into bonus programs or other incentives. Finally, provision of information concerns the problem that in order to effectively contribute to the accomplishment of a complex organizational task, agents need sufficient information to be able to act in coordination with others. Addressing this problem typically involves decisions regarding the implementation of information systems and other formal communication channels.

Taken together, we propose viewing a DTO as a historical model of a specific organization that captures how decisions regarding the universal problems of organizing influence each other as well as important organizational outcomes. In what follows, we will further specify this idea and also demonstrate that its realization is not just a distant vision of a "digital paradise".

Towards a digital twin of a holacratic organization

Holacracy is a form of organizing that radically decentralizes authority and decision-making throughout an organization (e.g., Schell and Bischof 2022; Weirauch et al. 2023). A holacratic organization basically consists of super- and sub-circles, akin to semi-autonomous teams, that contain a set of holacratic roles (see Fig. 1 for an example). Each holacratic role can be thought of as a sub-set of tasks required to fulfill the overall purpose of its circle. Each member typically holds a changing set of 5–15 different roles. Decisions regarding the creation, change, and dissolution of circles and roles as well those regarding the (re-)allocation of roles to actors are taken within each circle during regular governance and tactical meetings (Robertson 2015). Typically, actors will rely on digital tools to keep track of and inform decision-making during these meeting. One existing and widely used tool that is specifically tailored to the needs of holacratic organizations is GlassFrog (GlassFrog 2023).

The wide-spread use of tools like GlassFrog implies the availability of digital traces in the form of logfiles that contain time-stamped information about decisions regarding (at least) three of the four problems of organizing. In holacratic organizations, problems of task division are addressed by decisions regarding the creation, change, and dissolution of roles and circles. Digital traces of these decisions can be retrieved directly from GlassFrog's governance records. Problems of task allocation are addressed by decisions regarding who takes up which roles. Additionally, GlassFrog creates time-stamped logs for role assignments to individuals. This data is even used in GlassFrog already as a basis for a history tracking system that allows users to understand role reallocations over time. Finally, also the approach a

Fig. 1 Organizational structure of Springest (from 2020, for an updated version see also https://springest-roles.fly.dev/) as an example for the structure of holacratic organizations
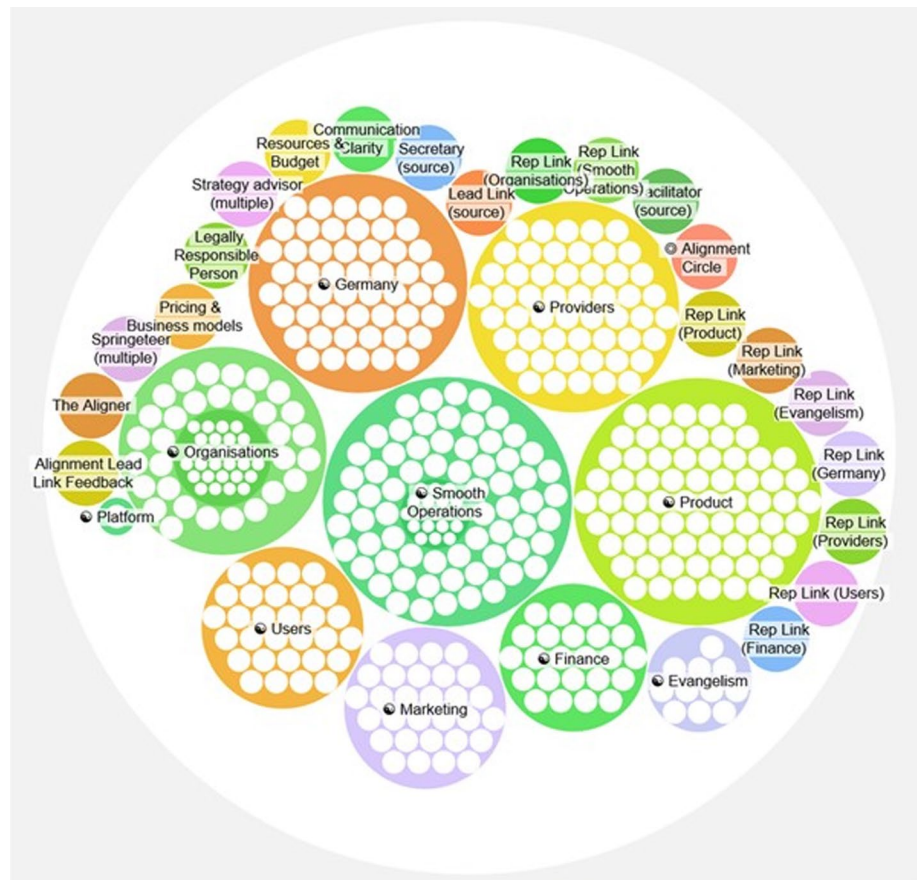
holacratic organization takes in addressing problems of information provision is at least partially represented by the allocation of roles to circles, and the creation of specific coupling roles. Again, digital traces of these decisions can be found in GlassFrog's logfiles.

