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ABSTRACT

The need of the IS-community to theorize the IT-artifact has been claimed by several authors. It has been somewhere between difficult and impossible to unequivocally agree on what the IT-artifact is. This paper argues that this is even more challenging when considering inter-organizational information systems (IOIS). After pointing to methodological and theoretical problems of researching IOIS this paper develops a different research approach. It proposes the notion of identity as a concept to study the IT-artifact. This paper works out a theoretical framework that blends the Gibsonian notion of affordance with that of organizational identity. In his work, Gibson emphasizes the importance of perspective. In order to account for different perceptions of affordances of the IT-artifact, organizational identity is discussed as an important element of perception. By combining the notions of affordance and organizational identity a new framework for studying IS in general and IOIS in particular is proposed.

Keywords

Organizational identity, affordances, IT-artifact.

INTRODUCTION

The call for IS-scholars to theorize the IT-artifact as their core subject matter is a recurring topic in the literature (Orlikowski and Iacono, 2001). It has been somewhere between difficult and impossible to agree on what the IT-artifact is and consequently what the appropriate theoretical tools are to study it. The debate is still ongoing even among researchers involved in the social study of technology (Grint and Woolgar, 1997; Hutchby, 2001, 2003; Rappert, 2003). Thus, the theoretical conceptualization of the IT-artifact is of major importance as it answers the question of how to distinguish IT-artifacts. Additionally, such distinction is needed to discriminate among IT-artifacts of the same class.[1] This question is even more challenging when considering inter-organizational information systems (IOIS). The reason for that is inherent to IOIS as by definition IOIS extend across at least two organizational boundaries. As with the concept of information systems, several definitions of IOIS can be found in the literature. By defining the concept, the research community sets the boundaries that determine what is considered part of an IOIS. Qualitative case study research seeks to better understand how IOIS are embedded and enacted in their organizational contexts. In doing so, researchers are relying mainly on interview data. In this paper I argue that interviewees cannot be expected to share the construct of IOIS. Their observation and experience of the IOIS is limited to the parts of the IOIS residing in their organizational boundaries. In each organizational context, the IOIS may thus receive different meanings. It receives a different identity.

The first section analyzes the research process on IOIS and identifies methodological and theoretical challenges. The paper suggests that these challenges should be appreciated because they provide a useful avenue to study the IT-artifact of and in an IOIS. In doing so, the notion of identity of IOIS is developed.

In the second section, the concept of affordances as developed by Gibson (1979) is explored in terms of its applicability to the study of IOIS. While social-technologists like Hutchby (2001) proposed the concept of affordances to study technology, this paper puts special emphasis on perspective as an important aspect of perceiving affordances. This leads to a closer examination of how to account for 'perception' in research. Essentially, perception is only possible from a specific point of view or perspective. Because one's perspective is not necessarily fixed it is referred to as the glasses through which perception takes place. The third section discusses how the concept of organizational identity can inform the understanding of perspective. It argues that organizational identity represents a valuable tool to account for the perspective of organizations on IT-artifacts. Thus, it contributes to research on what the IT-artifact is.

Together, organizational identity and affordances offer a new framework to study IOIS and IT-artifacts in general. Instead of searching for the essential properties of an IT-artifact such a framework features the notion of the identity of IOIS. Although,

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[1] In the class of IOIS we could for instance distinguish electronic ordering systems from electronic marketplaces.

'identity' has been briefly discussed as an option for research, its applicability has not been investigated (Kanellis, Lycett and Paul, 2000). With the identity perspective this paper not only develops new means to study and conceptualize the IT-artifact, it also demonstrates the usefulness of blending affordances and organizational identity in one theoretical framework, allowing new research opportunities on IOIS to unfold. Organizational identity is introduced as a necessary and helpful tool to do so, thereby showing a new field of application for this theoretical construct.

