

## **Control, Use and Development; Connecting the Actor and Resource Layers**

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### *Introduction and purpose*

In the autumn of 1988, ETSI (European Telecommunications Standards Institute) proclaimed a new standard for digital telecommunication; the ISDN (Integrated Services Digital Network) standard. This proclamation was based on recommendations from the ITU-T (International Telecommunications Union – Telecommunication Standardization Sector), and basically meant that all digital telecommunications systems in Europe should be adapted to one specific standard with regard to interfaces between systems, and between systems and users. In other words, hardware interfaces would now be standardised, while the services delivered by this hardware were allowed to vary between telecommunications providers. Looking at ISDN services marketed in the Nordic countries of Norway and Sweden, we have identified several differences between the two countries.

An interesting observation came from one of the people we interviewed regarding ISDN services. He said that the Norwegian provider Telenor was one of the few providers to view the D-channel as an “always accessible” telephone connection, whereas most other providers tended to look upon the D-channel as a second-rate (low-speed) data transfer connection. In this article, we want to pursue this claim, and to evaluate how the framing of resources by actors affects the ways in which the resources at their disposal is handled and related to each other. The theoretical approach used is the IMP tradition, and we will investigate the actor-resource connection and in particular concentrate on the effect of the actor-resource connection on development issues, but we will also look at other types of literature for inspiration, particularly when it comes to understanding the concept of framing.

### *The empirical Case*

Data for the empirical case is partly found in technical literature on the subject (the main source used in this article is Riksaasen, 1995). To this technical literature has been added information about the particular situation in Norway and Sweden. This information has been gathered through interviews with people central to the telecommunication firms operating the ISDN

service in each country. Three interviews have been done in each of the two countries, and the interviews were done in 2000 and 2001. This means that the empirical case is seen from the telecommunication firms' point of view.

Since its inception in 1876, telephony has been analogous, meaning that the sound was transferred between customers as a wave signal. However, with the advent of data communication this was about to change. In data communication, sound waves are broken down into components of 0's and 1's, which can then be transferred digitally and reassembled into sound waves in the other end. The main benefits of this method are twofold; a) quality of the transmitted sound wave increases, since it is much easier to recognise an on/off-signal than all the nuances of a wave signal and b) the "width" of the transferred signal is much smaller in digital communication, thus greatly increasing transfer volumes and speeds.

As mentioned above, an international standard for digital telecommunication was ratified by the ITU-T in 1988. This standard became known as the ISDN (integrated services digital network), and has since then, it has been implemented in all countries throughout the world, although the penetration rate and speed has varied. The telephone operators' main piece of equipment is the switching office, and digitalised operation requires digitalised switching offices. The transferral of service from analogous switching offices to digital ones, have represented a major investment for the operators. For the customer, it is quite possible to continue to use analogous equipment even if linked to a digitalised switching office. All that is needed is an "interpreter" between analogous and digital signals known as a modem (modulator/demodulator). This, however, does not give the customer access to any of the advanced services possible through the use of a fully digital connection such as ISDN. For these services, the customer too needs to invest in digital equipment and this investment is by many customers seen as being too large in relation to the improvement of services a digital connection can deliver. Thus, most telecommunication operators have struggled to convince their customers to change to ISDN connections.

The ISDN standard deals with specifications regarding the user/provider interface and the provider/provider interface. User/provider interfaces exist in two main "sizes", the primary rate access, intended for larger customers (firms and organisations) provide 30B+D, while the basic access provide 2B+D and is intended for private customers, small firms and shops. The B-channels are circuit-switched data channels with a speed of 64kb/s, and can best be compared to the earlier access lines in that they can be linked to one other customer at a time. In other words, if, for example, a male customer uses a B-channel line to phone his mother and wants to talk to his wife, he must first disconnect the ongoing conversation and then phone up and connect to his wife's phone.

The D-channel, however, works quite differently. It is a 16kb/s data channel which is always connected. Originally, it was intended as a signalling channel to allow certain extended services (for example to allow the incoming number of a call to be shown on a display even though the main B-channels are busy), but the fact that it is always connected allows the channel to be used as a packet-switched data communication channel. In other words, it is not "connected" to one particular other customer. Instead, each data packet is addressed and the D-channel may thus uphold a "connection" to several other customers at the same time. Unfortunately, with a mere 9,6kb/s effective transfer speed it is not a very fast way of transferring data. However, it has the advantage of coming "free" with the ISDN installation, thus being available in a large number of shops and private houses. This is in comparison to faster data channels (of which at the time

X.21 and X.25 where the most important) which had to be specifically installed, representing a much larger investment for the customer than conversion from analogous to digital telephony.

From the very beginning, the telephone operators knew how to operate the D-channel as a data transfer channel. In fact, a transfer protocol for this use was built into the ISDN standard. However, the degree to which the different operators chose to exploit this technical possibility is different in the two Nordic countries. We will quickly describe the situation in each of the two countries used in this empirical case:

*Norway:*

In Norway, the D-channel was aggressively exploited as a data transfer channel. ISDN-Pak, a packet-switched data transfer service built around the D-channel was introduced in 1994, the same year as Telenor introduced ISDN Basic Access. Adapters were introduced to allow better use of the D-channel, and when the X.21 data transfer network was shut down in 2001, the customers were encouraged to switch to use of the D-channel, something which increased the use greatly. In 2002, when data was gathered, the D-channel was used by approx. 10.000 users as a data transfer channel, mainly for electronic payments (bank cards and credit cards) and for online registration of lottery games (Tipping, V75).

