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Theorizing the IT-Artifact in Inter-Organizational Information Systems: An Identity Perspective

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Abstract

Several authors have claimed the need of the IS community to theorize the IT-artifact as their core subject matter. In a research project on the evolution of inter-organizational information systems over large-time scales this lack of theorization became problematic. In fact it became evident that the notion of change or stability requires a sharper theorization of the artifact than currently found in the literature. As a result, this paper sets its aim to provide a new theoretical conceptualization of the IT-artifact in inter-organizational systems. The lack of sufficient theorization of the IT-artifact is established by analyzing several accounts of studies on information systems change in the literature. The notion of identity and its philosophical venue is being introduced as a promising requirement for theories of information systems change. Although not fully developed it is shown that it promises a more thorough analysis of IOIS in theory and in empirical studies. It provides guidance for theory development and empirical work not only in regard to IOIS but IS in general. Although not being prescriptive in nature the identity concept may be helpful in explaining systems failure.

Keywords: inter-organizational information systems (IOIS), information systems change, IT-artifact

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Motivation

Several authors (Orlikowski & Iacono, 2001; Hutchby, 2001; Alter, 2003a) have claimed the need of the IS community to theorize the IT-artifact as their core subject matter. Since then, this claim has become a recurring topic in the discussion of the identity of the IS discipline in general (Weber, 2003; Alter, 2003b). This underlines the significance of this claim for the IS community.

As Orlikowski and Iacono (2001) observe, “IS researchers tend to focus their theoretical attention elsewhere” (p. 121) rather than on the IT-artifact. This observation seems to be true not only for studying intra-organizational information systems but inter-organizational systems as well (Robey et al. 2008).

The research presented in this paper explicitly focuses on the theorization IOIS as one instance of the IT-artifact. This paper addresses specifically questions arising out of studies on information systems change or persistence over large-periods of time. It is motivated and informed by conceptual difficulties that arose in a research project on an electronic ordering system in the pharmaceutical distribution industry. This system evolved over a 25-year period and is still operational today. Due to remarks by interviewees and researchers alike, it seemed that the system persisted until today. It seemed to have run almost unaltered since the days of its inception, despite profound changes in its technical and economic environment. This puzzling observation is at the core of considering the identity of IOIS. In short it addresses the question how much may a system change but still be regarded as the same system.

As Robey et al. (2008) observe, the literature on IOIS is particularly interested in the analysis of single systems in regard to their adoption, governance structure or organizational outcomes. Due to the focus of these studies the need to distinguish between different systems along time is not evident and hence not addressed properly. More recent studies in IS change take into account the evolution of systems over large periods of time (Lyytinen & Newman

(2008); Reimers et al. (2009)). Their ability to distinguish whether they are encountering a new or an old but changed artifact seems to be limited. In this paper this question culminates in a discussion about identity of IOIS as a prerequisite for studies of IS change. This paper elaborates on the concept of identity as a matter of perspective both on the theoretical and empirical level. Thereby its theoretical and practical relevance comes to the fore.

The remainder of the paper is structured as follows. First, the need for a theorization of the IT-artifact in IOIS is explained by pointing to some challenges in the empirical background. This sets the ground for a closer look on the concept of stability and its interconnectedness with the notion of identity. It is followed by a short overview of the concept of identity as discussed in the history of philosophy. This is used to elaborate the notion of identity on the theoretical level and its relatedness to studies on IS change in the literature. Ultimately, this leads to the development of a new lens for IOIS research.

Empirical backdrop

The research project to which the introduction referred to, traced back the origins of electronic ordering (eOrdering) systems between pharmacies and pharmaceutical wholesalers in four countries.¹ This paper uses two of these countries as its empirical base, namely Australia and the Republic of Ireland. Due to space restrictions this paper only refers to the Irish case. The first eOrdering system emerged in the mid 1980s. A time horizon this long would lead us to suspect that a profound transformation due to rapid developments in information technology would have taken place, both on the intra- as well as on the interorganizational level. The results of the research project indicate that this is not the case. Instead interviewees stated that the system is running almost unaltered for the last 20 years. These empirical observations pose the question of how to explain continuing use of essentially unchanged IOIS in a world in flux.

