

**TRANSVECTION PROCESSES AND RESOURCES IN
BUSINESS NETWORKS: CONCEPTUAL
DEVELOPMENT AND EMPIRICAL ILLUSTRATION**

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Abstract

This paper outlines a potential development of the network approach to business-to-business marketing based on Alderson's theoretical works. The purpose is to assess the possible contribution to the development of models of markets-as-networks by integrating concepts of the Aldersonian framework. The conceptual analysis shows that business networks can be conceptualized as complex exchange systems comprising processes of sorting in terms of assigning and assorting, processes of transformation in form, time, space, and ownership, along with five principal types of resources: conglomerate resources, composite resources, assorted resources, transformation outputs, and assortments. The Aldersonian concepts of transformation in form, time and place are supplemented with the notion of transformation in ownership. The notion of exchange is incorporated in this transformation of ownership, and the concept of resources and processes in exchange systems are analyzed and exemplified using a case illustration. In closing the discussion, implications for further research are indicated.

1 Introduction

Since its inception in the early 1980s the interaction approach (Hallén, 1982; Håkansson, 1982; Hägg & Johanson, 1982) has gained increased attention among scholars of business-to-business marketing. The ideas of the interaction approach, further developed into the network approach (e.g., Anderson, Håkansson, & Johanson, 1994; Håkansson, 1987; Håkansson & Snehota, 1989, 1995; Johanson & Mattsson, 1987, 1994), are now a major contender to traditional marketing approaches for understanding business-to-business markets (e.g., Alajoutsijärvi, Eriksson & Tikkanen, 2001; Gadde, Huemer & Håkansson, 2003; Håkansson & Ford, 2002; McLoughlin & Horan, 2002; Tikkanen, 1998; Wilkinson & Young, 2002).

Exchange relationships are a core concept of the network approach (Anderson, Håkansson, & Johanson, 1994; Blankenburg Holm, Eriksson, & Johanson, 1999). Interaction is channelled through these relationships (e.g., Håkansson, 1982) whereby networks of connected relationships are formed (Blankenburg & Johanson, 1992; Easton & Araujo, 1994; Håkansson & Snehota, 1995). The business networks are seen to be constituted by activity links, resource ties, and actor bonds (Håkansson & Johanson, 1992; Håkansson & Snehota, 1995), characterised by adaptation and knowledge relationships (Dubois, 1998; Håkansson, 1987) in business-to-business markets. Furthermore, research on how change arises (Håkansson & Johanson, 1993; Håkansson & Snehota, 1995) and is spread in a network (Anderson, Havila, Andersen, & Halinen, 1998; Halinen, Salmi, & Havila, 1999) and on the paradoxical nature of networks (Håkansson & Ford, 2002), produces a complex image of business-to-business markets.

The works mentioned above contribute to this picture of business-to-business markets as networks of connected exchange relationships. The network is per definition without a center and without boundaries. It stretches out in all directions and interaction processes may occur horizontally, vertically, diagonally or in any metaphorical dimension. The very notion

of interaction implies bilateral and mutual flows, and the notion of networks adds on multilateralism, multidimensionality, and flows in many directions.

Here we focus on the *directions* of the transformations and exchanges of resources in the network. In network-based studies (i.e., research adopting a markets-as-networks view of business-to-business markets) this is largely overlooked. There is an underlying idea of symmetry in the interaction concept (“back and forth”), whereas the concept of direction is asymmetric (“from and to”). Some network processes are fundamentally asymmetric, e.g., the transformation of resources, whereas others such as social exchange are fundamentally symmetric. The notion of exchange may indeed seem as the archetype of symmetry, but monetary-based product exchange (as opposed to barter) is also asymmetric in the sense that physical resources flow one way and financial ones another. Previous marketing research based on the supplier-dominated perspective may have overemphasized this unidirectionality, whereas the network approach may have overemphasized bilateralism and multidirectionality. This is the problem that motivates the present paper.

