FORM-ING INSTITUTIONAL ORDER

Complete Research

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Abstract

This paper examines the central place of the list and the associated concept of an identifier within the scaffolding of contemporary institutional order. These terms are deliberately chosen to make strange and help unpack the constitutive capacity of information systems and information technology within and between contemporary organisations. We draw upon the substantial body of work by John Searle to help understand the place of lists in the constitution of order. To enable us to ground our discussion of the potentiality and problematic associated with lists we describe a significant and modern instance of list-making, situated around the issue of digital identity management. The theoretical framework discussed allows us to better explain breakdowns in the institutional order characteristic of this domain.

Keywords: Lists, Identifiers, Scaffolding, Institutional order, Digital identity management.

1 Introduction

In the classic thriller *The Day of the Jackal* (Forsyth, 2011) the assassin visits a London cemetery and writes down details from a gravestone of a person who died in childbirth. He uses these details to apply to the national registry of births for a birth certificate for this person. This birth certificate is then used to apply for a passport from the national passports agency. Finally, this passport is used both to gain entry to France and to enrol in various services within the country such as hiring a car.

But this breakdown in institutional order is not complete fiction nor is it something set in the past. In 2013, for instance, a report was published indicating that the identities of 42 dead children were used by undercover metropolitan police officers (BBC, 2013). The process by which these identities were acquired had many similarities to that described in the novel by Frederick Forsyth.

The semiotician Umberto Eco (Eco, 2009) believes that society makes lists as part of its attempt to impose order or control on the world. This idea has some pedigree. Schmandt-Besserat, for instance, has proposed that clay tokens dating back to 8,000 B.C. are some of the earliest examples of lists of commodities (Schmandt-Bessarat, 1978). Ezzamel has argued that the construction and dissemination of lists were performative rituals critical to the maintenance of the ideological order of ancient Egypt (Ezzamel, 2009). Urton has argued for the place of assemblages of knotted strings, known as khipu, as unique artefacts for the making of lists amongst the Inka (Urton, 2003). More recently, Gawande has argued for the importance of checklists as key aids in the control or coordination of behavior in critical areas of contemporary life such as engineering and surgery (Gawande, 2010).

This paper examines the central concept of the list and the associated concept of an identifier to help breakdown established conceptions of information systems and information technology. The ubiquity of lists across time and human culture suggests that they serve some critical function within human existence. But what is such a function? What does the imposition of order or control through list-making mean in this context? To help answer this question, this paper considers the place of the list

using a conceptual framework we have developed in previous work (Beynon-Davies, 2011). We use this framework to examine the place of lists in *form*-ing both intra-institutional and inter-institutional order.

Clearly, digital computing and communications technology has made the making of and use of lists much easier. Larger lists can be built and such lists can be manipulated far more quickly than in the past; such manipulation being particularly reliant on the constructive importance of the identifier. Hence, it is comparatively easy to search a list containing millions of identifiers in many varied and complex ways in a matter of a few seconds. The practical ease with which modern list-making can occur, linked to the increasing rationalisation of action in modern life, has meant that we rely upon lists more than at any time in human history. However, the increasing ease with which we can create and manipulate lists frequently masks much of the nature of lists as significant artefacts.

To help ground our discussion of the potentiality and problematic associated with lists we describe a significant and modern instance of list-making, situated around the issue of digital identity management. We argue that personal identifiers, as critical parts of systems of list-making or record-keeping, demonstrate the ways in which lists of things help constitute institutional order. The management of digital identity illustrates the role of records not only as supporting 'infrastructure' (Bowker and Leigh-Star, 1999) or 'scaffolding' (Orlikowski, 2006) within particular organisations; but as institutional objects shared between organisations. An understanding of the scaffolding of lists and identifiers is also important to exploring ways in which breakdowns in institutional order occur.

2 Enacting Significance

We propose that lists can best be understood at the intersection of signs, patterns and systems – a domain we have referred to in previous work as the *enactment of significance* (Beynon-Davies, 2011). We propose that the patterning of order characteristic of organisation is enacted through three entangled (Barad, 2007) forms of action that cohere in significant patterns. Through formative acts actors constitute forma, a term we use to stand for the various ways in which physical substance is given form. Through informative acts actors constitute informa, a term we use to stand for the various ways in which form serves to inform. Finally, through performative acts actors constitute performa, a term we use to stand for the various ways in which informed actors achieve coordinated performance.

The terms forma, informa and performa are taken from the work of Dietz (Dietz, 2006) but given an expanded meaning within the framework described here. This tri-partite entanglement we take to constitute the unitary essence of the accomplishment of significance. It is the same essence which exists in the founding work of the semiotician Peirce (Peirce, 1931) when he defines a sign in terms of three component elements: representamen, object and interpretant. It is also critical to the distinction made by the philosopher Austin (Austin, 1971) between the locutionary, illocutionary and perlocutionary aspects of a speech act, and which forms important foundation for the conceptual edifice created by John Searle. Finally, this arrangement of order bears a resemblance to Habermas' (Habermas, 1998) distinction between the objective, subjective and social worlds.

