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Understanding Interaction Through the Lens of Materiality and the Processual Nature of Artifacts

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Competitive paper

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Abstract

The elements and processes to understand organisational business-to-business interactions have been extensively explored. The context and forms these interactions takeunderpinmajor threads of research in the Markets-as-Networks tradition of understanding business networks. Standard operating procedures (SOPs), job specs, contracts andbriefs as physical objects play material roles within these business-to-business interactions, guiding and managing how these relationships play out. This paper primarily builds on the rich Markets-as-Networks tradition by refocusing attention on the role artifacts play in the interaction process. In addition there appears to be non-material artifacts, without physical forms, that also aid in guiding and managing interactions. This paper incorporates the construct of materiality into considering non-material artifacts,broadening the scope of our analysis and allowing us to gain a more comprehensive understanding of the role various artifacts play in business-to-business interactions.

Two cases considering inter-organisational routines through the lens of an artifactual unit of analysis are outlined.These two cases raise issues of focus in relation to the context of interaction core to the Markets-as-Networks tradition. As a consequence this paper takes a closer look at: the processual characteristics within long term, close and complex relationships; the roles that artifacts play in these interactions represented by organisational and inter-organisational routines; how the artifactual characteristics in themselves either aid, alter or hinder the context of interaction.By drawing distinctions,relating to the materiality of artifacts, we illustrate how mangers' understanding of the role artifacts, and unseen artifacts can play in impacting on guiding and managing business-to-business relationships.

The conclusion of this paper discusses the managerial relevance of the processual characteristics of artifacts and their form of materiality. By comparing and contrasting two inter-organisational cases through the lens of materiality and the processual characteristics embodied in artifacts managers can gain a better understanding how various artifacts can guide and manage processes of interaction.

Interaction in Business-to-Business Relationships

Introduction

From the early developments of marketing, marketing researchers have claimed the concept and activity of exchange as their specialist domain of expertise (Bagozzi, 2009, 1975). The context of exchange between industrial buyers and sellers, extending especially to interactions and relationships,provides the basis for the Markets-as-Networks research tradition (Ford and Håkansson, 2006). The main processual elementsunderpinned much of the research conducted in an inter-organisational context (Figure 1).The early studies from the IMP Group(1982)focused onsocial, financial, informational and product/service interactions. Research focused on activity links, resources ties and actor bonds (the ARA model) as the basis of routines provides a rich foundation for considering the material role artifacts to formalise strategy as to guide activities, develop bonds and allocate resources. This paper focuses on the material roles artifacts play, in the interaction process, in supporting and guidingvarious inter-organisational routines and their significance in managerial strategising.
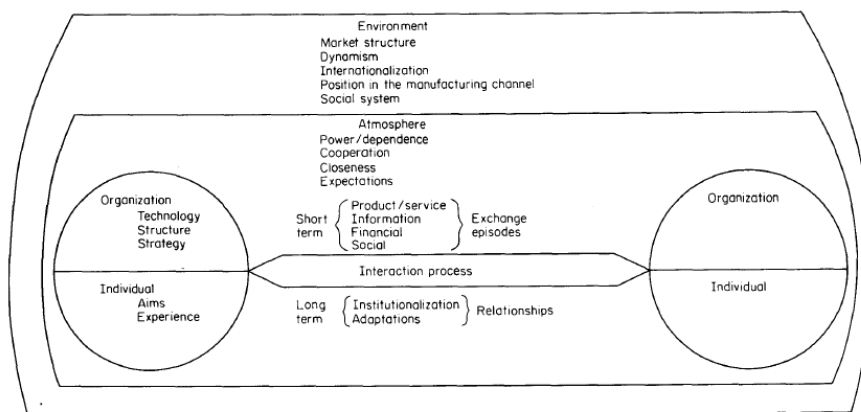

Figure 1: The Interaction Model (Source: Håkansson 1982)

The Characteristics of Routines& Dynamics of Change

Business relationships have been characterised using both structural and processual characteristics (Håkansson and Snehota, 1995). They identify recurrent structural characteristics of relationships; that relationships are continuous, are complex, embody a form of symmetry using balanced resources and reflect forms of informal bonding. The recurrent processual characteristics included mutual adaptations as a prerequisite for developing relationships; that relationships are characterised by social interaction which includes both conflict and cooperation. The authors, citing Nelson & Winter (1982), note that *'while business relationships are often complex and informal, they tend to become institutionalised over time. Routines, explicit and implied rules of behaviour, and rituals in conduct emerge... The routines that emerge help in coping with the complex needs to coordinate the individual activities within the relationship'*(p.10).

The authors' description manages to combine characteristics of continual change in inter-organisational routines and the role actors play in influencing that change. They also highlighted a linkage between the interplay of a structural characteristic of informality, in the face of formalising artifacts i.e. contracts, with a process characteristic of mutual adaptations. The *'social interactions'* and actor bonds are presented as conflicting with what might have been perceived as 'machine like' relationships (p.10). So in the context of stable institutionalised relationships mutual adaptations resulting in change were actually acknowledged. Informal characteristics could also impact on the structural nature of

interaction processes.More recently explicit calls for incorporating elements of evolutionary economics, i.e. routines theory, into the Markets-as-Networks research tradition have been made so as to *'enrich'*the study of *'the dynamics of change within inter-firm relationships and networks'*(Brennan, 2006). Brennan notes that while the structural characteristics of business relationships have been explored the processual characteristics, eluded to by Håkansson and Snehota (1995), have largely been ignored, due possibly to an underestimation of the significance of the nature of business-to-business interactions (Brennan, 2006 p.833). Using evolutionary economics i.e. routines theory he argues could be used to support efforts to find a *'coherent endogenous theory of chnage within inter-organisational relationships'*(p.836).