And while the digital traces that are produced by GlassFrog already provide a very good basis for a DTO, it is not complete. For example, the organization's approach in addressing the problem of reward provision cannot be represented with information from GlassFrog logfiles. Also, the data on the problem of information provision is incomplete. While the formal communication channels can largely be reconstructed with the available data on circles and roles, it is not possible to reconstruct more specific information about who is communicating with whom, about which topics and when. Moreover, data on organizational outcomes, like revenue, job satisfaction, or cycle times cannot be extracted from GlassFrog.

However, it is not hard to imagine that at least some of these short-comings can be addressed by some organizations, provided they are already using the appropriate tools. For example, data on information flows could be extracted from logfiles of widely used tools like Jira, Asana, or Teams. Data on the provision of rewards should be available from employee recognition and reward tools like SAP Success

Factors, or workday HCM. Data on relevant organizational outcomes typically come from regular employee and customer surveys, accounting tools or process mining software. Considering these alternative data sources together with the trace data from GlassFrog, we would assume that there are already some organizations out there that do have all the data necessary to start building their own DTO.

To be a useful tool for organization design, such a DTO would have to able to inform organization design decisions on the four problems of organizing (Puranam et al. 2014; Puranam 2018). And indeed, we find that a number of already tried and tested data-science methods should provide a great starting point to implement such a functionality in a DTO. For example, regarding task division, one could implement predictive models using machine learning algorithms (see e.g., Balasubramanian et al. 2022). Such algorithms could use the already available data on the development of roles and circles, to generate predictions for how a change in one circle (e.g., creating new roles) will result in pressure for change in other circles. Decisions on task allocation, in turn, could be supported by matching algorithms (see e.g., Jiang et al. 2011). Such algorithms can be used to analyze available data on previous role allocations and relevant outcomes like job satisfaction to provide suggestions for allocating actors to roles. Clustering algorithms (see e.g.,

Xu and Tian 2015) would lend themselves to support decisions on the provision of rewards. One could, for example, use data from various performance metrics to dynamically (re-)allocate employees to different reward-schemes. Finally, design decisions regarding the provision of information can profit from association rule mining algorithms (see e.g., Kumbhare and Chobe 2014). Using data on information flows and the development of roles and circles one could identify hidden interdependencies between and within circles as a basis for closing structural holes in the established communication network.

In conclusion, we believe that, provided the availability of the necessary digital trace data, it would be possible to develop a DTO that is, in fact, "fit-for-purpose" under specific boundary conditions. Lyytinen et al. (2023) define fit for purpose in terms of): (1) model quality for causal explanation, (2) observability of the real world, and (3) synchronization of model and data. Basing the DTO on an analysis of continually updated time-series data of decisions regarding the four problems of organizing as well as important organizational outcomes should result in a baseline model that captures relevant causal mechanisms while at the same time allowing for continuous updates to account for their ongoing change.

In terms of observability and synchronization, it is notable that in holacratic organization most design decisions are already taken with the help of digital tools like GlassFrog, creating a continuously updated data-base for (re-)constructing the model. And while the DTO suggested by us would primarily be based on traces of formal decisions rather than informal dynamics, one could argue that the analysis of historical trends of formal decisions will at least implicitly also capture the influence of informal dynamics on these trends.

Finally, it is essential to acknowledge the boundary conditions of our approach. Most importantly, it is dependent on the availability and quality of digital trace data. To be able analyze and interpret historical decisions concerning the four universal problems of organizing (Puranam et al. 2014; Puranam 2018) one needs a substantial amount of accurate and granular trace data on these decisions. Thus, while our approach can offer insightful perspectives and solutions in environments where detailed decision-making data are readily available, it is not applicable in contexts lacking such comprehensive data. Recognizing this limitation is critical for evaluating the model's utility in various organizational contexts.

Conclusion

By offering a data-driven model of a digital twin for a holacratic organization, we address Lyytinen et al.'s (2023) concern about the DTO being a far-off vision, demonstrating a

near-term solution for the implementation of a DTO. We provide a more practical and streamlined path to DTO development, illustrating it for the specific case of a holacratic organization. Our DTO focuses on the four universal problems of organizing—task division, task allocation, provision of rewards, and provision of information (Puranam et al. 2014; Puranam 2018). We posit that in holacratic organizations decisions regarding these problems are already digitally traceable to a large extent, which is a prerequisite for effectively implementing our proposed DTO model. Based on an analysis of these digital traces, a DTO should be able to generate actionable insights and recommendations for decision-makers.

Declarations

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