By applying the concept of organized behavioral exchange systems as coined by Alderson and Cox (1948) and reinterpreted by Bagozzi (1974) we conceptualise business networks as comprising sorting processes (assorting and assigning) and transformation processes (Alderson, 1957, 1958). In this way we recognize a direction of the shaping of resources, thereby suggesting an enrichment of the network approach. Only limited attention has been given to this problem. Exceptions are the works of Hulthén (2002) and Gadde and Hulthén (2003), who use Alderson’s framework to develop an understanding of variety in distribution networks. In the same vein, but with another focus, we explore possible cross fertilisations between the network approach and Alderson’s framework when related to the problem of the direction of the shaping of resources through interaction in a business network.

As recognized by Easton and Araujo (1994), exchange theory with a base in Alderson's framework underlies the network approach. The purpose of this paper is to refine that base and to explore the consequences of such an explication of the links between Alderson's framework and the network approach.

2 Exchange Systems

Although the notion of organized behavior systems originates in Alderson and Cox (1948, p. 151), it is most commonly attributed to the works of Richard Bagozzi (e.g., Bagozzi, 1974). Bagozzi departs from an analysis of the concept of exchange and concludes that what he calls "mixed exchange" comprises both utilitarian and social components (Bagozzi, 1975). Drawing on the Aldersonian notion of organized behavior systems (Alderson & Cox, 1948) as defined by Alderson and Martin (1965, p. 125), Bagozzi introduces the idea of an organized behavioral system of exchange as the contextual environment of exchange processes (Bagozzi, 1974). These organized behavioral systems of exchange emphasize the social and institutional context of mixed market exchange processes. For the sake of simplicity we call them "exchange systems" from here on.¹

In these exchange systems, the social context of market exchange is emphasized in a way that resembles the network approach. However, oversocializing (as well as undersocializing) business-to-business markets should be avoided (Granovetter, 1985) by keeping to the social embeddedness of economic behaviour. A balanced view is needed to develop our understanding of business-to-business markets as networks (e.g., Håkansson & Snehota, 1995) and this can be achieved by adopting the notion of exchange systems comprising processes of mixed exchanges.

¹ In fact, Bagozzi himself uses the term "exchange systems" as short for the more cumbersome *organized behavioral system of exchanges* (Bagozzi, 1974, p. 77).

However, Bagozzi does not explicitly relate exchange systems to the framework of Alderson. By developing the notion of exchange systems as comprising sorting processes (assorting and assigning) and transformation processes, we re-attach to the framework of Alderson. This gives us a notion of an exchange system consisting of sorting and transformation processes representing what Alderson calls transvections (Alderson, 1965; Alderson & Martin, 1965). These processes are important ingredients in buyer-seller exchange relationships also when conceptualised in a network approach (e.g., Gadde & Hultén, 2003; Hulthén, 2002).

3 A Differentiated View on Resources in Exchange Systems

In applying Alderson's theoretical framework (Alderson, 1957, 1958, 1965; Alderson & Martin, 1965) in relation to the network approach, dyadic buyer-seller exchange relationships are seen as including processes of assorting and assigning.

We recognize in the writings of Snehota (1990) that what is exchanged is seen as “a set of resource elements” (p. 62). These resources may take different shapes depending on their potential to satisfy particular expectations and needs (Alderson, 1957). According to Alderson and Martin (1965, p. 122), *conglomerate resources* are sets of natural resources as they occur in a state of nature, and their relationships to human needs and activities are only random and have little meaning (Alderson, 1958, pp. 15-16). The marketing process is seen as the continuous operation of transforming such conglomerate resources ultimately into meaningful assortments in the hands of consumers (Alderson, 1958; Alderson & Martin, 1965, p. 122). It is through transvections (sortings and transformations) that heterogeneous resources that are not related to human needs are transformed into meaningful *assortments*. Assortments are congenial in the sense that they satisfy related needs (Alderson, 1958). Consumption is seen as the use of resources in order to provide “need satisfaction against future contingencies”

(Snehota, 1990, p. 59). The assortment thus possesses a need satisfying potency created by transvections consisting of interlinked transformations and sortings.