¹ For more information on this research project see (Reimers et al. (2009)).

In regard to the large time scale the research question arises on what grounds researchers and interviewees alike can establish a continuing existence of the (same) IOIS throughout time. The following paragraph will provide some background information on the Irish case and raise problems that motivated the research question of this paper.

In the 1980s, Irish wholesalers were actively looking for innovative and strategic solutions to facilitate ordering. Doing eOrdering was perceived as a means to reduce transaction costs and thereby streamline processes to become more efficient. The wholesalers decided deliberately not to pursue a proprietary solution as originally intended. Instead, the representative body of Irish pharmacists (IPU) facilitated negotiations among them to develop a common set of standards. Eventually, the IPU was granted manufacturer status by EAN UK, which enabled them to provide EAN-conforming numbers to all products sold in Irish pharmacies. This served the requirement of having a unique identifier for all products. The final agreement encompassed the order protocol, a product file and the product identification code. The software vendors, which acted during the negotiations as passive observers, implemented these standards and subsequently started to develop pharmacy software packages including the order module. Today, all pharmacies (~#1.400) use eOrdering and regard the order module as a must-have feature. Thanks to the common standards they are able to place orders with all three wholesalers active in the market.

The statement that this system remained stable for the last 20 years becomes problematic as soon as it is analyzed more thoroughly. Such an investigation is confronted with a mixture of stable and changing elements. While it is true that the set of standards (order protocol, product file, product key) has remained largely unaltered, the surrounding software and its integration into broader software packages have changed significantly. While now a modem connection is used to establish a connection between the communicating parties, other hardware like PCs on the pharmacies' side and automatic picking&packing systems on the wholesalers' side have changed. On the organizational and network level some things have changed while

others remained unaltered as well: Due to mergers and acquisitions the number of full-line wholesalers has decreased from originally six (1980s) to three today. Organizationally the role of their telesales staff shifted from mere order-takers to customer relationship managers. Pharmacy chains are not prohibited by Irish law and have grown in numbers. In fact, one wholesaler took over a pharmacy chain a few years ago. On the other hand, basic roles as well as the technological link of wholesalers and pharmacies have not changed at all. However, some of the standards are now used by other parties in the industry as well (hospitals, reimbursement agency). Still, the IPU assumes the role of a standard custodian by maintaining and updating the product file and its codes on a monthly basis.

The account above exemplifies the problem of conceptualizing stability by pointing to aspects of the IOIS in regard to material structures, structures on the level of a single organization and aspects concerning the network structure. It appears that, depending on where the boundary of the system is drawn, it is possible to arrive at different conclusions in terms of stability and change. One reason for this ambiguity is the lack of conceptual clarity of the notion of IOIS itself. There is no widespread consensus about its definition or its boundaries. If we take the set of standards as the core of the system, we could easily say that they remained stable, i.e. have been subject to minor adjustments over time and have been enacted again and again in form of updated product files and sent messages, and hence the system did. A mere recurrence to such material properties seems to be questionable as the term IOIS already encompasses the notions of “network” and “organization”.

In order to research stability of IOIS over large timescales the concept of stability needs further refinement and already presupposes a clear conceptualization of the IOIS in this case or generally speaking the IT-artifact. The notion of identity is introduced to account for the continuity of IOIS and to avoid a comparison of apples with oranges.

Before engaging with the notion of identity the next section will explore the concept of stability more systematically.

Conceptualizations of change and stability

The previous section introduced some practical examples of problems that relate to stability of an artifact (in that case IOIS). In this section I will provide four theoretical conceptualizations of stability.² The objective is to sketch the empirical (prior section) and theoretical (here) challenges of stability that ultimately require and motivate research on the identity of IOIS.

At first glance, stability and change seem to be dichotomous terms, only one of which can be attributed to an artifact at the same time, i.e. they represent mutually exclusive categories. Before examining whether this conceptualization is helpful a closer look at the process, which establishes such a verdict warrants attention. In such a process a cognizing individual compares one artifact at different points in time. Hence, at least one of these points in time is in the past.³ By analyzing one artifact at different points in time one faces the challenge to recall the old artifact and its properties from memory or some form of documentation. Resulting from this, the comparison includes a perceptual and a representational part on which I will come back when explaining research challenges.

