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Exploring the use of QPID: A collaborative study of B2B in the automotive industry

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Abstract

Deep and grounded understanding of complex socio-technical phenomena, such as business-to-business (B2B) information systems, requires a collaborative process of enquiry where the researcher works with practitioners to make sense and establish meaning. This suggests the need for interventionary approaches, such as action research and action case, supported by a method of notation for describing a co-constructed reality to make sense of inter-organizational settings and to undertake cross-case comparisons. This paper tests the conjecture that systems thinking and the qualitative politicized influence diagram (QPID) are an appropriate lens through which to study B2B information systems. It demonstrates how the QPID workshop is valuable in inter-organizational studies as a practical and appropriate method of collaborative investigation. The paper concludes by raising issues for research methodology in terms of limitations of the research method, recommendations for further development, and future plans for incorporating multiple partners in industry-level research.

Keywords: QPID; Action case; Systems modelling; Research methodology

1. Introduction

The challenges faced by the information system (IS) investigator are expanding as the world is increasingly suffused with ubiquitous, interdependent, and emergent information technologies (IT). Qualitative studies into the impact of business-to-business (B2B) e-commerce across sectors such as automotive, aerospace, healthcare, and microelectronics are important as these are complex, multi-dimensional, and highly political settings [1–3]. Yet case studies and interviews are frequently insufficient as a research method where they depend on singular descriptions as a basis for gaining understanding. This paper argues that collaboration and participation are valuable in constructing reality through joint action by investigator and practitioner. This points toward interventionary approaches such as action research [4,5] and action case [6,7] through which researchers and practitioners work together to understand and intervene in a situation.

However, in order to be usable, a language or method of notation is needed for describing a co-constructed reality to make sense of these complex situations. This paper proposes that systems thinking is a means of achieving this because of its holistic approach, dynamism, and capability to capture multiple perspectives [8,9]. A second advantage of adopting a method and

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notation is that it provides a basis for comparison across individual cases. There are a number of feasible approaches to modelling a situation as a human activity system (HAS), such as Soft System Methodology [5,8] and SODA [10]. A recent research method to emerge that involves a collaborative process of enquiry is based around the building of qualitative politicized influence diagrams (QPID) [11,12]. QPID has the useful characteristic that it combines representation of the motivations and powers of specific agents for action within an explicit system model. This concatenation produces a powerful frame for analysis.

QPID is an extension of the well-known system dynamics (SD) family of approaches that aim at generating managerial action through the interrogation of explicit models of the interrelationships between components of a business system. Qualitative approaches expressing system behaviour through numerical simulation are widely used, but QPID builds on the tradition of structural, qualitative analysis also well represented in the SD literature. In essence its innovative aspect is the way in which agents of action are attached to those causal connections over which they have influence. Its uniqueness lies in its ability to represent explicitly the rôles of those human contributors to system performance. Thus, the agents of action (the individuals and groups in an organization) lie at the heart of the process of generation of managerial action. Moreover those agents' powers and motivations are seen within the context of the business system upon which, and in which, they operate. By developing the research design, this paper tests the conjecture that systems thinking and QPID are an appropriate way of studying complex settings, such as automotive B2B information systems used here as an exemplar.

In this paper QPID is tested as a basis for collaborative enquiry in the automotive industry where, despite considerable investment and high expectations for savings from e-procurement, there is little evidence of realized benefits from B2B transactions of direct materials between buyers and suppliers. The dawn of the second century of vehicle manufacture finds the global car industry in crisis: automakers beset by 40–80 days unsold inventory, one-fifth of European customers driving home cars that are not what they intended to buy, and around 85% of total waiting time attributable to bottlenecks in information flow before an order reaches production [13,14]. While heralded in the automotive sector as the solution to restructuring so-called 'old economy' firms with estimated annual savings of $1–200 billion in North America alone, the initial claims for B2B Internet trade exchanges (e-hubs) appear optimistic [15]. e-hubs have not only endured the ignominy of a dotcom crash, but are now increasingly criticised over difficulties in adoption, indeterminate lifespan, and failure to create value [16–19].

The structure of the paper is as follows. Section 2 reviews systems enquiry methods, and introduces QPID and the QPID grammar. The research method is described in Section 3 while Section 4 describes the workshop design and execution of QPID. Section 5 uses an illustration of QPID from recent fieldwork to show how it may be incorporated into cross-case analysis. Section 6 reflects on the usefulness of QPID for B2B industry study as a practical and appropriate method of collaborative investigation. The paper concludes by raising issues for IS research methodology in terms of limitations of the research method, recommendations, and future plans.

2. Collaborative enquiry

The process of collaborative enquiry can be approached from a cognitive perspective or from a systems perspective. Tegarden and Sheetz [20] define organizational cognition as '*the shared understanding that the managers have in common with each other*'. However, merging individual cognitive maps[1] into a single group map is difficult and time-consuming, as well as being open to researcher bias. Accordingly, Tegarden and Sheetz propose a groupware-supported approach in which individual cognitive maps are merged by the group, who define the congregating labels (rather than the researcher). Eden and Ackermann [21] propose a workshop facilitated by a researcher who guides the unfolding of the map through questioning of group members. Langfield-Smith [22] also uses a group workshop to create a shared map identifying joint and idiosyncratic beliefs, arguing that the areas of overlap between individual cognitive maps develop through collective encounters and the establishment of common beliefs over time such that the areas of overlap increase. Regardless of the rôle of the researcher, a cognitive map is typically represented using cause-effect relationships [21].

In contrast to organizational cognition, the systems approach to the creation of collective understanding is based on an assumption that reality is co-constructed (whereby informants' world-views co-exist and are

[1] For that is essentially what the ID in QPID is, albeit with the grammatical overlay that is necessary for subsequent structural analysis.