Within this paper we demonstrate how this framework allows us to understand the way in which lists play different roles within the accomplishment of institutional order. This is because lists relate to representation, to communication and to instrumental action. Lists are important as records which serve to communicate our understanding of ordering in the 'world'. The use of lists within acts of communication also serves as a guide to coordinated action – to the re-production or re-constitution of organisation which forms the institutional order.

2.1 Lists as Forma

Forma concerns the physical material utilised in the formation of signs within what Habermas calls the objective world (Habermas, 1998). Forma consists of physical patterns (symbols) which can be

combined into structures and manipulated to produce new structures (Newell and Simon, 1976). Forma is created and used within formative acts and formative acts occur in conventional sequences as formative patterns. A coherent set of inter-related formative patterns comprise a formative system.

In general, a formative act consists of an actor using one or more operators on one or more formative structures, elements or items (Tsitchizris and Lochovsky, 1982). Operators consist of four types of manipulation which transform formative structures, elements and items. Create or 'write' actions involve bringing new structures into existence, while delete actions involve removing existing structures. Update actions involve changing the value of given structures and read actions involve accessing the value of particular structures.

In such terms a list is a key example of persistent forma. Fundamentally, it amounts to a set of 'forms' each of which serves to stand for some thing to some community of actors (Peirce, 1931). Austin would refer to the act of creating a list-item, element or structure as a locutionary act. Searle distinguishes between two aspects of such a locutionary act: the act of physically creating some form (an utterance act) and the act of using such form to refer to something (a propositional act). Our use of the term forma corresponds to Searle's notion of an 'utterance'. The important point is that the elements of a list as 'utterance' persist beyond their act of production (Derrida, 1971). The very persistence of the list-item enables it to fulfil a primary purpose: that of referring to things across time and space to multiple actors.

At its most basic a list corresponds to a *set* of elements: an assembly of distinct 'objects', considered as an object in its own right. There are two ways of specifying the members of a set. One way is by intensional definition, using a rule or semantic description such as *A is the set of colours of the French flag*. The second way is by extension: listing each member of the set, such as A = {blue, white, red}.

Most lists used for modern institutional purposes are actually ordered sets known as sequences or tuples, implying that both the elements of the list and the position of the elements in a list are significant – hence the tuple <1,2,3,4> is different from the tuple <2,4,3,1>. Within institutional contexts, simple lists consist of an ordered collection of formative items, typically, as we shall see, identifiers for persons, things or events. More complex lists consist of ordered collections of formative elements (such as records) or even formative structures (such as files). Codd (Codd, 1970) had the key insight of mapping aspects of set theory, particularly the idea of tuples onto that of files, records and fields. Codd proposed mapping the formative structure of a file onto that of a mathematical relation, being a set of tuples. This formative structure fundamentally underlies the data management systems used within mainstream digital computing systems.

2.2   Lists as Informa

Any element within a list has two faces. On the one hand, it faces the physical world – it has material form. On the other hand, a list-item faces the social world - it relates to effects such as individual and social actions. Interposing between these two is the realm of cognition, mind and more generally the issue of meaning – what Habermas (Habermas, 1998) refers to as the subjective world. The term *informa* is used to refer to this latter pattern of organisation.

Forma, as we have seen, refers to the way in which substance is given form. The substance, or series of substances, is given a form which has <u>potential</u> to inform. But to be informative a given piece of forma must serve to inform a certain actor. The actor must accomplish an act of in-forming (Boland, 1987) in terms of such forma: the element of forma must be taken to stand for some other thing. This is the distinction between Searle's utterance act and propositional act referred to in the previous section.

Therefore, it is important to separate out the act of creating or forming an artefact such as a list-item from its use for doing something. Within the context of situations in which we are interested it is important to separate out (at least for the purposes of analysis) the act of creating, updating or deleting

some list-item from the accomplishment of being informed by this action. There are two main reasons for this. First, that the act of forming an artefact may be accomplished by a different actor from that being informed by the artefact. Second, that the association between the act of manipulating some artefact and the act of being informed by it is an arbitrary one. A certain artefact may hold significance for one actor but not for another. It may not hold any significance for anybody. In which case, in Searle's terms, it is an utterance act but not a propositional act.

Hence, formative systems *make sense* only within the context of an informative system. This means that each formative act within a formative system is coupled or co-constituted with one or more informative acts. From the pragmatic viewpoint (Agerfalk, 2010), an informative act is some act of message transmission designed by one actor, the sender of the message, to influence the performance of some other actor, the receiver of the message (Searle, 1970). This suggests that informative acts are actually comprised of two aspects. The first aspect we have already met. This consists of what Searle refers to as the propositional content of the message. The second aspect is what Searle, following Austin, refers to as an illocutionary act - comprising the intent or purpose of the message.