By taking into account multiple points in time the pace of change can be determined. Such a comparison is carried out by examining which properties of the artifact have changed. The more properties have changed the higher is the degree of change that has been observed. The pace of change and its degree are two dimensions one might consider in order to distinguish stability or persistence from change. This however would resemble a continuum with stability and change as its extreme poles rather than the dichotomy mentioned above. One might also take into account the stability and change of the context in which the artifact is used. Whether the artifact is termed stable or changed depends on the stability and change of its context. One might thus say, it is relatively stable with regard to its environment. By introducing the notion

² The terms artifact and IOIS will be used interchangeably, which resembles the struggle to theorize the IT-artifact in its form of an IOIS.

³ The individual can thus not directly compare the artifacts in its visual field. If this would be possible the individual would anyway not examine stability or change but whether one object is identical to the other. The comparison would then not incorporate the selfsame artifact but two distinct entities.

of context one might also contemplate on the artifact's flexibility and adaptability in regard to an ever changing environment. If it is still there, this might be a result of its ability to change. This would however conceptualize change and stability as a duality in which both mutually constitute a "surviving" object. Its "viability" in a Darwinian sense is thus dependent on the object's ability to be adapted to changing environmental conditions or needs.

In the above discussion, I have distinguished four theoretical conceptualizations of artifact stability:

- I) *Dichotomy*: An artifact is either stable or it has changed.
- II) *Continuum/Scale*: Stability/Change depends on the pace of change and its degree.
- III) *Relation*: An artifact's stability is relative to its environmental stability.
- IV) *Duality*: To remain stable an artifact needs to be flexible and adaptable.

All of these four conceptualizations are problematic as they rely on the assumption that we can identify the selfsame artifact at different points in time. Especially in regard to the "duality" conceptualization this begs the question of how to avoid a comparison between distinct artifacts.

In conclusion, a comparison of an artifact at two points in time presupposes a notion of identity.

Identity of artifacts revisited

The problem of the identity of artifacts is well-known in philosophy.⁴ Several thought-provoking puzzles have been raised in the philosophical community.⁵ All of these essentially concern the question of how to establish a continuity of objects or artifacts over time. Just as

⁴ See Gallois, 2008.

⁵ e.g. Heraclitus' river, John Locke's socks, George Washington's axe, Tin Woodman in the Wizard of Oz

we are asking whether the IOIS existing today is the selfsame IOIS that emerged 20 years ago, although it might have changed in some way or the other.

In the following paragraph the metaphor of the Ship of Theseus will be used to demonstrate the impact of different conceptualizations of identity on the theoretical level for the analysis of change on the empirical level.

The paradox of the Ship of Theseus is among the oldest and most prominent of these paradoxes. Plutarch reports that the Athenians preserved the ship in which Theseus had rescued the youth of Athens from Crete for hundreds of years.⁶ As soon as the old planks decayed they were replaced by new timber. The paradox that taunted philosophers consists in whether the ship is still the same although all parts of it (planks) have been replaced. Hobbes exacerbates the philosophical problem by adding another element to the story.⁷ Consider the situation where the ship is lying in the dockyard.⁸ The Athenians require the repairmen to replace every plank by a new one. The repairmen do as the Athenians wish. However, the old planks are not thrown away. Instead the repairmen secretly rebuild the ship in a second dockyard. Which of the ships is now the Ship of Theseus?⁹

The philosophical approaches cannot be discussed here at length. Instead I will use two statements by Irving Copi to give voice to this paradox¹⁰:

- I) If a changing thing really changes, there can't be literally one and the same thing before and after the change.
- II) However, if a changing thing literally remains one and the same thing (i.e., retains its identity) throughout the change, then it cannot really have changed.

There seems to be a paradox as both statements appear to be true but inconsistent at the same time. I will briefly sketch three approaches to tackle this problem. They resemble different

⁶ See Plutarch, 75 A.C.E..