This paper advocates for utilising routines theory, from evolutionary economics, to better understandbusiness-to-business interaction as called for (Brennan, 2006) and thus broadening the discussion beyond that of structure alone to considering the structure-process duality (Farjoun, 2010). While it is interesting to note that the structural and processual characteristics of business relationshipsdescribed preceded, yet is supported by,subsequently published seminal sources on routines(Feldman, 2000, Feldman and Pentland, 2003).

The Market-as-Networks Perspective of Routines &Artifacts in Business Interactions

Some of the discussions in relation to artifacts in the Markets-as-Networks literature has tended to focus more on the role technology plays in the context of understanding the *'texture of interdependencies'*between two organisations(Håkansson and Snehota, 1995). These interdependencies include the role of knowledge, technology, social relations, administrative routines & systems and legal ties providing the basis of competence. For example administrative systems and routineswere described as *'rules and norms in the context of a business enterprise that impose some activities to be carried out; meetings are held, papers and documents are `processed' to comply with business practice'*(p15).It would seem thatroutines were described as objective and thus obvious processes of an administrative nature that are necessary evils requiring completion to safeguard interdependencies.Ongoing changes in booking systems, tour operation and quality assurance were described as having unintended 'consequences' implying a need to safe guard and manage the interdependency(Håkansson and Snehota, 1995) so as to achieve stability. This represents just one perspective or school of thinking that suggests routines to be more stable and formalised.This appears to reflect a more rigid systems thinking type approach to routines, in the Market-as-Networks literature, rather than the more recent approach where routines would guide and contribute managerial action through continuous change(Feldman, 2000).

The research of the IMP Group has not subsequently addressed in any comprehensive way the role played by artifacts in the dyadic interaction of interdependent firms. While the interaction model focuses on the 'exchange' as the context for interaction the dyadic processesinclude and incorporate artifacts in different forms. As an extension of the current position taken on routines it is suggested in the Market-as-Networks literature that artifacts are 'processed', that they are the result of activities in processes i.e. manufacturing processes. Thus artifacts are tacitly treated as commodities with physical forms or as physical objects as outputs of the interaction process i.e. products for sale. Further study into the roleartifacts play and our understanding of how they influence exchange within routines would reveal a better understanding of business-to-business network relations.

In conclusion we take the more recently developed perspective that routines, including inter-organisational routines, whilestable in some respects may not be as formalised, as early sources in the Market-as-Networks tradition would suggest, and may be characterised by a sense of continuous change. As a consequence our perspective on artifacts is also expanded

beyond that of physical objects i.e. outputs from manufacturing. The next section expands on the theoretical foundation underpinning the treatment of artifacts in the empirical data.

Materiality in Artifacts &Imaginal Others

The question as to what constitutes an artifact in this context requires some attention. An artifact is formed when an object becomes adapted and stabilised through human and social interaction, often by means of mediating relationships and interactions.This paper considers two constructs, 'materiality'(Miller, 2005) and the dialogical construct of the 'imaginal other'(Tsoukas, 2009) to provide us with an insight into the processual and thus the dynamic role of artifacts in business-to-business interaction processes.

It is suggested that materiality within organisations involves the physical items such as chairs, tables and books;and the non-physical materials including electricity and a data network(Orlikowski, 2007). Miller (2005)offers a 'vulgar'definition of materiality as being simply a theory of artifacts.Developing on from this dichotomous view of artifacts the dynamic nature of theirrolehas caused much debate in conjunction with the idea of materiality. Ingold(2007) considers the concept of materiality as humans and non-humans collaborating with each other and their materials in order to go about their day-to-day lives. Using his example of holding a stone in one's hand, he discusses how working directly with the material object demonstrates how we engage with materials and thus give it 'materiality' as in its meaningfulness or it's 'thing-ness.' Therefore materiality appears to suggest tangibility with physical objects but that these objects may take a less traditional material i.e. physical form. This form may be represented through a virtual existence i.e. a webpage, blog or wiki. One cannot touch 'the material' of these things, but we know that they exist and are a representation of ourselves and of organisations.This position is supported by Orlikowski (2010)who provides an example by describing a group as a technological artifact, defining this as *"a bundle of material and symbol properties packaged in some socially recognisable form, such as hardware and software. These artifacts could include planning software, emails, shareware and social networking sites."*Ekbia (2009)offers a definition of digital artifactsas a way of collectively grouping such artifacts that despite having a non-physical form are still considered to have some level of materiality.In addition, Leonardi (2010)suggests that less obvious artifacts play essential roles within organisational interactions. He describes digital artifacts as 'having "material" properties, aspects, or features, we might safely say that what makes them "material" is that they provide capabilities that afford or constrain action'. An interesting parallel with routines theory might be drawn at this point as routines are said to provide capacities for action. This does not equate with a desired outcome relative to input but is analogous to a routine as a 'gene' (Nelson and Winter, 1982) that can have the capacities to produce an outcome (Hodgson, 2008, 2009).