The exchange of resources through transactions involves a series of sortings, i.e., reclassification of resources by breaking down heterogeneous sets into homogeneous subsets (assigning) and by drawing new items from homogeneous subsets to form heterogeneous sets or assortments (assorting) (Alderson, 1957; Alderson & Martin 1965, p.126). As mentioned above, Alderson uses the term conglomerate resources to denote large collections of resource elements, as they appear in physical and social nature in unprocessed form. Such conglomerate resources usually include varied resource elements, e.g. natural resources such as oil, wood, etc., and specific human knowledge and skills as well. Without processing, these resources cannot be meaningfully related to human needs. They cannot directly satisfy expectations in human activities. Through sortings, such conglomerate resources can be reorganized and linked to other resources through transformations (Alderson & Martin, 1965, p. 123). Ultimately, *assorted resources* are acquired by the final customer who uses these to create their assortments for consumption.

Along the path from conglomerate to assortments for final consumption the resources pass through sorting processes, which relate to resource transformation and resource exchange.

4 A model of transvection processes and resources

A model of transvection processes and resources in an exchange system is summarized in figure 1. A resource transforming and resource exchanging entity (“business entity A” in figure 1) may obtain some conglomerate resources. Using already acquired resources the business entity subjects these conglomerate resources to an initial transformation, which produces a transformation output in the form of a new heterogeneous set of resources. In the

transformation process, the previously acquired resources become linked to other resources in the business entity's resource collection. Through a sorting process the heterogeneous output is assigned to homogeneous subsets (composite resources), which may enter into new transformations with regard to form, time or place (Alderson & Martin, 1965).

In order to exchange resources, the business entity must sort its output by a process of assigning (Alderson & Martin, 1965, p. 123), i.e., reclassifying the heterogeneous output set of its resource transformation into meaningful subsets. In this particular moment of the transvection, the resources used in the preceding transformation have enabled the creation of a new set extracted from the process. This is what we call *composite resources*, and it is the result of the assigning process. The composite resource is the offer that the business entity takes to market and offers its customers. It has an instrumental character as it is a resource which through exchange and assorting by the customer is made meaningful for the next step in the transvection.