Consider three examples of informative acts that appear regularly within business organisations: [*Please take the customer order*], [*Will you take the order?*], and [*You will take the order*]. The content of these three messages is the same – [*that you will process the customer order*]. However, the intent (sometimes referred to as the propositional or illocutionary **force**) of these three verbal statements is clearly different: The first is a *request*, the second a *question* and the third a *prediction*.

Searle (Searle, 1970) maintains that it is possible to formulate five key types of informative act in terms of differences in the intentions that the actor communicating has: assertives, directives, commissives, expressives and declaratives. These types of informative act can be distinguished in terms of *Illocutionary force* or *propositional attitude* (the kind of attitude a speaker has when he says something) and the *direction of fit* between the world and the *propositional content* of the communicative act (the word).

For example, in terms of illocutionary force, *assertives* are informative acts that explain how things are in the world, such as in, '*Our orders have fallen by 10% this month*'. In contrast, *directives* are informative acts that represent the senders' attempt to get a receiver to perform an action, such as - '*Please ensure that our production target is met next quarter*'. *Declaratives* are communicative acts that aim to change the world through the communication itself, such as '*This order has been fulfilled*'.

The term direction of fit was used by Austin (Austin, 1971) to refer to the relationship between mental states (perhaps rather confusingly called the *word*) and reality (or what philosophers refer to as the *world*). Three directions of fit are proposed: word-to-world (intended to describe the world), world-to-word (intended to change the world) and null (having a mental state implies that some fitting to the world has already taken place).

Certain types of list, that Eco (Eco, 2009) refers to as practical lists, relate specifically to informative acts. Such lists consist of a collection of symbols which stand for informative acts. However, different types of informative act generate different types of list. It is possible to unpack the key function as well as limitations of lists as informa in terms of illocutionary force and direction of fit.

Consider the following example, adapted from one given by Searle. A retail manager gives her procurement operator a list of products needed to replenish a particular store: P1, P2 and P3 (Searle, 1983). The man takes the list to the market and makes purchases to match items on the list. Hence, the list functions as an order or desire and has a world-to-word (list) direction of fit. It is the responsibility of the man to make the world, in terms of his purchases, match the items on the list (the word).

Suppose the man's activity is tracked by a consultant hired to audit procurement. The consultant writes down everything the man orders. When both the consultant and the procurement operative return to report to the manager, they have identical lists. However, the function or direction of fit of the two lists is different. In contrast to the man's world-to-word direction of fit, the consultant's list has a word-to-world direction of fit. The differences between these two functions become apparent when we

examine what happens when an error is made. Suppose the operative fails to procure product P1, but instead procures a different product P1.1. In terms of the consultant's list the error is easily corrected. He crosses out P1 and substitutes P1.1. However, in the case of the procurement operative the situation is not so easily corrected. Correcting his list does not change the state of the world.

In terms of informa, the consultant's list comprises a set of assertives, which have a word-to-world direction of fit. It is the function of the consultant's list to match reality - it functions as a list of assertions of what happened. In contrast, the procurement operative's list comprises a set of directives, which have a world-to-word direction of fit. It is the responsibility of the procurement operative to make the world match the items on the list (the word).

Such background theory allows us to see that lists actually serve a number of different functions as artefacts of both representation and communication. Eco (Eco, 2009) primarily documents lists as assertions about how the World is ordered – this person owns this land while this person owns this land... In contrast, Gawande (Gawande, 2010) documents the importance of lists as directives or commissives to action – do this, then this, then this....or I will do this, then this, then this…

More recently, Searle (Searle, 2010) has suggested that implicit lists of declaratives form fundamental background and are critical to constructing and re-constructing the social world itself. Searle argues that institutional reality is reliant on collective acceptance of the assignment of a particular status to 'objects'; whether such objects be people, things or events. Society is thus created from simple constructs which he refers to as status functions. Such status functions are important because they carry deontic powers - that is, they carry rights, duties, obligations, requirements, permissions, authorisations, entitlements etc. Status functions are created through constitutive rules of the form *X counts as Y in C*; where X stands for some object, Y stands for some 'status function' and C stands for the context in which the rule is acceptable. For example, *pieces of printed paper issued by the Bank of England (X) count as money (Y) in the United Kingdom (C)*.

Constitutive rules such as these generate institutional facts. For example, *this piece of paper in my hand is a five pound note and hence can be used to purchase goods and services within the United Kingdom*. Institutional facts are contrasted with brute facts. Brute facts are matters of brute physics, chemistry and biology. Such facts exist independently of human institutions. An example of a brute fact is that *the sun is ninety-three million miles from the earth*. In contrast, institutional facts are matters of culture and convention. They exist only within the context of human institutions.

Institutional facts rely on the background of collective intentionality ('aboutness') associated with a given sign-system for their existence. In *Making the Social World* Searle adds a further claim: that status functions are created through declarative speech acts. This results from the peculiar property of such declarations that they have both a world-to-word and word-to-world direction of fit. Collective intentionality is thus built from mutual acceptance or recognition of status functions. We, as actors, make something the case by declaration that a given status function Y exists.