The idea of the representation of ourselves and organisations in artifacts whether they are physical objects or less material in form can also be equated with a dialogical construct of the 'imaginal other'(Tsoukas, 2009). The author discusses artifacts as forming the basis of a dialogical process. One might consider a standard operating procedure (SOP) asa agreement between two organisations acting as a referencing point to guide and account (Feldman, 2000) for actions in the interaction process. Tsoukas' papercontinues by saying that *'dialogicality is at the heart of interaction.'* He describes three forms of dialogical and quasi-dialogical exchanges individuals may engage in: dialogical exchanges with real others; quasi-dialogical exchanges with imaginal others; and quasi-dialogical exchanges with artifacts.Dialogical exchanges with real others involves face-to-face dialogue. However individuals are never really alone, as they find themselves talking, arguing and responding to others, such as critics, friends, gods, their own consciousness, photographs, figures in their

dreams or in the media. This 'imaginal other' is a representation of a 'generalised other' such as 'the employer', 'the profession', 'the boss' or even 'the budget'. There is an argument that we can find representations of ourselves in these immaterial artifacts. As these are not represented in physical forms there is significant scope to address how their immateriality can impact on business-to-business interactions. This paper argues that it is hard to consider artifacts without acknowledging the dialogue or in this context the interaction process that is represented by an associated 'imaginal other'. We argue that this imaginal other is, inherently linked to the artifact itself. Tsoukas says that what is characteristic of artifacts, and by extension imaginal others, is their ability to carry knowledge as these epistemic objects are repositories of what actors focally know. This results in a form of stability but they also incorporate knowledge of which the actors are not focally aware of, hence they are open for further development so they serve at once as *'a materialised log of the making process'* (p167). This interestingly brings our discussion about materiality full circle as we identify firstly that physical objects can carry with them a different kind but no less important form of materiality in an associated imaginal other, and secondly that an imaginal other in the absence of any form of physicality can also organise, regulate, initiate and/or constrain patterns of activities.

Materiality Impacting on Interaction
While Hakansson&Snehota(1995) refer to artifacts as physical objects and outputs of a manufacturing process in the interaction process the Markets-as-Networks tradition appears not to consider artifacts in forms other than the physical material form. Research in a broader context of organisation studies has, until recently, also neglected the roles artifacts play in relation to action, patterns of activities and performance (D'Adderio, 2011). In the organisational routines literature the role artifacts play, and their processual characteristics, have only recently been considered (Pentland and Feldman, 2008) in guiding and accounting action (Feldman, 2000, 2003). The developments in these related fields could indeed 'enrich' ongoing research in the Markets-as-Networks tradition (Brennan, 2006). Research questions, fuelled by these interrelating fields might lead us to ask how the context of interdependencies, through the interaction process, is affected by the role of artifacts? How might shared artifacts in an inter-organisational setting organise, regulate, initiate and/or constrain patterns of activities that might otherwise lead to close complex and interdependent relations? How might the processual nature of artifacts and their materiality impact on interaction in an inter-organisational context? This paper illustrates how, through two distinct bodies of literature and theoretical traditions relating to artifacts can contribute to our understanding of the role artifacts play in the interaction process between two organisations. We utilise evidence from two cases to provide a conceptual foundation to reconcile and arrive at an updated theory of artifacts for the business-to-business interaction process. As there are similarities between the Market-as-Networks literature and broader Organisational Studies literature when describing processes,we also expand on the IMP approach to artifacts by considering a broader array of artifacts through the lens of 'materiality' and the lens of the dialogical construct of the 'imaginal other'. Materiality becomes a process through which we shape interactions between humans and the environment. We will further illustrate the distinctions between these bodies of literature by combining new ideas so as to enrich the description of business relationships from a Market-as-Networks perspective.

The Materiality of Artifacts in the Interaction Routine – Two Cases

This paper compares two distinct separate cases, both mediated by artifacts impacting on the interaction process. The first case reflects the university-industry interaction focusing on placement/internships as reflecting the interaction between a higher educational institution (HEI) and a leading pharmaceutical employer (Pharma A) in Dublin, Ireland. The data in this case concentrates on chosen routines with associated artifacts that have inductively come through the data. The second case focuses on a micro-organisation providing support for digital engagement with other arts organisations in Scotland. The organisation here known as Digi-Arts Scotland is a digital support firm providing services to organisations in the Arts Sector through webcasts, conferences, workshops, direct engagement and training opportunities using leading digital specialists. The data in this case concentrates on two roles of Digi-Arts Scotland; the firstas a mediator between consultants and arts organisations; and secondlyon the process, or routine, of running live webinars.

Pharma A: A University-Industry Case

Description of the Context

This case considered the placement/internship university-industry routine between a HEI based in Ireland and a leading pharmaceutical employer referred to a Pharma A. The management of the placement/internship routinerequires a commitment of resources from the HEI. A fulltime Placement Officer is assigned the role of recruiter and relationship builder with notable industry employers. Pharma A is a long standing employer with a number of years experience with the macro placement/internship routine. Data was collected from four student actors, their immediate day-to-day employers, and senior managers involved in negotiations with the HEI. The Placement Officer and Academic Head of Course were also interviewed and shadowed to collect data on the interaction process.

The placement/internship macro routines provided the context for the inter-organisational exchange. Pharma A is required to comply with the codes and ethical standards of the Irish Pharmaceutical Health Care Association (IPHA) which has the authority to review how ongoing projects are managed through unannounced site visits. This has guided Pharma A, in conjunction with its own internal codes and terms of practice to utilise various sub-routines such as the *'job bag process'*.While electronic versions of the job bag system are available, Pharma A utilised the paper envelope for tracking the progression of day-to-day marketing tasks. Strict controls for tracking activities was emphasised to new student actors as false marketing claims would breach ethical standards representing an approval/compliance sub-routine. The physical job bag artifact itself represented not only the marketing routine, but also the approval/compliance and sign off sub- routines which were all grounded in the macro compliance inter-organisational routine. IPHA codes in relation to marketing include the 'IPHA Code of Marketing Practice' and the 'IPHA Code of Standards of Advertising Practice for the Consumer Healthcare Industry'.

