A BUSINESS MODEL ARCHITECTURE: OBSERVATION PROBLEMS AND SOLUTIONS IN MODELLING BUSINESSES AND THEIR NETWORKS

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ABSTRACT

This study uses the Hierarchy Theory concepts of criteria, grain and extent, together with the concept of mutual value exchange, to construct an architectural model of the relationship between any two members of a network. These dyadic architectures can be assembled into a business model architecture that can be used to analyse the 'health' of the network, to support management or automation and to predict sustainability. This business model architecture theoretically develops the business model literature and the linked area of business process modelling and it produces a practical insight into the developing area of orchestrating networked businesses. An analysis of a network of organisations that produce Information, Advice and Guidance services for job seekers is used to illustrate the use of the model. The analysis produces theoretical implications about the relationship between modeller, model and subject as well as practical management implications for the manager as modeller and contrasting inter-organisational perspectives.

Keywords: business model architecture, Hierarchy Theory, specification and scalar emergence, perception, orchestrated business networks, careers guidance services.

INTRODUCTION

Models of businesses are an important subject for managers and researchers because they are a powerful tool for *managing* the entities that they model. For example *business process models* can be used to facilitate human understanding and communication; to support process improvement; to support process management; to automate process guidance; and to automate execution support (Curtis et al, 1992). Another model of a business is a *business model*. A recent study by Ostwalder et al repprted a surge in occurrences of the term 'business model' in the academic journals of the Business Source Premier database (2005). In their study the first occurrences of the term appeared in 1957 and 1960 and its frequency remained in single digits until it rose sharply through the nineties and early part of the twenty first century. Business process models are not the same as business models since business models describe *what* value is generated and offered whereas business process models describe *how* this is done (Gordijn et al, 2000a). Models of businesses are an abstraction of the complex socio-technical systems that we call businesses. Well constructed business process models preserve the salient characteristics and inter-relationships of the business to be managed or studied by managers and researchers (Shaw et al, 2007a). The proper construction of a model reduces the complexity of the subject modelled from the boundedly rational modeller's perspective. This is especially fortunate because the complexity of businesses has increased with the introduction of information and communications technologies (ICTs), outsourcing, globalisation and the associated rethinking of how firms can operate. Certainly ICTs enable individuals and firms to relate together and organise in more complex forms, like networked organisations which then presents more complex business modelling challenges.

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The current 'business model literature' mostly lacks a theoretical basis (Porter, 2001; Hedman and Kalling, 2003) and uses many different definitions of the term (Hedman and Kalling, 2003; Pateli and Giaglis, 2004; Osterwalder et al, 2005). Pateli and Giaglis call for structuring and codification of the area and suggest a framework for analysing business models (2004). Also business model literature is concerned with firm-level analysis when managers are increasingly concerned with additional network levels such as supply chain management and B2B network orchestration (Shaw 2007b). The most sophisticated theoretical model in the recent business model literature is Hedman and Kalling's (2003). They have *assembled* a set of theoretical constructs from different disciplines and used them as a basis for their component model of business models. This is a significant development because each component is theoretically supported by a robust foundation in the literature. However, their model does not theoretically justify the choice of components and their inter-relations are purely superficial links that do not theoretically unify the model.

Here I use the concept of value flow system (Shaw, 2007b) to construct a theoretically unified business model architecture of business models whose completeness is justified and whose inter-relations are fully explained. I also use Hiearchy Theory, Semiotics and Process Modelling concepts to theoretically explain the inter-relations of the model's components. The architecture acts across many organisational levels which enables it to model the business models of networks of firms as well as the business models of firms themselves. This paper contributes to both a theoretical development of business modelling and the linked area of business process modelling and it produces a practical insight into the developing area of networked businesses. First, I summarise some of the opportunities for developing Hedman and Kalling's model. Then I use concepts from the systems theoretical, theory building and business modelling literature to build such a business model architecture and then I describe my research approach. Then I introduce a case study of a specific network business and analyse it using the business model architecture that I have developed. Finally I discuss the novel analytical perspectives generated and the implications for managers and researchers.

LITERATURE REVIEW

Hedman and Kalling's model of business models

Hedman and Kalling's component model seeks to integrate diverse strategic perspectives such as resources, activities, firm structure, products and the market environment (2003). They try to do this by using theoretical perspectives from strategy research, business model research and e-business research to generate a set of components for a business model (see Figure 1). But they do not theoretically integrate these components. Each component is supported by theory but the arrangement and connection of the components is not. This has two implications; firstly, there is no theoretical justification for the completeness of the model, i.e. there may be other components that could be added and there could be other levels that contain components, e.g. components that model substitutes and compliments and sub-component constructs like those within the offering component (C3) and the resources component (C5). Secondly, the model does not describe how the components interrelate below a certain level of theoretical granularity. The relations between the components, what Hedman and Kalling call 'causal inter-relations' and 'causalities', are only described in terms of causes produced by one component and affects upon another component. The actual causal mechanism is not described or explained in the model and so it does not model how change is transmitted between the numbered components or why this is so.
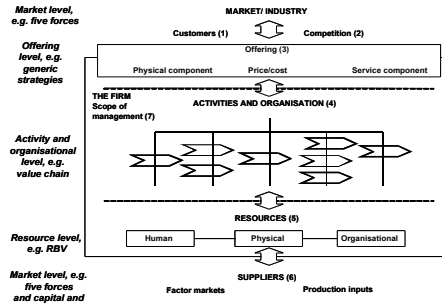
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Figure 1: Hedman and Kalling's component model of a business model (2003).