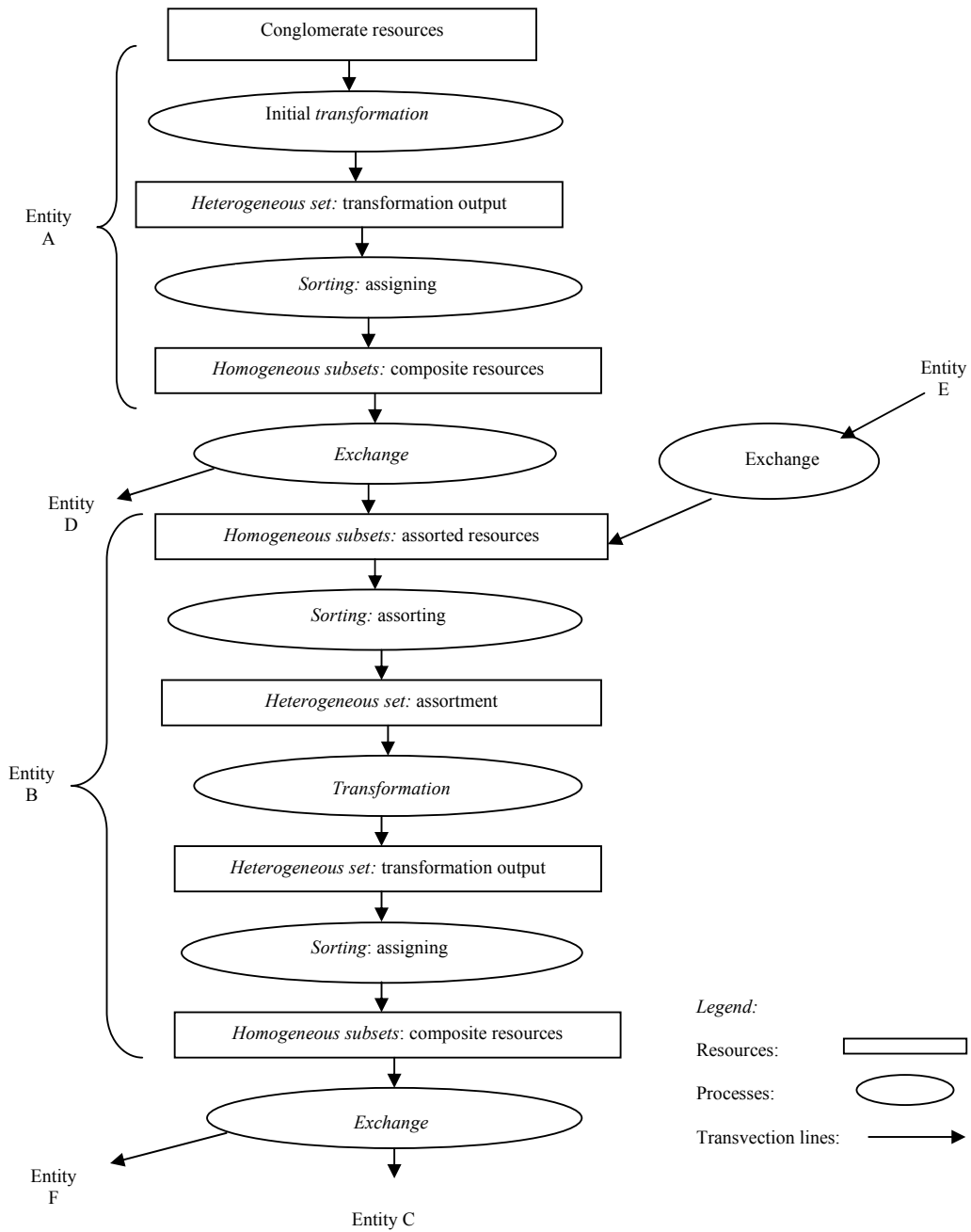
The sorting processes of the supplier and the customer are normally linked to each other by transformation processes in time and place (e.g., storing and transportation) but also by a process involving change in ownership. This specific transformation process we will term exchange. The change in ownership is also noticed by Gadde and Hultén (2003) and Hulthén (2002) and is recognized by Cox and Goodman already in 1956 as being one of the important processes that converge in building a house (Cox & Goodman, 1956, pp. 41-42). The composite resource is transferred from business entity A to another business entity B in exchange of another resource, usually money or any monetary equivalent.

From a customer's point of view another sorting process is undertaken, termed selecting or assorting (Alderson & Martin, 1965, p.123), by which the customer relates the resources to its previously held resource collection. The assorting process implies that an assortment of meaningful heterogeneity is created by drawing units from various homogeneous subsets.

Thus, the assorting process means the reclassification of resources from subsets to a meaningful set. This assortment of newly obtained resources constitutes the input for a subsequent transformation process; thus the assorting process enables the subsequent transformation process.

Business entity B deploys a process of assorting to reclassify the composite resources acquired from business unit A and other actors in order to make these resources part of its own unique resource collection as an assortment suited for its own transformation processes. Many sequential transformation processes may occur within the same business unit, each of them followed by sortings in the form of assignments, i.e., breaking down the heterogeneous transformation output into homogeneous subsets suitable for the next transformation step. (These multiple transformation sequences are not indicated in figure 1). In the transformation processes the assortments of obtained resources become linked to a different set of resource collections. After the transformation process, in order to enable exchange of resources, business entity B deploys an assigning process to create a new subset made up of composite resources from the set of previously acquired and now further transformed resources. This composite resource is offered to buyers anew and is transferred to them through exchange processes, and the cycle of assorting, transforming, assigning, and exchanging may start again.

Figure 1. *Processes and Resources in Business Exchange*



Thus, a transvection can be said to comprise three basic processes: assorting, transforming, and assigning, in that order within a cycle of resource manipulation. When

repeated, this cycle transforms heterogeneity with less relevance for use into meaningful heterogeneity. See table 1.