HOW TO DISTINGUISH IOIS – THE ROLE OF THE OBSERVER

The aim of this section is twofold. First, the process of distinction is explored. This is important as it is by distinction that we can delineate what the IT-artifact is and equally important what it is not. Secondly, this process of distinction will be applied to IOIS in order to demonstrate the methodological difficulties of common theoretical approaches. This application leads to the distinction of two levels of observation that need to be accounted for in research.

Process of distinction

A missing definition of the core concepts is generally regarded as a major weakness in scientific papers of any discipline. The Merriam Webster dictionary explains that a 'definition' is "a statement expressing the essential nature of something"[2]. Etymologically the Latin 'de-finire' describes the demarcation, distinction or confinement of something. The act of distinguishing is performed by an observer. It involves placing a boundary around the entity, thereby separating it from its background and making it identifiable (Ford and Ford, 1994). Although the boundary is in itself not a thing it becomes reified by this process as a discrete entity (ibid, 1994). It is important to note that the boundaries reside in the mind of the observer and not in the observed (ibid, 1994). In regard to an IOIS the research community establishes its boundaries. Thereby, IOIS as a type and an entity becomes reified by isolating it from other information systems and the organizational context.

Although the term IOS can be attributed to a paper by Cash and Kosynski (1985), Kaufmann (1966) introduced the idea of "Data systems that cross Company Boundaries". Cash and Kosynski (1985) defined interorganizational systems as automated information systems shared by two or more companies. Johnston and Vitale (1988) stated that the "essential characteristics of an IOS are both technological and organizational"(ibid, p. 153). They coined the term interorganizational information system (IOIS) which is also used in this paper.[3]

Where earlier authors concentrated on the technical features, later scholars put more emphasis on the interacting subjects (Kumar and Dissel, 1996) and the organizational context in which these systems are embedded (Reimers, Johnston and Klein, 2009). For this paper a rather high level view is adopted. An IOIS is a socio-technical system that crosses organizational boundaries by providing electronic linkages between partners.

In the following paragraph these "essential characteristics" of IOIS, as Johnston and Vitale (1988) called them, are used to show the characteristics of IOIS in research:

- IOIS consist of technical and organizational characteristics. The former could be referred to as hardware (e.g. terminals) and software (e.g. programs but standards as well). The latter refers to governance structures of the network and practices in which interaction with the technical aspect takes place.
- The notion of organizational boundaries denotes the uniqueness of the organizational contexts in which the IOIS is embedded. The difference may be described as different business roles (e.g. supplier-retailer) which may be part of different organizational cultures or organizational identities.
- Not every organization is part of a specific IOIS. Its boundaries denote who is in and, equally important, who is out.
- The scope of the IOIS can be understood as the extent to which tasks are complemented or substituted by electronic means. Generally, only the electronic linkages are considered part of an IOIS.

Although this list can be extended, it sufficiently denotes some characteristics that delineate the observed "thing" in the sense of the first paragraphs.

Applying the process of distinction to IOIS

Mintzberg, Lampel and Ahlstrand (1998) used the famous fable of "The Blind Men and the Elephant"[4] to illustrate the contribution of different schools of thought to make sense of strategy (part of the elephant). The understanding of each part contributes to an understanding of strategy formation as a whole (elephant). I will use the same fable to point to the

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[2] http://www.merriam-webster.com/dictionary/definitions

[3] This paper uses the terms IOS and IOIS synonymously.

[4] originally from John Godfrey Saxe (1816-1887).

challenges of researching IOIS as a whole (elephant). We, the researchers are the oberserver who specifies the boundary of an IOIS (head and tail are part of an elephant). This definition is accompanied by attempts to further differentiate types of IOIS (Asian and African elephant).