The HEI was also required to follow academic standards and proceduresin terms of mentoring, counselling and support to ensurethe macro placement/internship routine maintained quality standards even though what constitutes 'quality' remains an intensely debated point and representing a core quasi-dialogical exchange.

Student actors, new to the macro-routines and more importantly employer sub-routines, were guided by both academic and practice based routines which the data illustrate as guiding and accounting for their actions in preparation for, and while on placement.In the context of the macro inter-organisational routine a number of sub-routines were induced from the data. Within these sub-routines various artifacts were identified that actors used to guide or account for action (in varying degrees depending on how important those artifacts were)

within the interaction process.The following section will illustrate various different forms of routines and artifacts including their dialogical and processual characteristics resulting in a more comprehensive understanding of their impact on patterns of activities in the interaction process.

Findings &Analysis

The data was induced from the interviews and analytical memo writing was utilised to identify broad themes grounded in the data. Four notable routines with related artifacts were identified. The first two routines focus on physical objects as artifacts. The latter two routines placement more emphasis on artifacts as *'imaginal others'*(Tsoukas, 2009), representing a different form of materiality.

1. Logbook Signing Sub-Routine &Logbook Artifact: The logbook signing process representing the academic quality assurance (QA) sub-routine requiring employers to review student logbook entries. The logbook artifact was a booklet handed to every student on placement. Entries were important to capture the day-to-day pattern of activities of the student actors. This booklet was presented to employers on a weekly basis for signing so that employers could review student entries resulting in students being guided by academic expectations while also reflecting on immediateemployer requirements.

Thus the logbook artifact was used to guide the actions of both student and employer actors during the placement and HEI actors for QA purposes. Without the physical logbook itself guarantees of guiding the academic QA sub-routine might not have been met. According to the data that was provided (*NB Interview 1*) that without the sub-routine and related artifact dialogue between the student and employer actors would have diminished. This was the first example induced from the data of where a physical artifact directly supported and guided an inter-organisational routine.

*Discussion:*Here the routine is dependent on the existence of the physical artifact while the artifacts raison d'être was drawn from the routine itself. The interrelationship of the artifact and the routine raises a question in relation to action. As artifacts form a significant part and embody the routine what role does it play in pattern of activities that we can see in the interaction process?

2. The Job Bag Process (Sub-Routine) as Represented by Artifacts: A deeper description of the 'job bag process' as a project management sub-routine was sought. The sub-routine was sustained or support (or propped up) by a number of different artifacts including the physical job bag folder which was there for two main reasons;

- project management purposes – in accordance with marketing functional sub-routines
- approval, compliance and transparency purposes – supporting the IPHA approval/compliance sub-routine.

The need for transparency, as required by the industry body IPHA, was institutionalised in the hierarchical sign-off and approval sub-routines. The physical job bag folder itself was sectioned off into two compartments forconceptual and approval stages of the routine. The folder was used to including briefs, concepts for promotional items, mock-ups, and sign-off sheets, as physical artifacts. Various other artifacts could be physically placed in the folder so as to guide the actions of those working on the project sub-routine ensuring transparency and accountability.

Discussion: Whereas these artifacts guide actors they are also present due to the process itself. It appears they are both interdependent of each other i.e. a marketing brief is broadly irrelevant without the sub-routine, as the sub-routine can't progress without the brief to marketing agencies. As actors use these artifacts to guide their actions and behaviours

through the routine, it supports the assertion that artifacts have themselves a processual element and embody significant material influence on action in the interaction process with such organisations as IPHA and marketing agencies.

3. The Budget & Expenses Policy Routines: These intertwined sub-routines reflect decision making relating to accounting and financial patterns of activities. In Pharma A there was a requirement to devise a new expenses policy within an overall budgeting routine which was also changing due to the economic recession precipitating the review. The detail and content of artifacts were revised for claiming expenses. While actors engaged with the SAP accounting package and a budgetary artifact could be printed the budgetary routine did not have physical artifacts of the nature described in the previous two routines above. The budget artifact as a part of the process guides future decisions and actions and accounts for past behaviour and actions. Interestingly this artifact reflect the imaginal other i.e. what does it mean to make a decision in light of 'the budget'? The budget can become reified in the mind of the actor not unlike a physical artifact. The budget can be realised into a physical objecti.e a budgetary report and/or held possibly in a financial database/system. In the interview data *[PG Interview]* on the expense policy it became obvious that the expenses policy as a routine could manifest itself as an artifactual policy through forms and documents to be completed by the expenses applicant. The 'expenses claiming routine' was revised by altering present artifacts, necessary for the functioning of the routine framing the routine's development and resultant action. The differences between artifact and process can be illustrated with the following example;

- Expenses Policy –printed physical artifact - noun –results in dialogue WITH.
- Expenses Claiming Process - routine - verb - action WITHIN the routine.

Discussion: Here we see an example of artifacts that are not necessarily physical objects but too having material impact on action within the sub-routines.

4. Achieving Academic Credit & Academic Integrity: The placement officer's role appeared to be a confused role depending on the actors interviewed. The role altered from the perspective of the academic head from that of an administrative to that of an 'academic role' or 'lecturer role' as might have been perceived by student actors.This is interesting because it treats the administrative links/placement officer as a 'lecturer', as a member of the lecturing staff, which is different to the role that the officer would describe for herself.The placement officer perceived and described her role as that of an 'intermediary' and/or a 'recruitment firm'. This shifting perception of roles (which can be equated here as imaginal others–may lead to confused impacting on a routines ability to guide patterns of activities and action.