In a sense then, what Searle refers to as a status function is very similar to the Pierciean conception of a sign. According to Pierce, a sign is '*something which stands to somebody for something in some respect or capacity*' (Peirce, 1931). Within a status function, X really forms the designation of a sign and Y its intension. The context C is the background of collective intentionality relevant to some domain. According to Searle, social reality is constituted through the iterative application of such constitutive rules. This means that one status function can be built upon a large hierarchy of previous antecedent status functions. The X term at one level is likely to have been a Y term at a lower level. Furthermore, the C term is typically a Y term (or perhaps a series of Y terms from earlier stages).

2.3   Lists as Performa

Hence, building upon the extensive literature of the language-action tradition (Lyytinen, 1985; Te'eni, 2006), we would argue that an informative system consists of recurring patterns of informative action:

acts of communication in which actors create and send messages in an appropriate context with certain intentions. The communication of intentions fulfils the purpose of an informative act: it enables the coordination of per-formative action. In Austin's terms every illocutionary act can be considered not only in terms of its communicative intent but also in terms of its perlocutionary effect. Hence, another way of portraying the declarative iteration of status functions suggested by Searle is to say that the formative act of creating a list-item is constituted through its informative and performative context. Once an item is recorded in a list as persistent forma it has the potential to inform actors. Lists therefore act as a critical resource in the coordination of mutual performance by multiple actors.

Lists are particularly used within the modern world to enact enrolment of people within particular systems of performance or to prohibit enrolment in such systems. Enrolment is a term we adapt from actor-network theory (Latour, 2005), and which in the large involves answering the question, in relation to a particular performative system, *how am I expected to perform and how will others perform towards me?* Entry of a person upon an appropriate list privileges individuals with rights, responsibilities and activities in a particular system of performance. Another way of unpacking the idea of enrolment is in terms of the deontic logic of Searle. Searle originally proposed a number of broad categories of status functions - symbolic, deontic, honorific and procedural – but has recently argued that all such status functions actually collapse into the base form of the deontic. The term deontic is derived from the ancient Greek déon, meaning that which is binding or proper. Such binding is provided through power and its exercise. Any deontic status function is assumed to have the structure (S does A) where S is an individual actor or group of actors and A is an action (Searle, 1995). Searle therefore extends his representation of a deontic status function with an expression of the collective intentionality imposed on the X term to form: we accept (S has power (S does A)). Hence, an individual or group might be granted certain powers: We accept (S is enabled (S does A)). For example, we accept (S, the bearer of X (five pound note), is enabled (S buys with X up to the value of five pounds)). We might also collectively restrict the power assigned to some individual or group: We accept (S is required (S does A)). For example, we accept (S the person to whom X (parking ticket) is issued, is required (S pays a fine within a specified period)).

3 Digital identity as Signs of the Person

To help demonstrate the central place of the list in forming contemporary institutional order it is useful to consider the burgeoning issue of personal identity management, sometimes referred to as digital identity management (Neubauer and Heurix, 2010). Expressed purely as a technological issue this can be seen to involve the use of various technologies to manage identifiers associated with persons in their use of IT systems. In this section we wish to broaden this conception. For us, digital identity management resolves around the use of lists as collective declarations of significance. We also wish to unpack how and why the management of personal identity through such lists is a problematic area for modern individuals, organisations and societies (Whitley, Gal and Kjaergaard, 2014).

Our key argument is that personal identity, at least as it concerns the issue of digital identity (Lyon, 2009) (Poster, 2006), is a critical accomplishment signified through forma, informa and performa within a multitude of formative, informative and performative systems that serve to constitute the contemporary institutional order in many societies. At the level of forma, a person's identity is authenticated through various forms of persistent and non-persistent identifier. At the level of informa, such symbols are critical to identification and necessary to ensuring the effective operation of informative acts. At the level of performa, the possession of appropriate identity is critical to enrolment in various performative systems and hence to coordination of mutual performance amongst a multitude of actors. Figure 1 illustrates the inter-relationship between various concepts which we find critical to unpacking the enactment of digital identity, and which are discussed below.

Following Morris (Morris, 1946), it is possible to understand any sign as fulfilling three possible roles: as identifiers, designators and prescriptors. Identifiers are signs used to reference an 'object' in time and space. Designators are signs used to signal properties of some object. Prescriptors are signs used

to signal appropriate responses on the part of the actor. Personal identifiers are signs used to reference an individual actor. Personal identification, as we shall see, is frequently signalled through an aggregation of designators about the individual actor. Assigned identity is typically used as a means of determining appropriate behaviour associated with some specified role within a performative system.

Therefore, we propose that the signification of identity is important to joint action because of the way it conflates three critical and entangled processes of signification: authentication, identification and enrolment (Beynon-Davies, 2006; Beynon-Davies, 2007). These processes communicate three different things about the digital identity of the individual. In other words, digital identity is normally accomplished within three inter-dependent signification processes.