Hedman and Kalling implicitly acknowledge the systemic nature of a business when they discuss the interconnectness of a business, e.g. improvements that do not actually save money, or increase profits, because excess staff are not made redundant or excess safety stock is not reduced (ibid). But their assembly of components does not explicitly model businesses as *systems* because they do not *theoretically* model the relationships between their model's components. Business models that are based upon *systems theoretical* concepts need not suffer from this minimum theoretical granularity below which they cannot model. Also, business models that are based upon *systems theoretical* concepts can be proven as *theoretically complete*, i.e. the components that constitute the model can be theoretically justified, and so can the arrangement of the model's components.

Analysing the theory in Hedman and Kalling's model

Theories consist of "what" – the variables, constructs and concepts that describe the phenomenon of interest; "how" – the ways that they relate to each other; and "why" - the reasons for existence of the "what" and their relationships of "how" (Whetten, 1989; Sutton and Staw, 1995). Thus theories are two-level conceptual systems with the upper level describing the conceptual elements and *how* they interrelate and with the lower level describing *why* this is so. Conceptual models that are not 'based' upon theories do not contain lower level explanations for the upper level description. Also, this two-level system is recursive. The lower level "why" concepts are themselves explained by another, even lower, level of underlying "why" concepts until some level is reached that the theorist labels as *axiomatic*. This also applies to academic articles and other conceptual systems that are boundedly rational (Simon, 1997), i.e. they are limited in their conceptual modelling capacity by, for example, a maximum paper length. So called axiomatic concepts may actually be further decomposed in other academics papers or other disciplines. The components of Hedman and Kalling's model (2003) are based upon axiomatic concepts from several disciplines and this separation in the reference disciplines has led to a lack of *theoretical linking* between in the components of their theory. As well as deep explanations of the relationships between its components the model also lacks a justification of completeness at the component level (Sutton and Staw, 1995). Hedman and Kalling do describe the numbered components (C) of their model (see Figure 1) as linking 'causally', i.e. the activities and organisation of a firm (C4) produce an offering (C3) which is bought by customers (C1) and competes with competitors'(C2). But their model does not contain a theoretical explanation of this causal link.

As far as articulating theory in terms of its constructs, laws of interaction (relationships), state space and event space (Weber, 2003) Hedman and Kalling's model lacks depth and detail. An example of this problem is where the model relates both customers (C1) and competition (C2) to offering (C3). These are relations between semantically different concepts. An offering is not dimensionally the same construct as either a customer or a competitor. Empirically we can see that there is some link between the model's components

but the model neither describes nor explains what it is. The model does not include substitutes so it is *incomplete*. Also the model does not explain why *particular* customers (C1) would be attracted to *particular* offerings (C3) only that offerings are made up of configurations of physical and service components and have prices and costs. The model does not explain why a particular offering (C3) would be produced by particular configurations of the activities and organisation of a firm (C4) only that they are organised in a value chain. The same limitations in explanation also apply to the other links that are denoted by block arrows in Figure 1, that link (C4) and (C5) and also (C5) and (C6). Thus the components of the model themselves each have lower theoretical levels that explain why the components are present in the model but not how the components inter-relate.

In summary, Hedman and Kalling's model is the most theoretically sophisticated model that is available because of its theoretical basis in several reference disciplines but it has no underlying theoretical basis that (i) justifies the conceptual completeness, (ii) deeply explains its internal causal structure (iii) deeply explains its external connections to its environment, i.e. the structural relationship between a firm's business model and the overall business model of the network that it functions within, and (iv) deeply explains how and why managers can develop it according to internal and external drivers. Next I develop an approach to modelling business models that is based upon Hiearchy Theory, Process Modelling Theory and Semiotics and I unify concepts from these disciplines with the concept of *value*.

A theoretical approach to modelling business models

In the business model literature *value* is commonly used to mean *economic value* and it is a core business modelling construct (Gordijin et al, 2000a; Gordijin et al, 2000b; Gordijin and Akkermans, 2001, Ostenwalder et al, 2005). The definition of *economic value* is how much a service is worth to someone else relative to other options (OED, 2008). This could be paraphrased as 'value is defined by the *observer*' and it allows me to introduce the concept of *valuer perspective*. Different actors make different valuations upon the same service because they have different *uses* for the same service, i.e. they have different service-needs (Shaw, 2007b). Service-needs are requirements generated by a downstream process for the output of an upstream process and for a good *fit* between the two processes the service and the service-need should be *symmetrical*. Using a systems theoretical perspective, the justification for this concept of 'service symmetry' is that process composition joins two lower level processes into a single meta-process, i.e. a single higher level process system. As a firm enacts business processes that are designed to realise its own business goals it produces service-needs. This also applies to products but in this paper we only refer to services. *The value of a supplier's service is produced by a customer's processes (by a customer's process needs) and not by a supplier's processes.* This is because value depends upon perspective and it is only as a component in the customer's process that a supplier's service can be valued. A supplier only *directly* values the payment it receives in return. Pateli and Gaglais mention values flows but do not define them except to say that they are usually difficult to express in monetary terms (2004). Parolini's Value Net methodology is a strategic tool for competitive systems analysis but it does not use systems theoretical concepts that explore various inter-level phenomena (1999). Like Parolini, Shaw (2007b) conceptualises this system of interconnected services and service-needs as a *value flow system*. A value flow system is a model of a business that is based upon the concept of value exchange so a value flow system is a type of business model. In a value flow system the needs of the firm, its suppliers, customers and partners customers are inter-connected so as to mutually satisfy the different component firms in the network. A model of business models that describes such a value flow system (in terms of the multitude of services and service-needs of its component firms) has the power to explain why particular customers chose particular suppliers and particular services. This explanation would also be scalable

from the sub-firm, to the firm and then the network level because its axiomatic concept is the *service versus service-need fit* which is empirically measurable and theoretically describable on all levels.