The researcher does not directly observe or, more importantly experience and interact in the IOIS (at least in non-ethnographic studies). Instead, participants in our studies are interviewed. I will refer to the interviewees as observer (A) and to the interviewer or researcher as observer (B). The concept of IOIS as such is often unknown to participants in studies. Thus, in terms of the fable the observer (A) is blind in regard to the IOIS (elephant). He perceives and experiences something, observer (B) would consider a part of the IOIS. Figure 1 illustrates the difference in perception of observer (A) and (B).
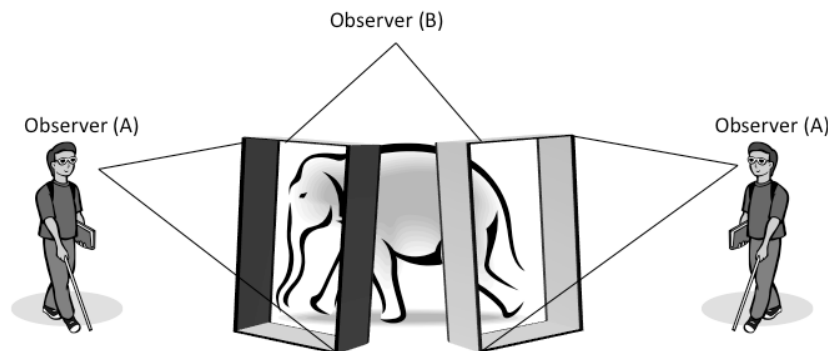

Figure 1: Two levels of observation

Different blind men are thus examining for instance the head of the elephant. Their descriptions and experiences inform, via their answers to our questions, our understanding of the elephant of which the head is part. The head might be described differently due to a different cultural background. A person having sensed an elephant's head previously (e.g. Asian elephant) might produce other differentiations because of the ability to compare these experiences (e.g. African elephant). The user of an electronic ordering system may thus be able to compare previously used ordering systems with the one the researcher is interested in.

The fable tells that each blind man is examining a different part of the elephant. One describes his perception of the tail, while the other is concerned with the head. As they don't know what an elephant is, each would respond differently to such a question. IOIS are crossing organizational boundaries. Hence, parts of an IOIS are residing in different organizations. In these organizations interviewees are interacting with different parts of an IOIS. For instance, the retailer has an ordering interface in front of him which interconnects him with a supplier. The interface at the supplier's side is most likely different from the retailer's. Each of these observers (A) tells a different story about the IOIS. At the same time a GUI makes opaque a major part of the software processes taking place underneath. Data exchange standards and the infrastructure used to transmit these messages are not directly observeable for every participant of an IOIS. Some major building blocks of IOIS are thus difficult to characterize by its day-to-day users.

All of these examples contribute to the difficulties in determining the identity of an IOIS. It is the researcher who has a concept of IOIS in mind (observer B). He relies on information elucidated from users of the system (observer A). While an analysis of what the IOIS is can already be challenging at one point in time, it becomes even more complex when considering change in longitudinal studies. It involves not only the analytical activity of joining head and tail as parts of an elephant but the need to establish the identity of each system across time. The information coming from observers (A) can be multi-faceted and contradictory. What would be the researcher's conclusion if participant I (observer A) says: "The system has been stable for many years." and participant II (observer A) states: "The entire architecture has been changed a year ago. We've now a new system.". Both may make valid observations that are equally true but contradictory. While participant I observes that the system has essentially stayed the same, participant II observes that in view of the profound changes it becomes hard to speak of the selfsame system. This paper seeks to account for both arguments by proposing a research framework based on the concept of affordances.

Thus, we can conclude the following:

- Observer (B) establishes the unity of the entity (head and tail belong to an elephant). He constructs the whole and makes inquiries to inform his analysis.

- Observer (A) is not likely to describe the entity (IOIS, elephant) but, with the guidance of observer (B), parts of it (head or tail).
- It is observer (B) who needs to assure that these described parts (head, tail) belong to the same entity at one moment in time (elephant at time t).