⁷ See Hobbes & Schuhmann, 1999.

⁸ This altered version is based on Hobbes & Schuhmann, 1999 II, 8-12.

⁹ Four answers could be disputed: the ship the Athenians get back (1), the ship of the repairmen (2), both are Ships of Theseus (3), none is a Ship of Theseus (4). [see Theis, 2001]

¹⁰ Cited according to Gallois, 2008.

streams in the philosophy of science. Due to different underlying epistemological and ontological viewpoints each of these sheds a different light on the concept of identity.

First, an ontological realist would claim that there can be only one Ship of Theseus. Classic philosophy demands a logical statement that allows us to establish identity or non-identity based on the empirical reality (materiality).¹¹ The artifact possesses measurable properties, which serve the purpose of comparing. The Ship of Theseus is thus conceived as a collection of wooden planks that are arranged in a specific shape.

Second, we can apply a non-positivistic (e.g. constructivistic) perspective. In doing so, we become aware of an important difference in Irving Copi's statements. "To be identical" at two points in time is not to be confused with "retain identity". The latter notion of identity however is not concerned with a specific set of properties of an object (being identical) but is a construct of an experiencing organism. In this regard Glaserfeld (von Glaserfeld, 1979) reminds us that continuity is not an inherent property of things and therefore not detached from experiencing subjects. Instead, he sees the subject as the creator of continuity who is attributing continuity and permanence to his constructs.

Third, (post-) phenomenology argues that artifacts cannot be separated from their use contexts (Verbeek, 2005 p. 117). "A technology can receive an identity only within a concrete context of use, and this identity is determined not only by the technology in question but also by the way it becomes interpreted [...]" (ibid. p. 117). Ihde (1986) calls such context dependence "multistability" which means that one and the same artifact can have different identities in different use contexts. "The fact that a stone is a missile does not imply that it cannot be other things like a brick." (Gibson, 1979, p.134). By building on the work of Heidegger, Ihde and Latour, Peter-Paul Verbeek develops a post-phenomenological perspective on technology. In his view, technological artifacts mediate the relation of humans with their world.¹² "What

¹¹ Like for instance Leibniz's law, see Forrest, 2009.

¹² He distinguishes between different types of relations: embodiment relations, hermeneutic relations, alterity relations and background relations (Verbeek, 2005, p. 123-128).

humans are and what their world is receive form by artifactual mediation.” (Verbeek, 2005, p. 130) Humans and the world they experience are both products of technological mediation. It is thus through mediation that both subject and object (world) are mutually constituted. Artifacts amplify and reduce aspects of perception; they also invite and inhibit actions of their users. Gibson once coined the term “affordance” to refer to multiple uses for which artifacts may be employed. Affordance is neither an objective nor a subjective property. “It cuts across the dichotomy of subjective-objective” (Gibson, 1979, p. 129). The ship of Theseus is thus not just a physical object (a ship), but it is the “Ship of Theseus”. It is perceived by individuals in remembrance of the hero’s deeds. It is part of continuing practices that are carried out over large time periods and passed on from generation to generation in order to remember past events (ready-to-hand).¹³ It becomes present as an old ship made out of wood which decays as years go by (present-at-hand). It cuts across the subject-object dichotomy in the way that the Athenians identify themselves with it and in the way that they are identified by other people due to their relation with the ship. Thus, it has become a reification of their community; it is their cultural heritage. The absence of the Ship of Theseus has normative implications.¹⁴ It bestows legitimacy to certain acts and illegitimacy to others.

It not only mediates the relation of the Athenian people to the world. By sailing with the Ship of Theseus to Delos the sailors establish a relation with the people of Delos. The ship and its crew mediate between Delos and Athens serving as a boundary object that cuts across space and time. It thus becomes a symbol of the cultural heritage of two different peoples residing in different spatial locations. The interpretation of the Ship of Theseus may vary for Delos and Athens.¹⁵ Although not directly participating in these events the people of Crete may as well establish an identity of the Ship of Theseus, brought to them by other means than direct

¹³ After Theseus return it was sent on a regular basis to the sanctuary on the island of Delos. Plato reports about this journey and its implications in his “Phaidon”, Plato & Rouse, 1999, p. 460-461.