The concepts of services and service-need production via business processes produce a rich theoretical description of the relationship between a customer and a supplier because, using Hedman and Kalling's components (2003), it links the business processes that a firm enacts in order to exist and persist (C4) to both the resources it consumes (C5) and its suppliers (C6), its offering (C3) and its customers (C1). A comparison of different suppliers' offerings from the *value perspective of a customer* (C1) explains the recruitment of any particular customer just as, from another actor's perspective, it explains the *choice* of any particular supplier (C6). A particular offering (C3) is produced by a particular configuration of the activities and organisation of a firm (C4). From the 'downstream' or 'customer end' perspective the configuration of input process is fully described by the service-needs of higher level, or 'down stream' processes. But from the perspective of a service suppler such higher level uses are unimaginable (unless they ask the customer) because they are *emergent* compositions of sub-processes. *Emergence* is a characteristic of systems and emergent phenomena are unknowable below the level that they emerge upon because the sub-elements that are composed into higher level elements can be composed in too many different ways for anyone to guess at before their composition (Checkland, 1999, p. 314; Salthe, 1985, p. 100; Allen and Starr, 1982, p. 267; Ahl and Allen, 1996, p. 146).

A customer and a supplier is value exchange system that is mediated by business processes and instantiated by specific services that fit specific service-needs. The services-needs are dependent upon whoever generates them, i.e. they are *observer-dependent*, and they are generated by both customers and suppliers since such systems support a mutual exchange of value. Furthermore, any customer has many customers and suppliers themselves, as does any supplier. So a value exchange system is a complex system, i.e. the system does not necessarily have large numbers of elements but the elements have many possible inter-relationships (Anderson, 1999; Ahl and Allen, 1996; Allen and Starr, 1982). Observer-dependence causes a complex system to appear different to different observers because the different observers sense different relationships. In lay terms this is called having a different 'perspective' or 'angle', in business process modelling terms this is called 'perspective' (Curtis et al, 1992) and in General Systems terms it is called a different 'level' (Wilby, 1994; Ahl and Allen, 1996; Allen and Starr, 1982; Salthe, 1985). All these examples of a need for decomposition and simplification are caused by the bounded rationally of human observers who lack the capacity to mentally model the immense combinations of inter-relationships in a complex system at one time. So they break up the system along natural architectural lines or surfaces. Next I introduce some systems architectures from Hierarchy Theory, an approach for modelling complex systems (Wilby, 1994; Ahl and Allen, 1996; Allen and Starr, 1982; Salthe, 1985), that could be used to decompose complex value systems into models. Hierarchy Theory was developed in biology (e.g. Salthe, 1985, 1991), ecology (e.g. Allen and Starr, 1982) and single firm management systems (e.g. Simon, 1973).

Scalar hierarchies and the specification hierarchies

Two different architectures of system hierarchy are the scalar hierarchy and the specification hierarchy (Salthe, 1991). A scalar hierarchy is a hierarchy of levels. It is an artefact of observation derived from the natural structures that are present in a complex system like a firm or a network of firms. Entities upon different system levels are only loosely coupled, which allows them to be modelled by an observer as though they are upon several *nearly-decomposable* levels (Simon, 1969). Scalar hierarchies are asymmetrical in that higher levels tend to have lower coupling intensities and lower natural frequencies and lower levels

have higher coupling intensities and higher natural frequencies (Wilby, 1994; Ahl and Allen, 1996; Allen and Starr, 1982; Salthe, 1985). Examples of scalar hierarchies are the organisational design of a firm from the CEO to the shop floor workers, [human-firm-network of firms], [leaf-branch-tree-forest] and [atom-cell-organ-human]. The levels are divided by natural regions of relatively low coupling intensity that appears to the observer-modeller as a system's architecture. In scalar hierarchies higher levels filter and constrain the behaviours of lower levels. Specification hierarchies also have inter-level asymmetries but the inter-level transmission of phenomena is fundamental to their nature and it is not filtered as in scalar hierarchies. Levels in scalar hierarchies are separated by magnitudes of spatiotemporal *scale* but levels of specification hierarchies are separated by magnitudes of *variety*. *Process stages* are a specification hierarchy with each stage specifying a progression of transformations of inputs into outputs (Salthe, 1991). Table 1 compares properties of scalar and specification hierarchies.

The concept of specification hierarchy can easily be applied to modelling a business process because the process is modelled into stages that progressively *specify* a final output. In this terminology each stage is *specified* by a service-need that is required for the process to continue. However, the concept of scalar hierarchies can be applied to processes as well. A simple example is the collection of sub-process that produce the sub-assemblies that are aggregated into the final assembly of a machine. Potential confusion is avoided if we use the concept of *observer* or *modeller*. A specification hierarchy is modelled from the perspective of one process *instance* as it *enacts*. A scalar hierarchy is modelled from a perspective that can observe many instances, e.g. in a process model or a business model. Moving between scalar levels involves a change in *frequency* and moving between specification levels involves a movement *through time* in the instance of a process.