These conclusions emphasize the crucial role of the researcher (observer B) and his difficulties in empirical and analytical terms. Furthermore, it becomes questionable if distinctions as researcher's constructs adequately represent how to elucidate the identity of IOIS from an interviewee's point of view. Methodologically this represents a top-down approach with pre-specified criteria that guide research and analysis. The following section introduces the concept of affordances as a different way of deriving distinctions of IOIS based on the constructs of interviewees. Thereby, the top-down approach is reversed.

AFFORDANCES AS DISTINCTIONS

The previous section emphasized that what technology or the IT-artifact is, emerges in context. Although valid for any technology it has been demonstrated that in IOIS this is even more important. Classical attempts of definition aim at measuring object-inherent properties. We perceive these objects by discriminating their properties. The perceptual psychologist James J. Gibson suggests that we do not perceive the qualities of objects but their affordances. According to him "[…] affordances of the environment are what it offers the animal, what it provides or furnishes, either for good or for ill" (Gibson, 1979, p. 127). An affordance cannot be measured as a physical property but exists relative to the perceiving subject. A knee-high surface may afford "sitting-on" to an individual (Heft (1989)). This affordance is delimited by the parameters of a specific individual. A seat perceived as such by a child is not perceived as a seat by an adult. It does not afford sitting-on because the adult has a different body-scaling (leg length, weight, etc.). An affordance is thus only specifiable in relation to an individual and not independent of a perceiver. Gibson stresses that an affordance is neither subjective in the sense that it resides in the mind, nor is it objective in the sense that it is object inherent. Instead, it cuts across the subject-object dichotomy. Affordances are relational in nature and thereby exist only when two entities are considered simultaneously (subject and object) (Heft, 1989, p. 4).

It has been argued that affordance is a relational concept. Heft (1989) argues, "affordances are the environmental counterparts to the animal's behavioral potentialities" (ibid, p. 6). The perceptual and behavioral capabilities of an individual co-implicate (1) what is perceivable and hence describable of the environment, and (2) what is significant of the environment in relation to an animal's actions. The former denotes that a human has a different visual spectrum as for example an insect. What is significant and describable in the environment is dependent on these perceptual capabilities. The latter points out that the significance of some features of the environment is co-implicated by the actions an individual can perform. A detached object smaller than a hand-length (not much smaller) affords grasping. Both the act of grasping and the object's features become meaningful in their interrelation.

Heft (1989) investigates the causal relationships between affordance and perceiver. First, the ongoing interactivity of environment and perceiver is ongoing or *continuous*. Secondly, it is a *reciprocal* relationship as affordances offer an array of possible actions of which only a subset is realized by the perceiver. Third, *cumulative* - the continuous interactions provide a historical base for perceptual development and environmental discovery.

The intentional act of sitting requires both the perception of the environmental characteristics and simultaneously the perception of the body. However, affordances should not be limited to objects in relation to a body. Gibson (1979) discusses the example of a mailbox that affords mailing a letter (ibid, p. 139). A mailbox does acquire such functional meaning not by mere reference to the body but also whether the act of mailing is a known concept to the individual. It is in that sense part of an individual's repertoire (Heft, 1989, p. 18). Additionally, this example refers to the context in which this knowledge has been acquired. While in the US rectangular-shaped blue objects with four legs and a curved top afford "mailing of a letter", different objects, albeit with the same meaning, emerged in other socio-cultural contexts (Heft 1989, p. 18). In Great Britain it is a red cylindrically shaped object, while in Germany it is a yellow cubical object. "Individuals learn particular situated, intentional acts in social contexts" (ibid, p. 18). By taking development over time into account this affordance-behavior relationship may change due to learning (knowledge) and maturation (body).

An affordance points two ways at the same time, to the observer and the environment. The reciprocal and non-dualistic notion of this relationship is important for Gibson to stress, "[…] to perceive the world is to co-perceive oneself. This is wholly inconsistent with dualism, in any form, either mind-matter dualism or mind-body dualism. The awareness of the world and one's complementary relations to the world are not separable."(Gibson 1979, p. 141). Perception and Perspective are thus intertwined.