¹⁴ During its absence no act of impurity was allowed to take place in the city. Therefore the condemned Socrates was allowed to live on for 30 days until the return of the sacred ship (Plato & Rouse, 1999, p. 460-461).

¹⁵ Where the former may view it as symbol for the sanctuary on their island and its reputation, the latter conceive it as a remembrance of their great hero and his liberation of their youth, their future.

perception. From their point of view, the ship becomes the reminder of their loss of the Minotaur, their princess Ariadne and the tribute of the Athenians. The Ship of Theseus does therefore not only mediate the relation between peoples directly perceiving it but between others as well.

Hence, the identity of the Ship of Theseus has transcended from being-a-ship with a specific set of planks to a metaphysical level that is socially constructed. It is not only “a” ship but “the” Ship of Theseus of which a physical ship is only a part.

The paragraphs above have broadened the concept of identity by adding perspectives informed by a positivistic, constructivist and (post-) phenomenological point of view. Each of these approaches the Ship of Theseus differently: as a ship made out of wooden planks (1), as a construction by an individual (2) and as a phenomenon of a use context (3). In fact, the latter conceives the Ship of Theseus not only as a physical object but as a socio-technical system. The ship has become a reification of the identity forming process in social communities. Conceived as such, the Ship of Theseus becomes a metaphor for an IOIS taken as a socio-technical system. In terms of an appropriate research design we can lay down the following requirements for a conceptual basis:

- I) Identity (of an artifact) is a social and historical construction.
- II) Identity (of an artifact) is co-shaped by the identity of the perceiving/experiencing individual.
- III) Identity always arises in a concrete context of use.¹⁶
- IV) The artifact has a mediating role between organizations.¹⁷

The philosophical problem of the Ship of Theseus demonstrates quite clearly that “It is the theory that decides what we can observe” (Einstein¹⁸). “Identity” in itself is a theoretical construct that depends on the ontological and epistemological chosen by its constructor (the

¹⁶ “always” refers to (a) actual use and (b) perceived use which includes observers of actual use.

¹⁷ Where 1-3 may be generalizable to other IT-artifacts as well, 4 is constituting for IOIS.

¹⁸ Quoted in Heisenberg, 1971, p. 77.

researcher). The theories with which we make sense of the world are then like a pair of glasses that determines whether we establish a continuing existence of an artifact or if we conceive it as something new. When shifting from a positivistic notion of identity to a social constructivist viewpoint we do not anymore conceive “the” identity of an artifact but one identity of the artifact for a specific person in a specific context at a specific time.

Getting back to the empirical data

The previous section approached the subject of identity from the theoretical angle and introduced the classic paradox of the Ship of Theseus. This section will demonstrate its parallels with IOIS by using the Irish case presented beforehand.

Against this backdrop we have to conceive the IOIS in the Irish case as incorporating multiple identities or parts of identities. The relation between at least two communities (Pharmacies-Wholesalers; Athenians-Delosians) is mediated by a technological artifact. Each of these uses the artifact in order to do something. In Heidegger’s wording it reveals itself as ‘ready-to-hand’ (Heidegger, 1977). For these parties the artifact itself becomes present-at-hand only when it breaks down. To avoid this, a third party (IPU, software vendors; repairmen) is concerned with maintenance.¹⁹ The relation between the two communities may be exclusive which means it only exists between those. This does not imply that such a relation is out of vision of other communities (observer; Cretans). These may as well form their identity of the system, yet from an outsider’s perspective.

The system incorporates material structures. Just as the wooden planks of the ship some hardware and software had to be changed and updated over the years. Even the set of standards that we saw at the core of stability is not identical to the original set (e.g. old product lines were discontinued, new products entered the file). In fact, these “planks” were updated every month. What remained stable is the shape or structure of these standards. Without a crew to repair and maintain the ship it would fall apart quite soon. In case of the

¹⁹ From their point of view it is present-at-hand.