Table 1.   **Contrasting scalar and specification hierarchies (based upon Salthe, 1991).**

Scalar hierarchy ('levels')	Specification hierarchy ('process stages')
Larger scale entities are *made up* of smaller scale processes. Level separation based upon degree of *aggregation*	Sequence of development from general to specific, a *process* of refinement. Stage separation is based upon degree of *specification*
Parts are nested within *emergent wholes*. Can be just organisationally nested, e.g. soldiers nested within a general's command	Nested stages represent *emergent orders* of greater or lesser specification
Higher level variables appear as constants to lower levels. They constrain lower levels.	Higher levels are more *defined* than lower levels.
Synchronic – scalar systems simultaneously exist on all their levels in different spatial and frequency locations	Diachronic – specification systems exist over time
Three levelled. Level 0 constrained by level 1, driven by level -1. Mostly *non-transitive*. The boundaries between levels block inter-level signals. Signals *attenuate* with distance between levels. Signals are two-way.	Two levelled. Level 1 specified from level 0. Inter-level relations are *one-way* and *epigenetic* "one stage is required in order to get to the next". Inter-level transmission is fundamental

Scalar and specification hierarchies are architectures for the system levels and process stages that in turn are the structure and behaviour of firms and networks of firms. Scalar

levels exist simultaneously in single instants and specification process stages occur serially through time. Scalar levels are differentiated by higher levels constraining and filtering the phenomena of lower levels. The stages of specification hierarchies are differentiated by process *options* such that the sum of a specification hierarchy is a full description of the transformation of raw material inputs into outputs. Both hierarchies exhibit emergence that does not allow higher level, or later stage, phenomena, to exist upon lower levels, or earlier stages. Higher scalar levels contain inter-relations of lower level elements that are separate on lower levels, e.g. a chamber of commerce will experience recessions but a single firm can only experience reduced sales because 'recession' is a concept that does not exist on the level of a single firm. Later specification stages contain the results of choices that were unforcastable in earlier stages because there were too many options, e.g. suppliers can never fully understand how customers use their products unless they ask.

As well as presenting architectures for breaking up complex systems so as to make managing them easier, these two hierarchies also represent opportunities for observation errors by the managers that use them to model problems. The modeller, i.e. the observer of a subject system, is also part of a wider observer-subject system. This is expanded by Semiotics, the Theory of Signs (Liu, 2000) to an observer-model-subject system (see Figure 2). In industry Business Process Management Systems are common examples of managers controlling real world system by using models (Shaw, 2007a, Shaw et al 2007, Shaw et al 2006). Including the modeller, or observer, allows the possibility that the process of observation may influence the modelling process. This is influence could come from several characteristics of the observer and the subject. Firstly, the observer and the subject may not be on the same scalar level and this applies to both *temporal* and *spatial* dimensions. Higher level concepts do not exist at lower levels because of *scalar emergence*, e.g. water molecules are not *wet* at the level of the molecule. When phenomena are transmitted from its originating scale to the human scale it is *distorted*. The scale of the observed phenomenon relative to the scale of the observer affects the observation process itself. Also, if the observer samples at the *same* scale as the observed phenomenon then the observer distorts the phenomenon because observer and subject become strongly coupled (Allen and Starr, 1982). An example of a same scale observer is a patient that is being observed by a psychiatrist that behaves differently than a patient on their own (ibid). A different scale observer example is a serial projection of discrete cinema projector images that are seen by a higher scale human as a single dynamic image (ibid). The lower frequency (higher level) human sampling frequency does not sense the gaps between the static film frames. This type of distortion can seriously affect experimental methodologies and is caused by reassembling several lower scale *samples* into a larger scale measurement (Wilby, 1994). The reassembly process itself may distort the phenomena samples. At the very least the observer's presence does so, if only because it is the observer that reassembles the phenomena, and to the observers internal reassembly plan at that. Also, the observer has to choose the *grain* and *extent* of their observation. The grain of observation is the minimum perceivable fineness of distinctions and the *extent* of observation is the maximum perceivable size of distinctions (Allen et al, 1984). The phenomena to be observed must be larger than the grain of the observation and smaller than the extent of observation or else it will not be successfully captured. This is the same as in experimental sample design and case study choice. In spatial scales an example of an unsuccessful choice of grain and extent is a fishing net that is too small for the big fish or one that has holes too large to catch small fish in. In temporal scales a example is the choice of frame frequency of old cowboy films that seemed to show the wagon wheels turning backwards because the time grain of the camera frames is not frequent enough. An error in the choice of extent here would be that the camera operator shoots the film before or after the wagon goes past the camera.

Secondly, in addition to scalar observation errors there are also potential specification observation errors due to *specification emergence*. Specification emergence is different to scalar emergence. Again higher level concepts do not exist at lower levels but in this case higher levels are later process stages and higher level concepts are option choices that are too varied to be forecast, e.g. the unforeseen uses of software by users that partly justifies beta testing in software development. The other part of the justification is the complexity of modern software itself.