What constitutes 'academic integrity' maybe perceived in different ways by different actors but achieving integrity also guides actions and patterns of activities. While not a physical artifact the artifactual 'imaginal other' that achieving academic integrity can clearly guide or account for behaviour of the academic head, the student actors and the employers to a lesser extent who are guided by the confines of the academic output required by the student actors.

In addition the discussion on academic credit provides additional information as an imaginal other and guiding. One student actor *[NB Interviews]* raised the issue of academic credit inadvertently and illustrated how the students would not engage with an employer after the placement unless they were doing their dissertation research with the employer. This suggests that the need for 'academic credit' is what prompts engagement and as a part of the interaction process. With the imaginal other of 'academic credit' then the guiding nature of the imaginal other doesn't exist or is not as strong.

Discussion: The examples of budgetary and academic credit are both examples of routines with artifacts that may or may not appear in physical formats but have significant impact ton their ability to guidance action within the interaction process. They present what Tsoukas refers to as 'imaginal others' in which human actors converse with i.e. 'academic integrity' and 'the budget'. This dialogue with these imaginal others also results in action, and patterns of activities being carried out. It is these hidden or less obvious artifacts that human actors or 'others' converse with that result in clarity of guidance in the routines.

Digi-Arts Scotland: A Digital Artifact Case

Description of the Context

This case presents a study of Digi-Arts Scotland, a B2B micro-organisation which aims to improve digital delivery within the cultural sector in Scotland. Digi-Arts Scotland is a not-for-profit organisation set up as part of a programme for the creative sector offering audience development services to arts organisations that pay membership subscriptions. Digi-Arts Scotland also supports bids for funding under large programmes in the creative sector. Its overall aim is to enhance and shape the interactions, albeit network interactions, between arts organisations and their audiences.Arts organisations are small and medium size organisations, which often lack the expertise, knowledge and awareness of digital developments and confidence in embracing new media into their programming, marketing and developing relationships with audiences.Through government programmes, it has increasingly undertaken its activities by integrating digital needs, skills and knowledge through the processes of delivery via digital,and face to face activities.In turn Digi-Arts Scotland is funded by a number of public sector organisations specifically concerned with arts, cultural and digital skills development. The multiple stream of funding reinforces complex sets of relationships, with different accountabilities over different time periods. The programmes aim to:

- Support capacity building around skills, infrastructure, and knowledge in adopting digital technologies
- Address and reflect the further digital technology development needs of organisations with the capacity and interest to innovate and significantly enhance organisational sustainability through further integration of sophisticated digital technology
- Support the further organisational sustainability of those exploring progressive business models, or at a more advanced stage of developing creative content

These programmes and specific funded projects are expected to be innovative in devising services, and introducing digital technology. These programmes offer many benefits: cost savings; devising artistic programmes; effective gathering, managing and analysing box office data;creativity a capacity to address policy targets of broad social engagement more effectively. Digi-Arts Scotland was followed over a period of 12 months. Data collection included regular depth interviews with the development officer actor, attendance at webinar events, direct observation of a board meeting and focus group with actors from involved arts organisations. We analysed the organisation's digital resources and activities within their online interactive online environment, and observed their social media interactions on Twitter and Facebook. In this case study we focus on two main activities of the organisation i.e. Digi-Arts, the allocation of funding routine for consultancy projects, and the co-ordination routine of live webinar events for the creative sector.

Findings and Analysis

1.Application for Consultancy Funding Routine: Creative Scotland released an open call for funding for consultancy to improve digital services within arts organisations. This could

include improving technical skills, building websites, online sales, organisation development and strategic development and social media skills. Arts organisations created a business case to explain why they should be allocated funding. There was a two tiered system for allocating funding; the proposals with the clearest vision was offered five days of consultancy and given 'partner' status. Less well developed proposals were offered a half day of funding and given 'associate' status. From the 84 original applications 55 were selected.The business case involved completing a pro-forma, with a very limited amount of space (maximum 100 words per question).In the focus group, one of the associates commented on the pro-formaartifact and the routinethat,*"At this point it was a really creative idea so sitting down with a pro-forma doesn't inspire a creative environment. You need to start with a blank canvas."*In an interview with the Development Officer for Digi-Arts Scotland she stated that *"The associates were cheesed off, as they were not getting the money, but we had to explain that you are missing the point, what we are offering is valuable. It was just that your business case was not clear enough."* A focus group with Associates after the project finished revealed that some organisations felt that it *"might have been useful to know what were priorities up front, this might have helped us shape our application."*Another associate added *" [as an arts organisation] we are used to being rejected... when we found out that some of the other projects were really similar and had been awarded funding it would have been nice to have more transparency why some got supported and others didn't."* The associates suggested that*"a little bit of consultancy up front helps you articulate."*

To complete their project the consultant and the arts organisation had to complete a technology audit of the organisation. The arts organisations were encouraged to fill in the technology audit at the beginning of the project as a means of signposting their consultant with their ideas and requirements, making it clear what knowledge, skills and resources were already in place within their organisation. The purpose of this routine and artifact would therefore be to inform the related decision making routine and become a live document that followed the project. For the consultant this was an essential document to complete as it had to be submitted with their final invoice. In the focus group one of the associates complained that *"The IT audit – you did kind of feel you had to do it. I didn't really feel that we got benefit from it."* It proved very difficult for the Development Officer to persuade organisations to submit their completed technology audits.Speaking a year after the project ended she said, *"I was emailing some organisations begging them to fill it in so that their consultant could get paid... eventually consultants would ask 'can you just pay me please, it's been 8 months', and I would have to pay them."*