IOIS the IPU assumed the role of a standard custodian, who “repairs” the set of standards. At the same time these tasks have to be carried out for hardware and software.

We have seen that identity arises in a concrete context of use. The Athenians send their ship on a journey to Delos. Both people establish practices to deal with the arrival of the ship. In case of the IOIS we can observe two communities, wholesalers and pharmacies that communicate via the IOIS. Orders and Backlists are sent around. Their behavior has become a routine, a practice that is aligned to the affordances of the boundary object that “travels” back and forth.

The normative implications we witnessed in regard to the Ship of Theseus have their counterpart in cut-off times, which encourage pharmacies to place their orders until then. Orders reaching the wholesalers after this time will be processed and delivered in the next delivery cycle. Orders that beforehand have been placed by phone are now electronically processed. The wholesalers experienced this as a loss of personal contact. The reassignment of the tele-sales staff served their rational to increase customer loyalty by creating a more personal relationship. The technological artifact mediates in a specific form the relation between both communities. In our metaphor the Ship of Theseus is re-creating by every journey to Delos the relation of Athens to Delos. The exclusivity of this relationship (Crete is not part of the journey) becomes apparent as wholesalers became upset when the IPU handed over the protocols to a third party. From their point of view, wholesalers and IPU own an exclusive right to the standards that should not be transferred to others.

The concept of identity in the IS literature

Generally, the IS literature is particularly concerned with the phenomenon of change. The causal agents of change have been discussed quite extensively and early on (Markus, Robey 1988). Lyytinen & Newman (2008) distinguish between four research streams accounting for change. In terms of identity it is not in the scope of most of these research streams to allow for discrimination between a new system and an old but changed system.

Studies that have taken a structurational perspective on technology seem to be promising as they emphasize the emergent view on technology. Technology does not exist in itself but is enacted. Its use is not determined by built in structures but emerges out of the artifact in use. In response to prior work (Orlikowski 1992) Orlikowski developed the notion of “technology-in-practice” which seems to take the conflation of the subject-object serious (Orlikowski 2000). With the concept of “technology-in-practice” she criticizes approaches, that view technology as embodying structures which are built in during a development process after which they become stabilized. In her view, this neglects the empirical evidence and is incompatible with Structuration Theory (Giddens 1984) which is used as a theoretical backing. In a technology-in-practice humans constitute structures in their recurrent use of technology. Change is inherently part of the concept as humans may always choose to do otherwise. Therefore, technologies are never fully stabilized. For “analytical and practical convenience” she admits, we may “choose to treat them as fixed [...] for a period of time” (Orlikowski 2000, p. 411). Orlikowski explicitly brackets the dynamics of technology and assigns a “stabilized-for-now” status to the technological artifacts under scrutiny. This analytical and practical convenience is unproblematic for short time periods and as long as we do not want to discriminate among different technologies. As soon as we are concerned with the use of technology that extends over decades it becomes questionable whether a “stabilized-for-now” status can still be assumed. The question regarding change of IS is then: At what stage is change undermining identity?

By analyzing the nature of IS change Lyytinen & Newman (2008) come to the conclusion that two paradigms can be distinguished: continuous, incremental change (A) and revolutionary, episodic punctuations (B). The former refers to longer periods of limited adaptations necessary to respond to environmental perturbations (first-order change). The latter (second-order change) conceptualizes change as the need to reform the “deep structures” of the system. These are described as a set of fundamental choices the system has made. Such