Using a scalar hierarchy perspective, different firms exist on different levels of a network and different business phenomena exist at different levels, e.g. an orchestrator like Manchester United Football Club is concerned with emergent phenomena that do not exist at the level of a single partner in its network (Shaw 2007b). Using a specification hierarchy perspective, different firms may look for different phenomena because they have different histories. So they have different business processes and therefore different service-needs. Different service-needs mean that they value different services so they look for different phenomena and also measure phenomena in different ways. This means that observers will have different *observation criteria*, i.e. different firms with different markets, missions or strategic goals will have different interests. Difference *observation criteria* can introduce potential observation errors, e.g. two firms may fulfil slightly different service-needs which may suit subtly different types of customers. This is the justification for market segmentation. I have used the above concepts of criteria, grain and extent together with scalar and specification hierarchies and the notion of mutual value exchange in a value system to construct an architecture of the relationship between two value system elements (see Figure 2). Figure 2 shows a theoretical basis for the architecture of the value flows that join the members of a value flow system. The architecture can be used to analyse their 'health', to support management or automation and to predict sustainability.
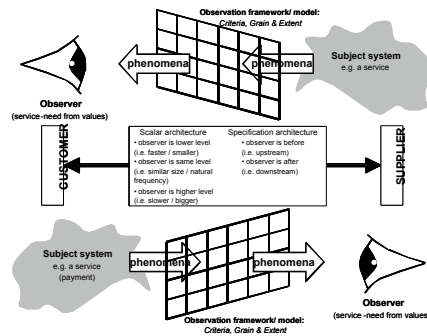

Figure 2: Architecture of the relationship between two value flow system elements.

In Figure 2 the observer or modeller is shown by an eye in the top and the bottom thirds. Phenomena from each subject (i.e. the affect of the service) are shown being transmitted from each subject (the customer and the supplier) to each observer because this is a model of mutual value exchange (e.g. a service for a payment) and value is only measured by the receiver. In a sense the supplier is the customer's customer for the payment and the reverse is true as well. Each service phenomenon is received and measured via each observer's observation framework. The observation framework is a model of what is needed by observers to meet their goals and it is designed according to each observer's observational design decisions about grain, extent and criteria. Using the three semiotic dimensions: (i) the semantic view is the link between the model and the subject that is modelled, (ii) the pragmatic view is the link between the observer and the model and (iii) the syntactic view is architecture of the model (Liu, 2000). The middle of Figure 2 represents the span of the different structural levels or process stages that separate the observers and the subjects. Figure 2 can be used to model of the relationships between all elements of the value system

on the network level, the firm level and lower levels down to the human level. Such a model of the value flows between network members enables the modeller to assess how sustainable the business model of the network or any firm in the network is. This architecture can used to check for errors in service production and reception as well as unmet service-needs and unrequired services

RESEARCH METHOD

This investigation includes a multi-actor as well as a multi-level study so it takes an interpretive stance, because of the subjective nature of human interaction. It iterates around a hermeneutic circle, between network and organisational level perspectives so as to consider an interdependent whole (Klein and Myers, 1999). The novelty of using hierarchy theoretical concepts in the inter-firm network domain points to a qualitative approach because the investigation is concerned with initial questions of 'how' and 'why' rather than of 'how many'. In in seeking to answer 'how' and 'why'-type questions, following Yin's recommendations (2003), the investigation uses a case study approach because it is concerned with contemporary phenomena, which I have no control over, of business relationships between many different firms from many different sectors. The use of a single case has external validity implications, that is, generalisation implications (Lee, 1989), but a single case is justified at the outset of theory generation (Benbasat et al., 1987) and although it may limit statistical generalisation is does not degrade analytic or theoretical generalisation (Robson, 2002). This is consistent with the theory building objectives of this study. I am concerned with dynamic phenomena so I have used different data collection methods and different sources (Eisenhardt, 1989). Over a 16 month period interviews ranged from 15-min informal conversations to semi-structured meetings and recorded and transcribed interviews. Interviews were with sub-contractors as well as a nextstep organisations' senior managers and the top team including the contracts manager, who manages the sub-contractors and organises sub-contractor networking meetings. Overall, I used triangulation to converge evidence, analysis and synthesis upon the same phenomena at the dyadic relationship level and at the network level. A very good relationship with the case participants also helped to reduce validity reactivity and increase trust as well as disclosure. Data sources included meeting notes, meeting transcriptions, telephone conversations, archival data, organisation reports and the website content of the different organisations involved.

NETWORK ANALYSIS USING A VALUE FLOW APPROACH

The case study network is a nextstep network which will be referred to as 'NS'. NS is one of 47 English not-for-profit organisations that are each called a 'nextstep' and that are contracted to provide the nextstep service in their local county. The nextstep service helps adults to develop to meet labour market needs via courses or training (NS Website, 2007). In 2000 Information, Advice and Guidance (IAG) partnerships were set up in England as part of the Government's lifelong learning agenda and from 2005 they were branded as 'nextstep' (NS Website, 2007, NS Contract Manager, 2007). NS holds several contracts and only one is the nextstep contract. The nextstep contract obliges NS to provide *an information service about skills, learning and work* to all adults aged 20 and above; and a more targeted advice service for those without a Level 2 qualification (i.e. five GCSEs at grades A* to C or the equivalent). Information, Advice and Guidance are three progressively more intense and specific interactions with clients from general information to advice in answer to questions and then in-depth guidance via an individual meeting (LSC, 2007c). The service that a client receives from the NS network could include, for example, advice on

preparing a CV, interview skills and services available during redundancy. NS contract holders also help adults with English as a second language and those with learning difficulties or disabilities. The contracts are funded by a budget controlled by the Learning and Skills Council (LSC) and are limited to England. Each contract is awarded by the head office of LSC and it is operationally managed by a contract manager from the local LSC office (nextstep stakeholder, 2008). NS consists of a management team, careers advisers, administrators, trainers and a marketing officer (NS overall manager, 2007).