Table 1. *Three Principal Processes and four Sub-Processes in Transvections*

Process Type		Characteristics
Assorting		The process of organizing a homogeneous subset of resources into a heterogeneous set.
Assigning		The process of organizing a heterogeneous set of resources into a homogeneous subset. Selection is a special case of assigning.
Transforming	Form	The manipulation of the resource in terms of reshaping its form.
	Time	The manipulation of the resource by linking it to various points in time.
	Place	The manipulation of the resource by linking it to various points in space through transportation.
	Ownership	The manipulation of the resource by linking it to various owners through a process of exchange.

By adding ownership as a special type of transformation (i.e., change of ownership through a process of exchange) in addition to the sub-processes of transformation in form, place, and time, we obtain four processes for the conceptualization of interaction in business networks. Our conceptualization of transformation in ownership emphasizes the notion of exchange of resources between two business entities across boundaries, which distinguishes it from the three previously identified types of transformations. Thus, an exchange system comprises four types of transformation processes (form, place, time, and ownership) and two types of sortings processes (assigning and assorting). In the exchange system, the sorting processes are linked to the transformation processes as depicted by Alderson, where each transformation is followed by a sorting, and vice versa (Alderson & Martin, 1965; Gadde & Hultén, 2003; Hulthén, 2002). We contribute with a more detailed account of transvections as we can distinguish a special case of transformation, namely that of transfer of ownership of a

resource. This process is emphasized in exchange between two entities and can indeed occur *only* in such exchange, thus giving the exchange its special character.

Such an exchange system can be seen as a business network. The system comprises many transvections that connect in some points by sharing some common business entities for transformation of resources (e.g., Hulthén, 2002). This is indicated in figure 1 as entities E, D, and F connect to the transvection including entities A, B, and C, hence representing other transvections (not shown in figure 1) that converge with the one depicted in figure 1.

By defining the output of both the transformation and sorting processes we can also make a distinction between five principal types of resources (see table 2), and a notion of consciously acting subjects, the business entities.

Table 2. *Five Resource Types*

Resource type	Characteristics
Conglomerate resources	As occurring in nature, usually heterogeneous and complex, and with only a random relationship to human needs and activity
Transformation output	A set of resources made homogeneous through a transformation process but being heterogeneous from the point of view of subsequent use
Composite resources	Homogeneous subsets of transformation output assigned by a supplier so as to be available and meaningful for the next step in the transvection
Assorted resources	Homogeneous subsets of composite resources selected by a customer to fit into further processing
Assortments	Resources for use or final consumption that have been assorted into a heterogeneous set which is congenial for its purpose with respect to human expectations

The business entities can obtain four principal roles in the transvection: those of “buyer”, “seller”, “consumer”, and “producer”. Each business entity may fulfill one or several of these roles from time to time. Exchange takes place as the sorting perspective of the “seller” (assigning) meets the sorting perspective of the “buyer” (assorting). Assigning in terms of selling and assorting in terms of buying relate sorting and exchange, but sorting can

also be an internal process within business units connecting transformation stages. Transformed resources are used and exchanged by business entities, eventually resulting in meaningfully heterogeneous assortments readily available for consumption.

5 Case Illustration: The RackCo Exchange System

RackCo is a small business firm in southern Sweden manufacturing pallet rackings to be used in warehouses to store palletized goods. In 2003 the firm had an annual turnover of approximately 15 million euros and employed 70 people. One of its many products is a pallet racking used to store warehouse and transportation pallets of standard dimensions. These pallets can hold many kinds of goods and the rackings are sold to many customers throughout Scandinavia and occasionally also to continental Europe. RackCo uses several of resellers to access the market and sometimes it also sells directly to large corporations in need of rackings.

Figure 2. *The RackCo Exchange System*



Figure 2 shows the resource manipulation processes in the RackCo exchange system using the model from figure 1. First, the conglomerate resource in terms of raw steel is

subjected to an initial transformation at the steel mill of SSAB, which processes the raw steel in a transformation process in order to give it certain qualities (“grades”), and turn it into various types of structural steel. The structural steel is the transformation output.