Authentication involves answering the question - *Am I who I claim to be?* Authentication is typically signalled by lists of identifiers: utilised and possibly stored within some formative system. Within face-to-face inter-action standard or 'natural' identifiers are used for the communication of identity. The contemporary problematic of remote communication in support of remote inter-action demands the use of surrogate identifiers to authenticate persons (Clarke, 1994). Identification in the large involves answering the question - *Who am I?* - and is typically signalled within informative systems by designators. In terms of personal identity, designators signal attributes or properties of the individual, including a recorded history of events within which the individual has participated. Lists of designators are particularly important for establishing the communicative competence of actors within such informative systems. Enrolment involves constituting the range of expectations used as both a resource and a constraint by actors within a particular performative system. Enrolment is largely signalled by prescriptors: signs that signify the requiredness of certain sequences of performance.

Figure 1 is also meant to illustrate how the three types of process, system and sign are not separate but entangled. A personal identifier as forma necessarily serves to inform actors and enables them to achieve coordinated performance, part of which may involve the manipulation of lists of identifiers which serve to further inform and perform….
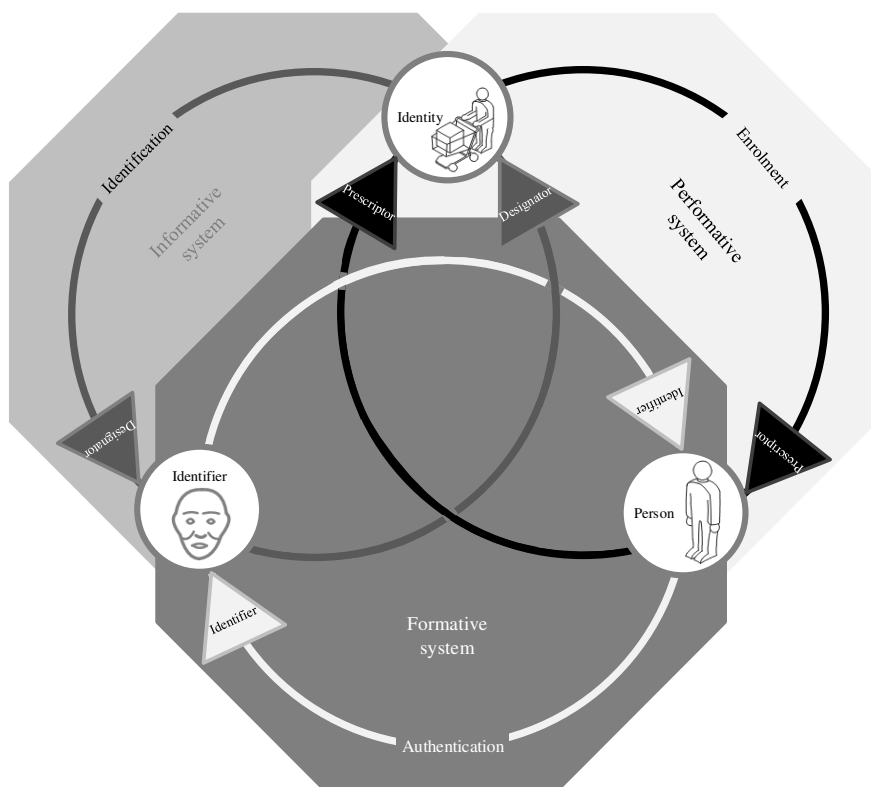

Figure 1. Enactment of digital identity

3.1   Forma of Digital Identity

Personal identity is critical to many formative systems in contemporary society, because of the way in which identity increasingly becomes reified in personal records. A number of forms of identifier are available for authenticating a person and associating other signs used as designators and prescriptors with such a person (Clarke, 1987). It is possible to classify such forms of personal identifier into three types: embodied, conventional and surrogate identifiers.

Within face-to-face communication facets within the sensory modalities of sight and hearing are normally used to code identifiers as symbols. Hence, appearance, and social behaviour are probably the most basic forms of identifier and constitute an instance of what we have referred to in previous work as embodied forma (Mingers, 2001), in the sense that such forma is reliant on the physical structure of the body or upon some immediate embodied action on the part of the actor. Appearance concerns how a person looks including features such as gender, skin colour, hair colour, colour of eyes, facial hair or distinguishable markings such as a birth-mark. Social behaviour concerns how the person interacts with others, including style of speech and accent or aspects of body language.

Along with embodied identifiers various human cultures assign arbitrary or conventional signs to persons for the purpose of authentication. The most commonplace example is of course the panoply of personal names associated with the individual. Such names include forename(s), surname, maiden names, nicknames and also-known-as names.

Within the persistent formative systems necessary for the constitution of the modern institutional order both embodied and conventional personal identifiers are generally deemed deficient for a number of reasons. Formative systems such as the relational database demand that personal identifiers be universal, unique, permanent, indispensable and exclusive. First, every relevant person for the performative system that is coupled to the formative system in question should have an identifier *(universality of coverage)*. Second, each relevant person should have only one identifier and no two people should have the same identifier *(uniqueness)*. Third, the identifier should not change, nor be changeable without authority *(permanence)*. This implies that the identifier should be *non-mnemonic* since if any meaningful association is built into an identifier such an association may change over time. Fourth, the identifier should be available for use at all times within the performative system *(indispensability)*. Fifth, no other form of identification should be necessary or used for the performative system in question *(exclusivity)*.