The NS network is shown in Figure 3. The IAG service of the NS network is generally produced by NS' sub-contractors and consumed by clients although some nextstep organisations service clients directly as well as indirectly via sub-contractors. The IAG service guides the client through the process of moving from one careers stage to another. This can be as early as the initial occurrence of the idea for a change of job or career to as late as actually getting a new job. NS' network of sub-contractors guides clients through the initial search for information, the consideration of what paths to take and then they give directions and recommendations for courses or other requirements that will help the client on this journey. The funding requirements are that the client is 20 or above, below a certain level of qualification and living in the NS' county. NS and its sub-contractors also work with other employment, education, training, voluntary, trades union and community organisations (nextstep stakeholder, 2008). NS uses the nextstep contract as a *core* for other services which it funds via other contracts from different IAG funding organisations.

The value flow system for the NS' nextstep network is shown in Figure 4. The LSC contributes funding for the nextstep core contract and needs data on the number of clients helped and how they have been helped. NS sub-contractors provide IAG to clients and give operational and results data to NS in return; they need developmental support from NS in the areas of training to improve their service and reporting capabilities in addition to their inter sub-contractor communications and coordination. They also receive nextstep funding via NS. NS sub-contractors also collaborate with each other and non-NS clients to provide services that seek to realise their organisational objectives. NS needs the sub-contractors' data that describes how they have helped clients so that it can aggregate it and pass it onto the LSC in return for funding. In return NS channels funding to the sub-contractors and helps their organisational development. Other funders also provide funding to NS and the sub-contractor organisations for other IAG related services to clients in the county that are not covered by the nextstep core contract. Other funders also require some form of feedback of performance data as evidence of the successful use of this funding.
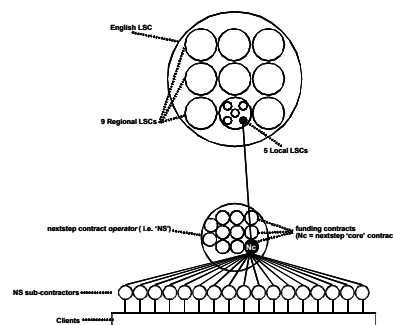

Figure 3: Elements of the NS network focusing upon the NS 'core' contract.
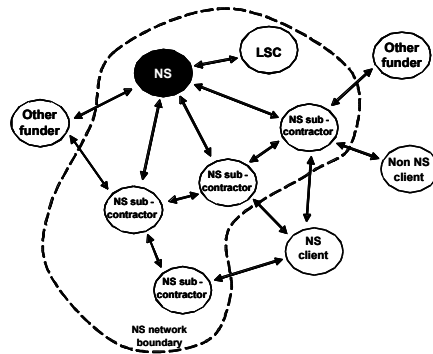
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Figure 4: Value flow system of a nextstep network.

Value flow analysis of NS' nextstep network using the value flow architecture

Next I will illustrate how a business can be modelled in a way that improves on Hedman and Kalling's approach (2003) by analysing the value flow system of the NS network in Figure 4 using the value flow architecture in Figure 2. I have divided my analysis into value flows across the network boundary (dashed line) and internal value flows. Due to space constraints I will focus upon the relationships, for value flows across the network boundary, between (i) the LSC and NS and (ii) NS sub-contractors and the clients. For internal value flows I will focus upon the relationships between NS and the sub-contractors. In keeping with the value flow architecture in Figure 2 I will highlight examples of 'good' and 'bad' fit from choices of observational grain, extent and criteria due to level differences in scalar and specification hierarchies. Examples will come from either end of the relationships.

- the relationship between the LSC and NS

From the LSC's perspective it funds the network's nexstep service to clients and requires data on the consumption and effects of that service. From NS' perspective the nextstep may only be one of several contracted services that it delivers and all funders require different results data. For example, some want to know the clients' National Insurance numbers, some require follow up interviews after different time periods to check the results of the service and some just require a measurement of client satisfaction. The LSC funds on an annual cycle but NS's work is continuous. For example, in a journey to employment a client may need several IAG interventions but the nextstep contract only pays for one. However, there is no LSC-level 'memory' between yearly cycles so clients can benefit form the nextstep service more than once as long as the interventions are in different financial years. This is particularly relevant for client stages that are on a frequency like 12 month long training courses.

- the relationship between NS sub-contractors and clients

The sub-contractors are funded according to the county geographical boundaries of the nextstep network that they are in and the educational level boundaries of the client. This may be irrelevant to a client who hears of an interesting course from a friend who lives nearby but in another county or is slightly less qualified. The different funding sources that some sub-contractors (and on another level NS) use provides diversity advantages in addition to extra money. Funding is usually designed for specific services so contracting from several funding sources allows sub-contractors to bundle several services together which from the client's perspective is perceived as help through subsequent stages rather than just one. From the client's perspective an IAG advice meeting is needed before and after each stage. For example before the client goes on a CV writing course the client needs help in deciding that this is the right course and after the course the client needs help in choosing the next

stage. NS sub-contractors also produce services for non-NS clients that are themed around their own particular charitable or organisational goals.