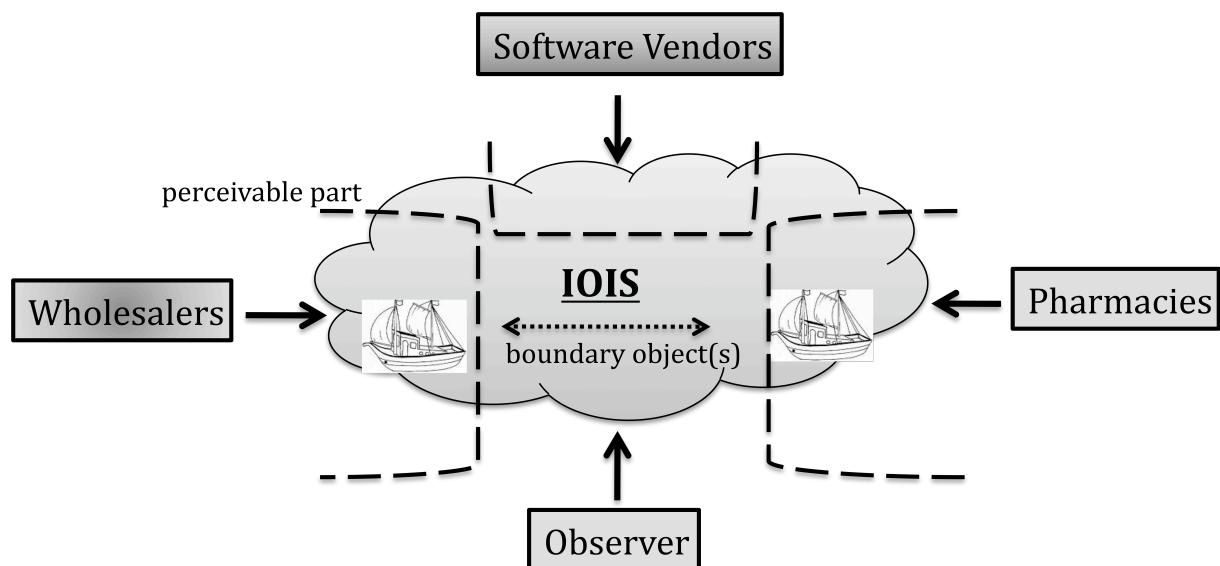
choices date back long ago. They are reinforced through positive feedback loops. When confronting Lyytinen & Newmans (2008) model of change with the question of identity it seems convincing that the identity of a system is rooted in its “deep structures”. Change that does not affect the deep structures would consequently not constitute a new identity or a new system. Gersick (1991) defines “deep structure” as „... a network of fundamental, interdependent "choices," of the basic configuration into which a system's units are organized, and the activities that maintain both this configuration and the system's resource exchange with the environment.“ (Gersick 1991, p. 15) The concept of “deep structure” is further fleshed out by Gersick (1991) by providing instances of these, given by six different theories. Although the concept of deep structure is intuitively convincing the paradox of the Ship of Theseus reminds us that the deep structure should not simply be equated with the identity of the IT-artifact. All of the instances provided by Gersick are theoretical constructions by researchers that do not necessarily overlap with the constructions prevalent in the field. Hence, whether we are encountering the selfsame ship is of our own making.

Kanellis & Paul (1997) propose to use the notion of “identity” and loss of identity to make sense of failure of systems. “An organisation therefore survives just as long as it maintains its identity. The same is true for IS.“ (ibid., p. 3) Essentially, the authors are requiring information systems to be adaptive to the living world in which they have to survive. In this sense the authors are not working out the concept of identity of the IT-artifact but attempt to show its applicability. However, Kanellis et al. (1996) make an important point by conceding that „identity [...] is very important, as it is the way that the stakeholder „sees“ the system“ (ibid., p. 207) This perspectival aspect of identity will be used in the next section to develop a theoretical framework of identity of IOIS.

Identity construction of IOIS as a theoretical vehicle

The sections before have already introduced identity as a theoretical construct. In this section persistence of IOIS or the continuing identity of an IOIS as an empirical phenomenon will be discussed.

The concept of identity is fundamentally theoretical in nature and at the same time dependent on the perspective of the constructing person. In terms of the empirical case, it is likely that the pharmacists construct a different identity of the electronic ordering system than the wholesalers or software vendors. Suppose, the software vendors would switch from a direct connection between pharmacy systems and wholesalers systems to a common gateway. Neither the pharmacists nor the wholesalers would necessarily be aware of this change as the technical core is transparent for them and hence not perceivable. The software vendors however, would conceive the gateway system as a different system rather than just having changed.



In this case the actors would perceive a different part of the IOIS and not-surprisingly construct different identities. However, they may also perceive the same part differently.