For this reason, surrogate identifiers have been invented as mechanisms for use in remote identity management. Surrogate identifiers constitute technical or formal signs created purely to satisfy the demands of modern formative systems. These include features such as codes and tokens as well as technologies that 'measure' and record aspects of the individual such as bio-dynamics and physiography used to uniquely identify individuals. Codes are what the person is referred to within a particular performative system such as a series of numbers or letters which can be human-readable, machine-readable or both. Tokens constitute what the person has in his or her possession; for example, a birth or marriage certificate, passport, drivers licence and credit card. Bio-dynamics are what the person does, such as the way in which someone's signature is written, statistically analysed voice characteristics, keystroke dynamics in relation to login-id and password. Natural Physiography amounts to what the person is in terms of features such as skull measurements, teeth and skeletal injuries, thumbprint, fingerprint sets and handprints, retinal scans, hand geometry and DNA patterns. If these characteristics are readable by machine then they are referred to as biometric identifiers.

3.2   Informa of Digital Identity

The informa of identity relates to the way in which identity is crucial to and relates with informative acts. Any informative act relies on the unambiguous signification of the identity of the actors in some communication. The theory of speech or communicative acts tends to be based on examples of face-

to-face communication, primarily using human speech, and hence presupposes the use of what we have referred to as natural identifiers. Therefore, the identity of actors, signalled through embodied identifiers, is a critical part of the context of any illocutionary act. In particular, conditions of satisfaction (Searle, 2010) associated with a particular communicative act normally rely on the assignment of appropriate identity to participating actors.

For instance, the trustworthiness of an assertion made by a particular actor will normally be assessed by other actors in terms of the assigned identity of the individual. Hence, if actor A asserts that actor B has cancer, B is likely to accept the truthfulness of the assertion if A has the validated identity of an oncology consultant. This means that we collectively accept that oncology consultants have power to make assertions about the health and treatment of cancer patients - (S has power (S does A)). Likewise the success of a particular directive will typically be determined by the judged identity of the actor issuing the directive; particularly attributes of status and authority associated with this identity. Hence, if actor A issues a command to actor B then B is likely to perform the directed response if B is a private soldier and A is a sergeant. The veracity of a commissive normally also relies on effective authentication of actors involved in an act of commitment. Hence, if actor A is selling some object X to actor B at a defined price Y it helps actor B if A can be authenticated as a valid salesperson for the purchased object. Commitments clearly underlie the performa of all forms of economic exchange. The authentication of individuals ensures so-called *non-repudiability* in remote transactions.

3.3   Performa of Digital Identity

As we have mentioned, digital identity is critical to enrolment in a vast range of performative systems within contemporary societies. The possession of appropriate digital identity privileges individuals with rights, responsibilities and actions in a particular performative system. For instance, a validated identity such as that of a taxpayer will enrol the individual in a whole range of rights, responsibilities and expected actions in the performative systems associated with fiscal matters. It will also entitle the individual to access services provided by the tax authorities of a particular nation-state. But a list entry may not only enrol persons; it may also prohibit such enrolment for particular individuals in particular performative systems. Hence, if an identifier for you appears on a credit rating blacklist, this will prevent you from obtaining credit from financial institutions that use such lists to guide performance. Lists of personal identifiers are therefore critical to what Lyon calls *social sorting* within the contemporary institutional order (Lyon, 2009).

To reiterate, to enact their roles in numerous situations, people have to enrol within numerous performative systems. To do this, they normally have to apply to become a validated identity to such systems. This typically involves creating some formative structure such as an application 'form'. In doing so the actor engages in a communicative act which expresses a wish to engage in the behaviors of the performative system, such as accessing services. Organisations will typically validate details recorded about the individual by reading personal records held on other formative systems. Such sources will assert or negate the validity of a person's identity. Decisions will be made on the basis of such validity as to whether or not to enrol the person into a particular performative system. Assuming so, a personal record and associated personal identifier, most probably a surrogate identifier, may be created to represent such enrolment. This commits the organisation to providing participation and declares such entitlement to the individual.

The identifier supplied to the person will then normally be required in all future interactions between the person and the performative system. The person will need to provide the identifier in any interaction as an assertion of her rights to entry, which will be read by institutional systems of the organisation. This will serve not only to authenticate the individual to such systems but also to pull down other designative attributes of the individual held in her personal record. Once identification is achieved, the person is able to perform in particular ways such as accessing services provided within the performative system. Accessing such services may cause changes to be made to records held about the individual such as the recording of transactions between the individual and the organisation.