In order to use the concept of affordance for studying IT-artifacts the following assumptions of the theory need to be kept in mind: First, an affordance involves the subject and object simultaneously i.e. the concept of affordance is relational. Second,

because of the perceiving and experiencing individual the enacted affordances of an artifact are dependent on the perceptual capabilities and behavioral potentialities. That is, an individual cannot be aware of an (individually) unperceivable characteristic of the artifact. Additionally, behaviors or actions carried out by the individual are only understandable in relation to characteristics of the artifact. Third, some affordances understood as functional meanings (e.g. mailing-a-letter) require a (learned) repertoire of intentional actions that is historically growing (cumulative). Furthermore, such intentional actions are acquired and meaningful only in a socio-cultural context.

The examples given in this section were on a rather high level of abstraction. The paper started with a more specific focus on IOIS. It has been argued that IOIS extend across organizational boundaries. The organizational context represents the environment in which parts of the IOIS become enacted and interpreted. As the affordance arises in relation to someone it is important to conceptually incorporate 'someone's' perspective into a research framework on IOIS. The following section argues that organizational identity is a promising candidate for that purpose.

ORGANIZATIONAL IDENTITY AS THE LOCUS OF AFFORDANCE EMERGENCE

In contrast to organization science the concept is not so prominent in IS-literature. A recent literature review by Gal and Kjærgaard (2009) reveals that the term 'identity' has been used substantively in IS-journals but at the same time the authors come to the conclusion that most scholars have not adopted the identity concept in a theoretical manner. Gal, Lyytinen and Yoo (2008) investigate the changes of organizational identity implicated by changes of boundary objects in network constellations. This paper seeks to employ the concept of organizational identity as a tool to incorporate 'perspective' into the study of affordances of IT-artifacts in organizations. As such the perspective found in existing articles is reversed. Based on the literature on organizational identity in organization science this section is devoted to exploring the applicability of the concept for this purpose.

Albert and Whetten (1985) introduced the concept of organizational identity in 1985. Basically, the concept is a response to the question of 'who are we as an organization' (Puusa 2006). It is an entity's attempt to define itself (Corley, Harquail, Pratt, Glynn, Fiol and Hatch 2006). Albert and Whetten (1985) proposed to conceptualize self-referential claims by members of the organization as organizational identity if these claims would be perceived by the organization's members as central, enduring and distinctive. Thereby, organizational identity tries to capture a self-referential meaning where the self is a collective. It could thereby represent a shared understanding by a collective (Corley et al. 2006). At the same time identity is arising in context and is inherently comparative. "[…] identity is typically conceptualized in terms of an actor's position or role within an established set of categories that define an industry[…] rather than essential properties" (ibid, p. 87). The relational character of organizational identity is distinguishing it against closely related concepts like organizational culture (Fiol, Hatch and Golden-Biddle 1998). The former is used in this paper as IOIS themselves represent profoundly relational phenomena.
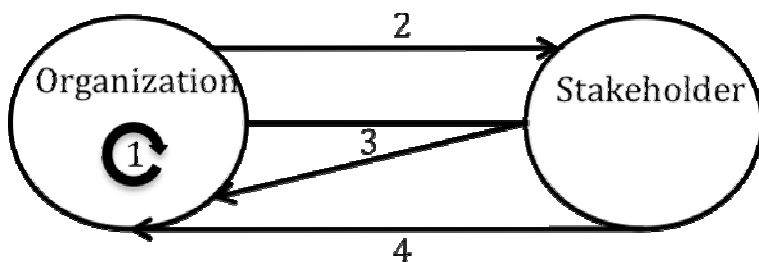

Figure 2: Viewpoints of on the organization (Brown et al. 2006, p. 100)