In the assigning process, SSAB assigns the structural steel into a subset called commercial steel under the brand name Weldom that is supposed to associate to the qualities of that particular type of structural steel. Weldom provides yield strengths of up to 1100 N/mm² and is a common construction steel for demanding constructions. It is easy to weld and thus suitable for RackCo.

SSAB sells Weldom to many customers, amongst them Scania, which obtains Weldom through exchange with SSAB. In figure 2 this is indicated by the transvection line diverging from the one in focus in this example.

RackCo obtains Weldom commercial steel through its exchange with SSAB and uses it for constructing beams and gables that are the main components of pallet rackings. However, RackCo cannot immediately transform the steel into the components of pallet rackings, because the firm also needs other assorted resources. Thus RackCo – among many other inputs – obtains lacquer powder used to paint the rackings through an exchange process with a supplier of such equipment (*Lacquer*). Here another transvection line converges with the main transvection shown in figure 2.

The Weldom steel and the lacquer powder are two homogeneous subsets of resources (together with several other subsets omitted in this example). These two subsets constitute assorted resources for RackCo, which are subjected to a sorting process (specifically: assorting) to organize them in accord with RackCo’s other assorted resources. The outcome is a heterogeneous set of resources in terms of an assortment, in this case the RackCo production facility.

From here on the resources (Weldox commercial steel, lacquer powder, production knowledge, welding equipment, welding wire, etc.) are ready for transformation into pallet racking. In our example, we enhance the transformation of Weldox commercial steel into beams and gables by the use of the RackCo production facility.

The beams and gables are heterogeneous sets of resources and are the transformation output of the process of transformation of RackCo. These beams and gables are subjected to a sorting process (specifically: assignment) in which they are turned into the commercial product known as the “City Racking”. The City Racking is a homogeneous subset of RackCo’s heterogeneous set of resources and is the composite resource that RackCo offers to the market. This composite resource is exchanged for money in a process of exchange with other entities such as PalletCo and EAB. In the latter case we have another example of a diverging transvection line.

From the RackCo case illustration we can identify the three principal process categories, the four sub-processes of transformation, and the five principal types of resources. This is summarized in table 3.

Table 3. *Transvection processes with Case Illustration*

Process Type		Characteristics	Case Illustration
Assorting		The process of organizing a homogeneous subset of resources into a heterogeneous set.	Organizing rackings production by RackCo
Assigning		The process of organizing a heterogeneous set of resources into a homogeneous subset.	Turning structural steel into “Weldox” commercial steel by SSAB. Turning beams and gables into “City Racking” pallet rackings by RackCo.
Transforming	Form	The manipulation of the resource in terms of reshaping its form.	Turning raw steel into structural steel by SSAB.
	Time	The manipulation of the resource by linking it to various points in time.	The storing of Weldox steel at SSAB for just-in-time supply to RackCo (not shown in figure 2).
	Place	The manipulation of the resource by linking it to various points in space through transportation.	The transportation of Weldox steel from SSAB to RackCo (not shown in figure 2). The transportation of City Racking from RackCo to PalletCo (not shown in figure 2).
	Ownership	The manipulation of the resource by linking it to various owners through a process of exchange.	The exchange of Weldox steel for money between SSAB and RackCo. The exchange of City Racking for money between RackCo and PalletCo.

Although the processes of transformation in time and space are not shown in figure 2 for reasons of simplicity they do indeed occur. They are clearly identifiable in our case data.

Finally, using the case to identify the resource categories that we have conceptualized, we obtain table 4, which illustrates the path along which resources are transformed from random heterogeneity via homogenizing states to purposeful heterogeneity.

Table 4. *Five Resource Types with Case Illustrations*

Resource type	Characteristics	Case Illustration
Conglomerate resources	As occurring in nature, usually heterogeneous and complex, and with only a random relationship to human needs and activity	Raw steel
Transformation output	A set of resources made homogeneous through a transformation process but being heterogeneous from the point of view of subsequent use	Structural steel of SSAB. Beams and gables of RackCo
Composite resources	Homogeneous subsets of transformation output assigned by a supplier so as to be available and meaningful for the next step in the transvection	Weldox commercial steel of SSAB. City Racking of RackCo.
Assorted resources	Homogeneous subsets of composite resources selected by a customer to fit into further processing	Weldox steel on-site at RackCo production facilities. Welding robot on-site at RackCo production facilities.
Assortments	Resources for use or final consumption that have been assorted into a heterogeneous set which is congenial for its purpose with respect to human expectations	The RackCo production facility.