4 A Case of Mistaken Identity

To help ground our discussion of the potentiality and problematic associated with both lists and identifiers for the purposes of constituting digital identity we describe in this section a significant and modern instance of list-making, situated around the ownership and use of automobiles. Besides its usefulness as an enacted environment experienced by most readers of this paper, this background has been recently utilised within the Information Systems literature. Agerfalk and Eriksson (Agerfalk and Eriksson, 2011) have used the case of the theft of automobile number plates as a problem situation for making the case for considering identifiers as institutional objects.

The institutional order described here is a composite of that declared across the European Union. The simple activity of using an automobile to transport oneself from point A to point B is, of course, commonplace practice for individuals but relies upon a complex, entangled system of significant accomplishment. We first demonstrate how a case such as this can be unpacked in terms of the conceptual framework previously described. This leads to discussion of a number of potential dysfunctions that arise in the use of lists and identifiers as institutional objects that bind communication and performance within this domain.

The performative system which makes up this case can be described in the following manner. Automobiles are clearly produced by automobile manufacturers and as new vehicles are normally sold through established dealerships to buyers. Automobiles are, of course, purchased for the purpose of driving and as such pass into the ownership of particular persons; but they can only be driven by people who have passed the appropriate driving test. They also need to be legally parked at various locations in the process of making journeys. At some point in its life an automobile may be subject to some incident: it may be in a crash, be stolen in its entirety or have its number plates or hub caps stolen. Eventually, the automobile will reach the end of its usefulness and will need to be recycled.

However, enrolment in the activities of automobile use relies upon a complex sequence of informative acts between various actors. The manufacturer of the vehicle first has to assert to its dealerships that a vehicle that fits a certain description has been manufactured on a certain date and is available for sale. A customer will then direct a dealership that they wish to purchase a car at a particular price and a sale is struck by the dealership confirming details of the vehicle sold with the customer. The seller of the automobile then has to assert to the appropriate registration authority that the vehicle has been sold to a particular person. The registration authority then declares that the nominated person is the new owner of the vehicle. To insure the automobile the owner has to both tax the vehicle and prove its roadworthiness. In the case of a new vehicle, roadworthiness is communicated automatically through the manufacturer and dealership. In the case of a car more than three years old, then roadworthiness has to be declared by an authorised test centre to the registration authority. Assuming that the roadworthiness, taxable status and driving status of the owner can be declared from the registration authority then the insurance company can declare that the vehicle is insured. During its life, the driver may park at some location and be declared to have parked illegally. Also more serious incidents may occur such as theft of number plates which need to be reported to law enforcement agencies.

Clearly, many acts of communication within this enacted environment will not be conducted in face-to-face communication between actors. Instead, such informative acts will be constituted through persistent records held within the formative systems of various organisations. Such records will be used to inform further performance. When a manufacturer produces a new automobile they are likely to enter a vehicle record into their manufacturing database. Details from this database will be used to select a particular automobile by a dealership for sale to the customer. Before sale the dealership will apply for a particular registration number to the registration authority and this number will be placed on number plates positioned on the car. After sale of the vehicle the two parts of the vehicle registration document are filled in by the seller. One part is given to the buyer as proof of purchase; the other is sent to the registration authority. The registration authority uses part 2 of this document to update its ownership and vehicle records and will send the final ownership document to the address of

the nominated owner. To drive the car the owner needs to tax and insure the vehicle. To tax the vehicle the owner need to prove ownership through the relevant document. Also, if it is a car over three years old then the roadworthiness of the vehicle needs to be verified through a roadworthiness certificate issued by a validated test centre. To insure the vehicle, details are provided to the insurance company of the registration number of the car and the person or persons to be driving the car. The insurance company is able to enquire of the formative structure held by the registration authority to confirm details of the vehicle, its ownership and roadworthiness. Provided these are satisfactory the car insurance policy can be issued. As some point in using the vehicle the driver may receive a parking ticket; details will be entered as an infringement record in the lists of the parking agency. When something more serious, such as the theft of number plates, happens, then an incident record will be entered by police and an incident number given to the owner for use in claims to insurance companies.

Agerfalk and Eriksson (Agerfalk and Eriksson, 2011) describe a scenario taken from the enacted environment we have just described, based upon an incident reported in the Swedish press. This scenario is useful to demonstrate a number of 'holes' in the fabric or scaffolding of contemporary institutional order described above through which breakdowns may appear. *The scenario begins with Lars having his number plates stolen from his blue Toyota Auris, which he duly reported to the police. He then proceeds to order another set of the same number plates from a registered plate supplier, and when they arrive, places them back on his car. A week or so later, Lars receives a notification from the police that a burnt-out car has been found with his stolen number plates and that this car is now being scrapped. Then Lars receives 13 parking tickets for his car through the postal service. He is puzzled: during the period in which these offences occurred, his car has been mainly parked outside his house. It becomes apparent after contacting the police and parking authorities that the parking tickets were actually incurred by the car with his stolen number plates. Later still, Lars receives notification from his car insurance company that his car insurance policy is now void because they had been informed that his car had been scrapped. This is odd because Lars can clearly see his car parked on his drive!*