These proposal documents could be considered to be artifacts as they were developed through discussions within the organisation and external parties. At every interaction between the consultant and the organisation the document changed slightly and became a record of how the project progressed. The material outputs from the consultancy work, were things that would assist in organisational change, such as a new website, an App, improved social media, and a better ticketing system. One focus group participant stated *"I tended to enjoy the implementation of the (box office) system, the seeing that come together and take shape and looking at functionality that we are going to have, about to launch... is our highlight."*

Discussion: Here the creation and development of two documents, the business case and the technology audit, are 'central' to the process of implementation. Each document started as a blank pro-forma and developed into an artifact through interactions between Digi-Arts Scotland, the arts organisation, the consultant and the funders. Here the concept of materiality becomes important. Three outputs from the consultancy process here often took a non-material form. The technology audit form was not perceived as being central to the process and thus having less material impact on action within the interaction process.

Each output was an artifact which represented organisational change. However the artifacts became meaningless without some form of materiality, whereby staff within organisations would need to interact with the new system. It is not for example enough to have a Facebook and Twitter page if it is not regularly updated with information that is meaningful to customers and stakeholders. Likewise, the technology audit artifact is only meaningful to the organisation and consultant if it is completed in full, and can be used as a means of demonstrating improvement in the systems.The material and non-material outputs from the consultancy project should be useful as a means of materialising the collaboration between the humans, the artifacts and the technologies.

2. The Process of Running a Webinar: Digi-Arts carried out a series of road shows across Scotland, each with the aim of enhancing digital knowledge within the creative sector. These road shows were publicised through their Facebook and Twitter sites, on their own website and sent to their email list. Participants were invited to attend either face-to-face, or online via a live webcast. Each road show was free to attend and was also recorded and made available to access on their website after the event. One focus group participant stated *"I loved the day in Stirling – really inspirational, loved the programme, wide examples of how people are implementing strategies, breakout stuff great and opportunity to pick someone's brain at lunch. Lots of depth where needed and lots of generalised stuff."* Viewers of the live streaming were able to interact with the presenters and each other via a live chat feature, moderated by a member of Digi-Arts staff. One member of the focus group stated that *"the seminars that I attended (either online or in person) gave me a wider access to people with specialist knowledge and hints, tips, ideas. Even the online chat... people were sending links and so on. Someone would say something in the room, someone else online withdisagree and would say what they think was a better idea."*
The ability to attend online was hugely beneficial to many people as it allowed them to participate without having to leave the office. One participant stated that *"being able to go online and either attend the event or realise that it was not the right level and switch off."* The ability to choose whether to attend online or in person, or use the online on-demand service gave participants the flexibility to chose, and thus engage as many people as possible. There were issues when Digi-Arts first started hosting these events such as holding them at locations that did not have large enough bandwidth to allow live video streaming, or insufficient technology capabilities to run the event.
The fact that the events were free to attend led to problems where people would book a place then decide not to turn up. At some events there was a 50% non-attendance rate. To combat this Digi-Arts Scotland introduced a small booking fee to cover catering costs, refundable to those who attended the event. The Development Officer explained: *"This became a total pain, as I need to collect in the money, and then I need to process all of the refunds back to the people, but we couldn't keep going like this. We had so much food left over, and to be honest it just didn't look good for us having all these empty seats at events."*
*Discussion:*The organisation of these events was a way of bringing together interested parties simultaneously through an actual and virtual event designed to enhance knowledge exchange. Each of the artifacts created was made available both physically, in a live setting, and online through a live feed with interactive chat. A video of the event was then made available on the website, accessible at any time. This shows multiple interactions between people, artifacts and technology. It is how people engage with this that gives it its materiality, its meaningfulness. The artifacts therefore guide action. Applying for a place at a road show and paying the refundable deposit implies that the individual will attend the event. Making the event available through a live webinar encourages more people to attend, not only in a traditional physical form. Having a recorded version available online gives people the

opportunity to interact with and contribute to the digital artifact at a later date, through submitting comments on the website.

Discussion

Introduction

The literature associated with the broader study artifacts and routines has developed in recent years (D'Adderio, 2011) and this provides us with an opportunity to reconsider their roles within the industrial marketing paradigm. The two cases provide a backdrop to two key constructs used to explain the role of artifacts. The construct of 'materiality' (Ingold, 2007, Miller, 2005) in organisation studies and the 'imaginal other'(Tsoukas, 2009) from dialogical theory are used here to build a theoretically rich description of the role artifacts play in what might be considered a dynamic business-to-business interaction process. The two cases presented here were selected as they illustrate various different forms of artifacts and their material role within routines including inter-organisational processes that would be of particular interest to the interaction model advocated in the Markets-as-Networks tradition.