Identity is dependent on the perspective or worldview a person holds. This worldview could be described as the identity of the person or the organizational identity. The way the

pharmacists encounter the IOIS is dependent on their being-pharmacists. As their organizational identity develops so may their perception of the artifact develop and change.

The identity of an artifact for a person is not easily constructed but requires contrasting and comparing. That means the identity of an IOIS for a pharmacist, say for instance in Ireland, becomes much more evident when having experienced similar IOIS in other contexts (e.g. UK).

The identity of an IOIS exists “in relation to”. This is meant in a twofold manner. First, methodologically the interviewer or researcher imposes/proposes dimensions of identity, thereby he co-constructs the elucidated construction. Second, an IOIS is by definition a relational system. Hence, not necessarily consistent perspectives and thereby identities are related to each other. This can be regarded as a build-in conflict.

Furthermore, perspectives are interdependent in two ways. First, due to specific governance structures or levels of analysis a perspective of one entity can be informed or dependent on the perspective of another. This is for instance the case with the IPU and its constituencies (pharmacies). Due to discursive patterns the perspective of the IPU will most likely be influenced by its members and vice versa.

Second, the interacting parties in an IOIS are negotiating about the meaning of things important to their interaction. Thereby, they care about their own image in others. One example would be that in the beginning of the eOrdering system in Ireland the pharmacists perceived the system as generating benefits only for the wholesalers. The wholesalers reacted to this image by communicating the system differently (emphasizing the benefits for the pharmacies) and giving discounts for orders coming in electronically.

In terms of stability and persistence of IOIS the perspectival view of identity allows for different degrees of stability depending on the number of perspectives sharing the view of a continuing existence of one identity over time.

Implications for research on IOIS

Although the concept of identity of IOIS is not fully developed yet, some of its merits and implications for research on IOIS can be evaluated. The general idea of differentiating and comparing different IOIS over time can be regarded as a requirement for theories of IS change. A theory of change should enable researcher to establish whether they are confronted with the selfsame system, albeit having changed, or not. That means it becomes necessary for a theory of change to spell out the categories of their respective identity construct. In this regard it contributes to better understand the IT-artifact in a theoretical sense.

It has been argued that the identity concept is inherently perspectival. From this point of view a theory is just a set of glasses that allows other researchers to come to the same conclusion. This does however not answer how to deal with the different identity constructions in the empirical field. Here, the notion of identity might serve as a lens to better understand the failure of systems and the evolution of systems by elaborating on the described built-in conflict in IOIS. That means a shift of the identity of an IOIS in the perception of one interacting party might trigger a break down of the entire system. Empirical research on this matter is far from trivial. The method of data gathering becomes crucial for the identity that is constructed by interviewee and subsequently interviewer alike. On the other hand, the concept embraces the perspective of the interviewees as equally valuable.

The concept of identity of IOIS will be further refined as research on the described cases goes on. The research strategy simultaneously engages with theory development and data gathering. So far this requires the search for possible ruptures that would alter the system from a researchers perspective or from the perspective of the actors. Where contrast-and-compare is possible, it is used to differentiate between perspectives and the identity of systems. Thereby, distinctive and coherent perspectives on the IOIS are intended to be found on an intra-case level. The researcher perspective is evaluated to flesh out possible categories of an identity concept based on an inter-case comparison.

Conclusion

The research on large-scale information systems over long periods of time gains increasing attention in the IS discipline. Due to empirical evidence researchers seek to account for persistence of information systems. It has been argued that the distinction between different IOIS over time is far from trivial and has not yet been addressed properly by IS scholars.

The notion of identity seems to warrant some attention, as it is applicable and relevant both on the theoretical as well as on the empirical level. As identity is in itself a theoretical construct establishing identity in the field becomes a twofold process. First, the researcher establishes an identity of the identity construct he wishes to research. That means the researcher defines on a metaphysical level the categories of identity. Second, this construct is being imposed/proposed to the field in order to elucidate constructions of identity from actors. These perspectives on the artifact and their interplay warrant further attention as they may yield promising venues to research failure and diffusion patterns of IOIS.

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