Using the conceptual framework established in previous sections it is evident that a number plate (or more precisely the vehicle registration placed upon this plate) is a physical symbol (forma). It is used to refer to or stand for a particular vehicle (informa). The informative potential of this sign is critical to binding the mutual performance (performa) of a large number of actors in areas such as ownership, tax collection, insurance and roadworthiness testing. It is noteworthy that many, if not most, of the identifiers utilised as scaffolding within the enacted environment of personal automobile transport are surrogate identifiers. This means that they are artificially created to have the properties of universality, uniqueness, permanence, indispensability and exclusivity described in a previous section. In a sense, this construction of the surrogate identifier is an attempt to develop institutional workarounds for certain problems evident in digital identification discussed within this case. For instance, the idea of permanence establishes the principle that an identifier for an object should not be changeable without authority. This is clearly an attempt to manage the deontic status of identifiers and is a constitutive rule which was broken in this case.

In this scenario two different cars ended up with the same identifier – the same number plates. Since this identifier was recorded in various formative systems against one particular owner, identified in various different ways within such systems, the rights and responsibilities of this particular owner were essentially multiplied across two cars for the period in which the stolen number plates were used. As far as the parking institution was concerned, for instance, its inspection of ownership records clearly showed that Lars was the owner of the car with the registration BD51SMR. This was sufficient for them to declare that this person had engaged in a number of parking infringements and to issue parking tickets to the address listed for this person. More intense scrutiny might have revealed that further properties of the said car did not match details held on record. Likewise, when the car with the stolen number plates was eventually set on fire the authorised treatment facility, which was given responsibility for scrapping the car by the police, produced a certificate of destruction having first enquired of the registered owner. They then notified the registration authority of the destruction of the vehicle, which updated its records accordingly. This triggered a declaration to the insurance company

listed for the vehicle, which in turn issued a declaration of insurance termination to the registered owner of the vehicle. Great effort was then needed on the part of Lars to unravel these declarations and re-instate his previous deontic status: his rights and responsibilities in relation to a particular automobile.

5   DISCUSSION

We have deliberately utilised the idea of the list and the associated construct of an identifier as 'technology' within the current paper to attempt to break-through entrenched and limiting conceptions embedded within the conceptual vocabulary of the information disciplines. Formative structures, elements and items build up to form complex lists of things. However, it is frequently forgotten that each individual record or element in a list has a life-history consisting usually of a complex sequence of formative acts situated within an even more complex nexus of informative and performative acts. We might even argue that making or form-ing a record or list-element about an object, person or event is a significant part of the way in which modern institutional reality is constituted (Searle, 2010). Lists therefore take central place in the way in which organisations and society at large form order through the construction of institutional facts which declare states of the world. Such facts rely upon a background of collective intentionality and are used as a key resource in communicating and reinforcing the nature of institutional order.

Just like Bowker and Leigh-Star (Bowker and Leigh-Star, 1999) we are attempting a meta-level of analysis above that of particular technologies; a way of unpacking the enacted environment within which IT systems are designed, constructed and used. This enables us to understand not only the ways in which order is constituted but also the ways in which breakdowns (Bødker and Grønbœk, 1991) can occur in contemporary order. Lists of personal identifiers act not only as supporting 'infrastructure' (Bowker and Leigh-Star, 1999) or 'scaffolding' (Orlikowski, 2006) within particular organisations; but as institutional objects shared between organisations. Such institutional objects not only serve to constitute institutional order but also are critical elements within breakdowns in such order. For instance, breakdowns in institutional order are evident in the case of the Criminal Records Bureau in the UK (Beynon-Davies, 2011), the ownership of automobiles in the European Union (Agerfalk and Eriksson, 2011) and in the management of foreign students in higher education in Sweden (Eriksson and Agerfalk, 2010). A breakdown in the management of digital identity between government agencies in the UK is also particularly evident in the example with which we began this paper.

We propose that the framework described is useful for unpacking more clearly the nature of digital identity and providing us with better ways of understanding breakdowns in the contemporary institutional order caused by the problematic of digital identity. Cases such as that of the stolen identifier is clearly part of an increasingly common phenomenon within the modern world. The stealing of number plates and their use on another car is an example of identity theft. But such identity theft is significant in the context where various remote but communicating actors rely upon persistent forma for the constitution of their collective intentionality. The rising amount of identity fraud and the identity theft upon which it is based is actually the fraudulent use of identity only in the sense that much of our institutional sense of who people are and what they are entitled or expected to do - both institutional facts - is represented in a multitude of lists shared across multiple actors working within many different institutional realities. This constitutes the contemporary problematic of digital identity.

Much has been written within communities of practice, particularly within the public sector, about both the potentialities and pitfalls associated with the sharing of lists of personal identifiers between institutional agencies. The framework described in this paper allows us to unpack not only the key functions that lists play but also some of the inherent dangers that lie within any attempt at list-making. In future work we particularly wish to use such sense-making to demonstrate the importance of understanding not only how intra-institutional order is constituted but also how inter-institutional order relies upon the collective declaration of significance.

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