Materiality in Relation to Physical Objects as Artifacts

In the Pharma A case we can see how physical artifacts, sometimes referred to as objects, such as the logbook and the job bag folder can play such an influential role in guiding the pattern of activities in the interaction process. The job bag folder and logbook artifact are physical objects that are interdependent with the routine they are most closely associated with. The presence of 'academic credit' and a 'budget' is also presented as artifacts as they too influence and guide the pattern of activities in their respective routines. The difference here is that they do not have a physical presence that one might expect and have an 'imaginal other' quality that initiates dialogue. The Digi-Arts Scotland case focuses its attention on the funding application routine and the activity of running webinars for arts organisations and the relevant inter-organisational interactions these present. This case focuses its attention more on the theoretical discussion of how materiality can be used to describe the nature in which artifacts can guide the patterns of activities in the interaction process. The following discussion focuses on how materiality and imaginal others can in union provide a rich interpretation of the role of artifacts in business-to-business interactions. The cases presented here highlight the presence of previously overlooked or unobserved artifacts with different material forms. This paper highlights this gap by claiming there are unconsidered artifacts in inter-organisational interactions that are less obvious that guide patterns of activities and that have not been fully incorporated into the IMP tradition.

Materiality in Relation Non-Physical Artifacts

The artifacts that do not reflect physical objects might be grouped into three groupings. These include; artifacts as 'imaginal others'; processual artifacts and digital artifacts. These three types of 'artifacts' represent the main focus of this paper whose goals is to illustrate the presence of artifacts that guide action and interaction in business-to-business settings in unseen ways, or in less obvious ways to physical artifacts as objects described in early 'materiality' literature.

*1.Artifacts as 'Imaginal Others':*This constructs is taken from Tsoukas' work on dialogue (Tsoukas, 2009). While treating artifacts and 'imaginal others' as separate quasi-dialogical processes on further inspection the line dividing the two might not be as clear as you might think. While there might be an argument for understanding materiality as 'representativeness' i.e. clear to the actor and or represented in a way that it is clearly observed, artifacts as imaginal others are certainly not obvious, as not having physical materiality, to all actors in a business-to-business context. These artifacts as 'imaginal others' may not be fully understood

by a detached objective researcher especially as previous research only focused its output on the action or interaction with physical objects. Researchers and other actors in the business-to-business interaction (as in the interaction model) cannot possibly visualise the effect imaginal artifact as perceived by the other actors unless a process of interaction (including dialogue) occurs to find the common ground. The material effect of 'the budget' or the 'budgetary process' provides an obvious example for many practitioners. The pattern of actions guided by 'academic integrity' might be less obvious. What does this mean for 'materiality' then when the artifact is 'imaginal' in nature but guides action and interaction? How does this context contribute to questions about our understanding of business-to-business interaction at all stage of the buyer-seller relationship as outlined by Ford (1982)

The difference between the routines on academic integrity and the budgetary routine is that achieving academic integrity routine is a routine that is integral to the macro placement routine but has less obvious physical artifacts in the context of a macro placement/internship routine. The physical artifact that is 'the budget' can be printed off however the 'budgetary sub-routine' can survive in the absence of a physical budget artifact. This is unlike the presence of the job bag folder, the logbook artifact or the pro-formawhich draws on and contributes to the meaning of the routines they are immediately connected with. The relation to 'academic integrity' and guidance toward achieving 'academic credit' can be described as imaginal others in which actors engage in a dialogue.Reification of 'imaginal other artifacts' into 'real' artifacts is an important aspect relating to clarity of the interaction process as a routine. As an artifact it is real or 'material' in context but it was an 'imaginary other' context to it as well. This artifact 'the budget' also has a process based aspect to it as in the 'budgetary process' - both the imaginal other artifact and sub-routine are connected in driving action and patterns of activities in the interaction process. The theories used here seem to be able to handle the complexity of what might be going on and an adequate explanation can be found within the Feldman/Tsoukas theories alone. However the perspective can be enriched even further if we take a look at how the theory of materiality can provide an additional and distinct perspective on the role of artifacts in the interaction process.

2. Processual Artifacts: Artifacts in business-to-business processes have processual characteristics to them that might not be obvious in the literature. For example 'the budget' whether in its material printed form or remaining in its digital form is a core artifacts in the 'budgetary' process or routine. The process of budgeting confers meaning on artifacts and artifacts support the processual nature of the routine they are connected to. Artifacts would have different meaning outside the routine and the routine might well not produce patterns of activities without artifacts. The argument here is that the processual characteristic of an artifact has a 'guiding' influence(Feldman, 2000, Feldman, 2003). It might well be argued that the processual characteristics associated with artifacts in routines result in a'*material representativeness'*.

3. Digital Artifacts as Immateriality: The ever more prevalent digital artifacts move our thinking away from that rigid materiality represented by physicality i.e. the job bag folder, pro-forma documents, logbook etc. How digital artifacts as reflected in the Digi-Arts case also have a role in action, performance and interaction even though not fully considered in the early materiality and Markets-as-Network discourses (Ekbia, 2009). The artifact (digital or otherwise) shouldn't be considered as an isolated objector isolated event as this only represents a narrow perspective of its role and meaning in context. Indeed it is this papers contention that artifacts are only represented; having representative characteristics in physical form of the true artifact. The construct of the imaginal other provides us with a way of

considering the way an artifact can speak to the actors and how that artifact can guide action and patterns of activities that might otherwise go overlooking in the business-to-business interaction process.

The construct of materiality can thus be used to move the discussion from the description of the role of a physical artifact toward the purpose in which an actor puts an artifact to use.Materiality provides an alternative but relatable lens that would aid us in our understanding of artifacts and their role in organising. Whereas this paper arrives at the same conclusion it does so through a different route. By using artifacts in dialogue and artifacts in process, focusing on the processual nature of the artifactthis paper illustrates how artifacts through dialogue i.e. the imaginal other can lead to action. This action by its very nature can confer on the artifact 'materiality' as it serves a significant purpose for the actor.