Brown, Dacin, Pratt and Whetten (2006) distinguish organizational identity (1) from other concepts like image and reputation (see Fig. 2). In their view identity is internal to the organization. It is held by organizational members about the organization. The notion of 'reputation' (4) refers to what outsiders think about the organization. The 'image' of an organization has two conceptualizations. The 'intended image' (2) refers to what the organization wants outsiders to think about itself whereas the 'construed image' (3) stands for the organization's belief about what others actually think about it. When considering IOIS as an entity this already complex ensemble of viewpoints needs to be extended even further. IOIS extend across organizational boundaries and allow organizations to collaborate. Communication is thereby mediated by electronic means. Hence, image and reputation are subject to artifactual mediation. Figure 3 exemplifies the role of technological artifacts for a dyadic relationship.
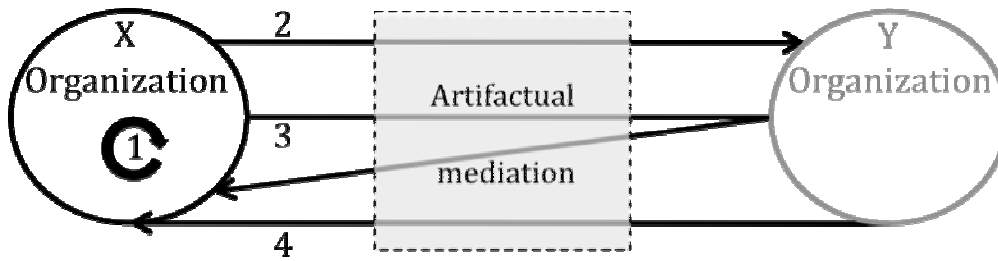
Figure 3: Artifactual mediation (perspective of organization X)

Such a conceptualization is of primary interest for scholars attempting to engage with the notion of 'inter-organizational identity' (e.g. Rometsch 2008). In contrast, the intent of this paper is to focus on the relationship between organizational identity and technological artifacts.

Research on organizational identity distinguishes two levels of analysis. One involves the analysis of how individuals view their organizations from their individual perspectives. This level would view identity as a property of an individual rather than a larger social group. Brown et al. (2006) argue that organizational identity is a collective-level phenomenon, which involves shared beliefs. For dyadic relationships between organizations this approach is directly applicable. IOIS per se are not limited in their number of participants. Methodologically this leaves two alternatives to the researcher. First, each member organization can be studied separately in terms of their organizational identity. Second, the concept of organizational identity can be extended to homogenous groups of organizations that share some features of organizational identity. The assumption is that these groups are homogeneous in terms of their organizational identity without implying that they have the same organizational identity in common. Important for the purpose of studying the identity of artifacts is that organizations belonging to the same group in a study share a similar view on the world – that is their perspective is, along broad lines, the same. For instance, the group of wholesalers might share such a similar view of the world while it is totally different to the one adopted by the group of retailers.

The concept of organizational identity can be employed as a metaphor to describe organizations or it can be conceptualized as a phenomenon that can be experienced by organizational members (Corley et al. 2006). If considered in the latter way the question arises about the implications of organizational identity on organizational practices. Haslam, Postmes and Ellemers (2003) make a rather profound claim that "[…] as a form of social identity, shared organizational identity is a basis […] for people to perceive and interpret their world in similar ways, […]" (ibid, p. 364). This basis of perception and interpretation of the (organizational) world gives meaning to artifacts. It is in this context where the identity of an artifact as a set of affordances comes to the fore.