- the relationship between NS and sub-contractors

NS passes on reporting requirements from the LSC level to its sub-contractors e.g. NS requires its sub-contractors to give it data on serviced clients that it aggregates and processes for the LSC but this is only one type of data for one of several organisations that the sub-contractors consume funding from. Generally NS acts as a filter and translator between the LSC and its sub-contractors but for one new funding contract in a single county the LSC wanted to directly communicate with the sub-contractor's level. The LSC asked the counties NS to invite all its sub-contractors to a meeting but other than that it did not use the NS' experience of sub-contractor management to initiate this new project and this had some negative consequences. When it presented the new funding opportunity to the sub-contractors it presented the news very simplistically and some sub-contractors felt patronized. NS had a much better knowledge of the sub-contractors' understanding on the issues that were containing in this new project and would have communicated accordingly. The sub-contractors had very different degrees of understanding of the new projects' context and goals. Some were more experienced in this area than NS or any other organization at the presentation. Also, the LSC was not ready for the questions that this presentation stimulated from the sub-contractors about how they would be paid and so it was not ready to answer them. Furthermore the LSC in this example did not consult the NS about publicity material and produced a leaflet for clients with NS' address on it. This address was useless to clients because they would consume this new service at the sub-contractors' offices rather than the NS office. Finally, the LSC required that all the sub-contractors attend but for some their presence was irrelevant because their service and the new project were unrelated. These sub-contractors found this direct intervention by the LSC particularly irritating because *for them* the cost of transport and the time allocated to the event was significant.

Table 2: Two contrasting perspectives on grain, extent and criteria for each of the different relationships within the nextstep network.

	LSC (nextstep funder role)	Nextstep (NS)	Sub-contractor	Client
LSC (nextstep funder role)		*Grain*: LSC have local contract managers that connect the LSC to each nextstep. *Extent*: the LSC manages all the nexsteps. *Criteria*: LSC is interested in an organization that can manage and develop a network of sub-contractors on its behalf.	*Grain*: The presentation did not need to differentiate between sub-contractors. *Extent*: LSC's presentation reached all the sub-contractors. *Criteria*: The presentation was meant to *introduce* the new funding project.	*Grain*: Client IAG and follow-up data is secured. *Extent*: All leaflets had addresses [sc]. As many clients are given IAG as is possible within the funding. *Criteria*: LSC is interested in a set of IAG sessions and their affect on a client population.
Nextstep	*Grain*: NS connects to local LSC contract managers. *Extent*:		*Grain*: NS manages sub-contractors	*Grain*: sub-contractors pass data

(NS)	LSC holds client data for 1 year. *Criteria*: NS is interested in developing sub-contractors ability to guide clients through a whole job-finding process that may take years.		individually & together. *Extent*: NS manages all sub-contractors. *Criteria*: Different strengths of sub-contractors can be combined to meet a full portfolio of geographical, client-type and stage needs.	from client meetings to NS. *Extent*: all client meetings generate data. *Criteria*: NS is interested in fulfilling a 'mosaic' of contracts to generally help clients in the area.
Sub-contractor	*Grain*: LSC's presentation did not differentiate between sub-contactors' expertise & data needs. *Extent*: Some sub-contractors did not need to be there. *Criteria*: sub-contractors have organisational missions that focus on themes such as race, location and specific sets of client needs but the LSC did not differentiate between them and invited irrelevant sub-contractors.	*Grain*: NS manages sub-contractors individually & together. *Extent*: NS manages all sub-contractors. *Criteria*: Sub-contractors get funding, developmental help and better contact with other sub-contactors.		*Grain*: Clients have individual IAG meetings. *Extent*: Number of clients seen limited by funding. *Criteria*: Sub-contractors offer specific services due to their founding objectives, capabilities and location(s).
From Client	*Grain*: leaflets produced by the LSC did not differentiate between different meeting locations that a client would use. *Extent*: The LSC funds just one IAG session but a client needs several of them to serially connect stages in their job-finding process. *Criteria*: A client uses IAG meetings to serially connect stages in their job-finding process.	*Grain*: A client's individual IAG meeting is funded. *Extent*: A client is seen (if there is funding left). *Criteria*: A client uses IAG meetings to serially connect stages in their job-finding process.	*Grain*: A client has an individual IAG meeting with a sub-contractor and some other form of support. *Extent*: client is seen if there is funding left. *Criteria*: A client chooses a specific sub-contractor due to their specific needs, location or ethnicity.	

Table 2 examines the contrasting perspectives of the different relationships between LSC, NS, sub-contractors and clients using three examples: (a) the presentation of the introduction of a new funded service (that is in addition to the nextstep contract) directly from LSC to sub-contractors, (b) the clients' IAG meetings and the data that they generate and (c) the production and consumption of the nextstep service in general. (b) is a specific part of (c) and (a) is new service of the logical type as (c). Each cell examines a dyadic relationship *with* the column heading member *from* the perspective of the row heading member, e.g. the top right cell (client, LSC) is the LSC's perspective of its relationship with the client group. The contrast between the perspectives of two parties in each relationship can be seen by comparing diagonally opposite cells.

DISCUSSION

In my analysis the different perspectives are most obviously apparent in the greatly contrasting *criteria*, e.g. a client is interested in how any one relationship or meeting helps them to progress along a process that ends with a new job. Whereas the other members seem to view the clients as one group but to differing levels of granularity. The sub-contractor's perspective comes from its own developmental process and organisational goals, as do the other member's own perspectives, of themselves, and these also contrast with members on higher and lower scalar levels. The perspectives of the two sides of each relationship can also contrast in terms of *grain* and *extent*. In some relationships there is a fit between *grain*, e.g. when local LSC presence fits each local NS or when sub-contractors have individual IAG meetings with clients, but sometimes there is a contrast between the granularity of how one partner views the other, e.g. the LSC may not differentiate between sub-contractors or clients. Similarities and contrasts also exist for the *extent* of a dyadic relationship as viewed from the two partners. For example, the *extent* of funding may be problematic for a client who cannot be seen because the funding has been consumed. But a sub-contractor, especially one who's capacity to produce services is full, may perceive this funding extent as normal or even as planned.