This literature review considers the updated role of artifacts beyond what was considered in earlier IMP literature. The treatment in this paper is beyond the rigid material nature of artifacts toward the less and confused materiality of digital artifacts (in Digi-Arts's Case) and the quasi processual characteristics of artifacts and imaginal others as artifacts (Pharma A Case).This literature review illustrates how two distinct bodies of literature can both separately contribute to our understanding of artifacts in the interaction process between two organisations. The next step illustrates how these two bodies of literature can contribute to each other and be reconciled toward a theory of artifacts in interacting / inter-organisational processes.

Relationships between Artifacts & Routines

Both the logbook signing and the job bag sub-routines have supporting artifacts guiding action and patterns of activities. The logbook signing sub-routine and the job bag sub-routine illustrate inter-organisational interactions connecting many actors. The artifacts used here are physical objects used by multiple actors resulting in multiple perceptions of routine guidance or a common shared understanding of routine guidance.

This illustrates how physical material artifacts can guide, from a bottom-up perspective, patterns of activities of multiple actors across simultaneously occurring routines i.e. the job bag folder itself played a part in the interaction process inherent to many routines at the same time. The physical logbook played different purposes from the perspective of different actors illustrating the potential complexities in the interaction process as linked to this one artifact.

Can we comment on the quality of the business-to-business interaction process while comparing these two sub-routines? It would appear that in both cases the existence of the physical artifacts is inextricably linked to the sub-routines themselves i.e. a form of interdependence. Neither the artifact has purpose nor the routine function without the corresponding artifacts in both cases above.It might appear that interaction process as routines (or sub-routines) is as minimum aided by the presence of artifacts and/or at, maximum cannot function without them. There are clear implications here for the Markets-as-Networks perspective on the interaction model if more evidence supporting the interdependent nature of the routine and artifact can be illustrated.One of the key understandings we can draw on is that routines including artifacts of varying degrees of materiality are interlinked with associated routines. In the cases above it is clear how contexts reflect multiple routines that occur at the same time and have a 'nested'nature.

Conclusion

The literature suggests that the relevance or significance of the artifact to the interaction process must be taken into account. So if we consider the routines, including subjectively perceived routines, that form the basis of the interaction process a full understanding of those routines cannot be achieved without considering the role of artifacts. Connecting artifacts and

materiality in the context of routines has been referred to in early IMP literature however there is a gap in move evolved IMP literature as it has failed to update the role of artifacts, of various material forms, as contributing to interdependencies in business-to-business interaction(Brennan, 2006). The IMP tradition has failed to consider in any systematic way artifacts alone but also artifacts of an immaterial or imaginal nature.

This paper brings together similar ideas from two bodies of literature; materiality and routines theory. The first is the idea of materiality of artifacts that do not take a physical form. The second body of literature is that of the processual nature of artifacts that may or may not have a physical form as represented by the construct of the imaginal other. By combining these two bodies of literature we gain a more comprehensive understanding of business-to-business interactions and the effect artifacts have on these long term close and complex relationships. By combining these bodies of literature using two distinctly different cases we have illustrated the rich nature of materiality and its linkage with artifactual dialogue. The implication for this is to develop a more robust methodological and analytical tool for appreciating the role artifacts play in business-to-business processes.

This paper acknowledges the juxtaposition present in two dualities (Farjoun, 2010). Håkansson and Snehota(1995)reference to the structural characteristic of 'informality' juxtaposed with formal artifacts such as contracts (p.8) i.e. the artifactual duality, suggests that the not only physical objects impact on the structural component of business relationships. Secondly this paper focuses attention on the processual nature of the 'routinization' of relationships. The juxtaposition of continuous 'mutual adaptations' and stable, often rigid 'institutionalised' (Ford, 1984, Ford, 1993) of business relationships suggests a change-stability duality.

Managerial Relevance

In furthering this discussion by addressing what is managerially relevant we can point managers involved in business-to-business relationships to address and appreciate how visible material artifacts and less obvious unseen artifacts can influence how relationships play out, are un-seemingly altered or enhanced by interactions guiding by unseen artifactual processes.The empirical data illustrate how artifacts mediating interactions can be used to guide actions that allocate resources. This research illustrates how artifacts have processual qualities, as materials and, which those undertaking exchanges are more or less aware of and more less able to adapt to in terms of materiality. Thus by researching the materiality of artifacts we can learn more about the nature of action and interaction in these relationships. By developing a theory of artifactual interaction, based on exchange, we can learn more about the resultant action. The role of materials and materiality are explored to provide additional conceptual underpinnings.These two cases illustrated the three types of non-physical artifacts listed above as well as material or physical objects. The digital nature of the artifacts, processual characteristics of artifacts and imginal characteristic of artifacts are shown in the two cases representing different environments. These two cases illustrate the 'scale' of treatment of materiality?These two cases illustrate the different roles played by artifacts.These two cases also illustrate different inter-organisational processes and routines and how the materiality of artifacts can be explored in the Markets-as-Networks tradition.Can the process of interaction be enriched by the artifacts that are developed and are in use by the actors that cross the inter-organisational divide? The artifacts they encountered and used in this context reveal interesting facets about the interactions and exchange process between these two organisations ostensibly in a business-to-business relationship. The artifacts used and created as an output of this interaction and exchange form the basis of guiding and managing an inter-organisational relationship.By looking at the interaction process through the lens of materiality and the processual nature of artifacts affords us the ability of looking at

action in the context of the interaction process that is initiated by both artifacts and routines, the relationship of artifacts and routines and the impact they bring to action. By considering materiality in the context of action it reveals a broader perspective on the types of artifacts that can guide action within routines.

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