Like any artifact IOIS are interpreted and receive meaning in an organizational context. How members of the organization perceive, interpret and attribute identity to these artifacts is dependent on the organization's perspective. In this paper I propose to use 'organizational identity' as a tool to empirically and theoretically account for this perspective. For instance, retailers perceive an IOIS differently than a supplier. They value some aspects more than others. It has to be acknowledged that such an approach conflates the perspectives of the individuals in order to gain a higher level of abstraction. The proposed interrelationship between organizational identity, perception and affordances of the IOIS-artifact is illustrated in figure 4. Both stakeholders perceive only a part of the IOIS. Some aspects residing in the middle part remain opaque for both parties. The intention of this research framework is to study organizational identity as a proxy for understanding the perspective of social groups (organizations, groups of organizations).
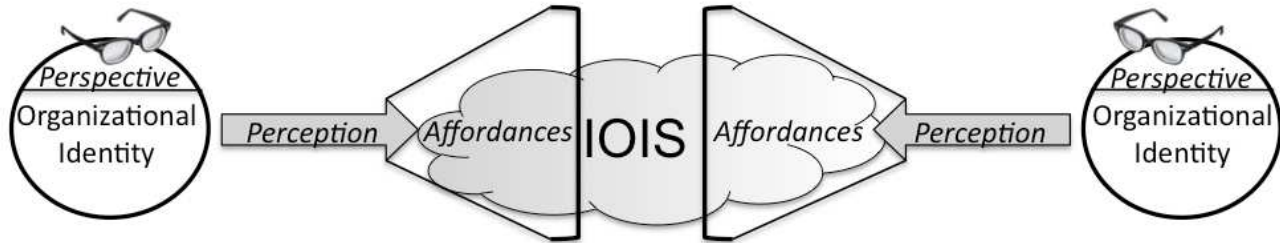
Figure 4: Theoretical concept of IOIS

In his work on communities-of-practice Wenger along with others (Hatch and Schultz, 2002) underlines the dynamic character of identity: "[…] identity exists – not as an object in and of itself – but in the constant work of negotiating the self." (Wenger 2005, p. 151). Over time the organizational identity may alter and shift. Thereby, the perspective adopted by organizational members changes. Although the physical properties of the artifact may stay the same its affordances may change profoundly over time. A change in affordances of an object may thus result out of change in the physical properties or by change in the perception of the user - his perspective.

CONCLUSION

This paper set out to discuss challenges that originate in the aim to theorize the IT-artifact in IOIS. Two levels of observation have been distinguished while special emphasis was put on the level of observation obtained by participants in case study research. The paper argued from the conviction that technological artifacts receive meaning in organizational contexts. The application of pre-specified criteria originating from the researcher's level of observation is therefore inappropriate, as the phenomenon of interest does not exist as such at the interviewee's level of observation. Consequently, the concept of affordances has been proposed to incorporate individual constructs of the artifact..

However, the question remains of how to incorporate the perspective and hence perception of the subject into a research framework. Organizational identity has been proposed as tool that allows researchers to methodologically and theoretically grasp the 'organizational perspective'. Its application has been sketched in form of a research framework. A more detailed discussion of the aspects of organizational identity that are of major relevance to understand the perception of technological artifacts in organizations needs to be postponed to another paper.

The blending of affordances and organizational identity features the notion of identity of IOIS. The previous section showed that several identities of an IOIS might coexist. While affordances open up the scope of how to identify artifacts it does not allow the process to become arbitrary. In the case of IOIS such identities are inter-connected by goal-directed behavior of participants that materializes as intentional acts in reference to an interrelated counterpart at other participants. An IOIS affords 'electronic ordering' insofar as the act of 'delivery' exists as the interrelated counterpart of 'ordering'. Both acts are performed in different organizations but are mutually constituting. Just as an elephant needs to be fed, an IOIS needs to be maintained. The performance of the elephant as a pack animal is dependent on actions that are carried out by a different individual. Performance and Maintenance are interrelated acts. The identities of an IOIS are not arbitrary but interrelated. Thus, two identities could be regarded as two sides of the same coin.

The approach presented in this paper is rather new as IS-literature primarily focuses on the implications of ICT on identity rather than the other way round. It therefore represents an approach that extends the area of application of the concept 'organizational identity' in the IS-literature. The blending of affordances and organizational identity offers a promising research perspective not only for studies on IOIS but IS in general.

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