In a progression from high level to low level, the LSC differentiates between clients the least, then NS sees more differences between clients, e.g. an IAG meeting may point to accessing another sub-contractor's services, and finally the sub-contractor actually meets them individually. However, only the client can perceive its route to a new job as a process. The other members just experience greater or lesser abstractions of collections of stages in clients' processes. The strongest contrast between the two ends of this dyadic system is between the processual perspective of the specification hierarchy that is used by clients consuming services and the structural perspective used by service producers. For example, clients are concerned with their serial progress towards their new career and job but the sub-contractors view them as a population of IAG and training events and they very different organisational goals. Similarly the sub-contractors' development and goal attainment is their reason for membership of the network but NS is concerned with fulfilment of the nextstep and other contracts and the LSC is concerned with improving the skills of England's workforce.

The sub-contractor's perspective of its own service-needs is *specificational* as it comes from its own developmental process and organisational goals and this also applies to the other members. Also members' perspectives of the services produced by other members are *specificational* for the same reason. But a member's perspective of the organisational *arrangement* of other members is *scalar* because they are perceived to exist upon higher and lower hierarchical levels. This duality of perception, where services and service-needs that the member directly experiences are *specificational* and indirect experiences are scalar, can be explained by the concept of experience. The *indirect experiences are actually models* and external models are arranged in a scalar structure. Where as internal models of one's own process through time are arranged in a specification structure. Only service-needs and service are 'directly' experienced and so not actually modelled. With more intervening scalar organisational levels between the observer and the subject, e.g. between the LSC and a client, then the more scalar abstraction occurs. This is scalar emergence. With more intervening specification levels between the observer and the subject, e.g. between a client at the start of a career change process and the eventual new job, then the more alternative routes there are. This choice of routes is a specification emergence. Looking in the opposite temporal direction of this personal internal process model, an increase in specification levels between the observer and the subject, e.g. when reviewing a memory, would not necessarily be a barrier to recollection because specification emergence only acts in the direction of causality.

CONCLUSIONS AND IMPLICATIONS

The customer and the supplier in each relationship and each transaction are both the observer and the subject of each other. They each have other customers and other suppliers. Appropriate choices of grain and extent are needed when the observer and the subject are on different value flow system levels. From a scalar level perspective this is means that higher level service producers should differentiate between the requirements of lower level service consumers, e.g. LSC to sub-contractors, and, in terms of grain and extent, they should include all *appropriate* potential customers. Also, lower level service producers should remove irrelevant details from submissions to higher level service consumers, e.g. sub-contractors to NS. From a specification stage perspective, this explains why service producers can never completely forecast all the uses of a service even when the service consumer is on a lower organisational level of their own firm. Appropriate choices of criteria are needed in order to *fit* each producer's service with consumer's specific service-need. A scalar model of the customer's place in the network can be used to organise which potential consumers to forecast a service-need for. The service-need can then be used to forecast a service design using a specification model. The scalar model focuses mangers on specific potential consumers and the specification model then enables them to forecast specific needs.

My architecture for modelling the business models (Figure 2), which is operationalised in Table 2, can be used to model the value flow system of a network. The model describes the sum of the service-needs and services in the network and enables the modeller to check for *fit* at different levels and stages and according to different criteria. If the services and service-needs of the different members at all levels and stages of a subject network fit then the network has a healthy business model. If some particular service-needs are not met by current services then the model has highlighted changes that are required. If some particular services are not consumed by current service-needs then again the model has highlighted changes that are required. Networks of firms and their internal and external customers are assemblies of human goals, values and the requirements that they generate as time passes and people move along their personal journeys. These requirements are dynamic and are emergent when people inter-relate in organisations on different scales. The sustainability of any firm or network or organisation depends upon the success of that organisational design in the mutual satisfaction of the interrelated people. This model enables the organisational design of services that *should* satisfy service-needs, via business processes, to be checked at different scales and frequencies. The ability to check such systems of mutual satisfaction is based upon the modelling of the values of the people involved at different scales and frequencies.

I have developed an architecture for modelling the business models of firms and networks of firms that is based upon the notions of the observer-model-subject system, the value system and two different system architectures. This model explains why particular customers choose particular suppliers and particular services. The model uses the concept of *value* and it has an underlying theoretical basis from Hierarchy Theory, Process Modelling Theory and Semiotics that (i) justifies its conceptual completeness, (ii) explains its internal causal structure (iii) explains its external connections to its environment, i.e. the structural relationship between a firm's business model and the overall business model of the network that it functions within, and (iv) explains how and why managers can develop it according to internal and external drivers.

By introducing the concepts of scalar hierarchy, specification hierarchy and value to this domain I am able to describe and explain *why* any particular *configuration* of a process occurs and *how* it occurs. Also the concepts of scale and specification hierarchies allow this

theoretical model to be used at any level from the level of one business process to the level of an inter-firm network. One limitation of this study is that clients do not pay for these services and this points to further research on networks whose services consumers also fund the service. Another limitation is that it is a single case and single sector study.

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