6 Conclusions

Alderson and coworkers (e.g., Alderson, 1957, 1958, 1965; Alderson & Martin, 1965) offer an overall picture of resources, exchanges and transformations well in line with the arguments in the present paper. Here, Alderson's concepts of "sets", "behaviors" and "expectations" are interpreted and reformulated as "resources", "activities", and "entities" as shown in table 5.

Table 5: *Reformulations of Alderson*

Alderson's original concept*	Reformulation	Comment
Sets	Resources	Five different types of resources are the objects and instruments in the central activities of exchange systems and related to the transvection process
Behavior	Activities	Buying/selling and producing/using are aligned to Alderson's transvection terminology by explicitly including exchange as a transformation concept
Expectations	Entities	Buyers, sellers, consumers, and producers performing functions as entities creating, transforming, reproducing, utilizing and exchanging resources, acting as autonomous subjects and adopting different roles at different times

Note: * See Alderson (1965, p. 57 ff.), and Alderson and Martin (1965, pp. 118-121).

As we have shown, an exchange system equals the notion of a network. It is illustrated in our case illustration in terms of transvections that cross the focal transvection in converging or diverging patterns. By incorporating the processes of transformation and sorting into an analysis of business networks, we can identify a direction of the shaping of resources in networks. According to Alderson, this direction proceeds from meaningless to meaningful heterogeneity through intermittent transient stages of homogeneity. Alderson expresses this as in the following:

The whole economic process may be described as a series of transformations from meaningless to meaningful heterogeneity. Marketing produces as much homogeneity as may be needed to facilitate some of the intermediate economic processes but homogeneity has limited significance or utility for consumer behavior or expectations (Alderson, 1958, p. 16).

Thus, by analyzing the transformation of resources from meaningless to meaningful heterogeneity through stages of homogeneity, a sense of direction in the shaping of resources

can be identified also in a business network, or in an exchange system. The movement is achieved by interaction comprising the four types of transformation processes and the two types of sorting processes that are in play in a business network. This rhythm or flow is shown in our case illustration in figure 2.

In the network approach, this interaction is conceptualized in terms of four interaction ingredients (and their corresponding substantiated resources): buying/selling, producing/using, cooperation, and networking (Håkansson & Waluszewski, 2002a, 2002b). By the application of the Aldersonian framework, we can refine some of these interaction ingredients. Alderson offers a theoretical framework that can serve as a base for the concepts of buying/selling and producing/using activity as comprising processes of transformations and sortings in the way that we have elaborated in earlier sections. However, Alderson does not provide a theoretical base for additional network concepts such as cooperation and networking. This may be related to the distinction between unidirectionality and multidirectionality introduced in the beginning of the present paper. Further exploration using theoretical frameworks other than Alderson's is called for in order to develop these concepts farther. Such frameworks should focus on multidirectionality, mutuality and symmetry. The network can be seen as comprising two types of processes that are superimposed and overlapping. The first one is a process mainly characterized by *direction* based on asymmetry and unidirectionality, while the second one is characterized mainly by *interaction* based on symmetry and multidirectionality. These notions can contribute to our understanding of the complexity found in business networks.

Moreover, what remains to be explored is the actual exchange process in which composite resources are exchanged and transferred from one business entity to another. Our case illustration gives some indications in this direction. It is worth noting that the only resources that can be exchanged are those defined as composite resources. Such exchange can

involve all four types of transformation, although those of transformation in ownership and in place are the ones most commonly emphasized and combined in most exchanges.

It is worth emphasizing that transformation in ownership is required for a transformation process to qualify as an exchange process. If transfer of ownership is absent, the transformation does not qualify as a process of exchange but as some of the other types of transformation processes manipulating the form, time or place of a resource.

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