*Sweden:*

In Sweden, data transfer capabilities similar to the Norwegian ISDN-Pak was built into the ISDN D-channel system. However, this system was not extended outside of the big cities. The Swedish main operator, Telia, decided to “jump” this technology and instead wait for broadband and internet technologies that could do the same services. Thus, penetration in the Swedish business market has been far lower than the Norwegian situation.

We thus observe that the situation in the two Nordic countries as to the penetration of the use of the ISDN D-channel as a data transfer channel differs. A prudent question would then be to ask how we can explain this difference. It would be surprising if it was possible to come up with one single reason for this. Rather, we believe that there are numerous reasons for the difference. However, research is all about suggesting such reasons, and thus we will in the following try to focus on one reason in particular which we believe is of at least some importance in explaining the difference, and that is something we will call “actor framing”.

*Individual actor framing*

Although we do not intend to get into discussions about how the brain works, we nevertheless have found it of interest to use some of the results from research on how the brain functions. It seems to be a general agreement that an important aspect of the brain is its ability to self-organise. De Bono (1991) explains it in this way: “...*the brain behave as a self-organizing system that encourages incoming information to organize itself into a series of stable states that follow one another – the formation of sequences and patterns (ibid, p11).*” This self-organising ability means that incoming information is not logically analysed as to its relevance, importance, which category it belongs to or any number of other analytical operations we might think of. Instead, the brain scans the information and looks for already established patterns which the information could belong to. When a suitable pattern is found, the brain may or may not initiate actions which would be appropriate within this pattern. For a very simple example, we might consider the act of tying shoelaces. Once learned, this activity is stored in a pattern, and may even include which foot we

start with. Later, this particular pattern may be evoked in many different ways, but once evoked; the pattern is repeated automatically, without any conscious thought about how we are supposed to do it. While this is a simple pattern, the brain is also capable of storing more complex patterns, for example patterns related to how we treat other people and, of specific interest to us, patterns which control our work habits as well as the ways in which we think about our work.

Pattern recognition allows us to handle all the myriads of sensory inputs which are sent to our brain. In fact, we could not function the way we do without this ability. As De Bono (ibid, p82) puts it: *"If the brain were not a pattern-making system we would not be able to read, write and talk. Every activity, [...] would be a major time-consuming task."* One aspect of pattern recognition is that the brain is able to evoke patterns from very limited inputs. For example, even the faintest smell of burnt material can evoke a pattern in which we start searching for other signs of fire and/or looks for fire-fighting equipment and/or the nearest possibility to escape. Another important aspect is that evoking a pattern does not rely on a single correct input. A computer program needs one particular command in order to start. Not so with the brain. The pattern described above, when we react as if there is a fire close by (whatever that pattern means for us), can be evoked by smell, but it can also be evoked by seeing small wisps of smoke in the room, or hearing the crackle of something burning on the stove. All three signs together would be a strong indication of reasons for evoking this pattern, and actually seeing flames an even stronger indication.

Normally, the brain's ability to recognise patterns is extremely useful. It allows us to unconsciously sort a large number of sensory inputs, and it allows us to sort out "important" inputs which can then be quickly translated into responsive action, for example to run away from danger. Sometimes, however, the self-organising property is troublesome. One of the most troublesome aspects is that since pattern recognition sets in before conscious thought, it tends to make us perform routine responses to challenges, based on "what have worked before". This is known as a "lock-in" effect, because we are locked into existing patterns, and may create problems for our ability to be creative. Also, in some cases, we may "recognise" a pattern wrongly. In such a situation, we will often make the wrong response to the situation, because we react on the basis of a wrongly recognised pattern.

The final point we will bring up about the self-organizing ability of the brain is that the brain has a capacity to create new patterns. This happens as a natural process when we are "confronted" with a situation which refuses to let itself be adapted to an existing pattern. For younger people with less experience (and as a consequence, fewer existing patterns) this happens more often than for older people, and it also happens more frequently when we enter into situations which are new to us, for example if we pick up a new hobby, start to work or fall in love for the first time. In such a case, the context of the situation is an important factor in how the pattern will be constructed. It is also possible to consciously "provoke" the process of pattern recognition in order to avoid using an existing pattern. De Bono (ibid) suggests several ways by which this can be done.

Goffman (1986) expresses a very similar view. His ideas about primary frameworks approximates De Bono's idea about patterns. The main "definition" of a primary framework is implied in the following excerpt: *"When the individual in our Western society recognizes a particular event, he tends, whatever else he does, to imply in this response (and in effect employ) one or more frameworks or schemata of interpretation of a kind that can be called primary."* (Goffman, 1986, p21). The main difference between Goffman and De Bono seems to be that the former use frameworks as a way

of describing "...the structure of experience individuals have at any moment of their social lives" (ibid, p13), whereas De Bono prefers to view patterns as a fundamental way in which the brain works, which, among other factors, also effect the organisation of experience into patterns which are later evoked.

*Is "organisational framing" a reasonable concept?*

The sources we have used as a basis for individual framing (De Bono, 1991 and Goffman, 1986) disagree on the possibilities of transferring the concept to a more aggregated level. Goffman (1986, p13) argues that "*This book is about the organization of experience – something that an individual actor can take into his mind – and not the organization of society*". As a contrast, De Bono (1991, p239) claims that "*All the comments made earlier in this book about the natural behaviour of self-organizing patterning systems in the brain apply equally to society, which is also a self-organizing system.*" We will not attempt to reconcile these two views, but we will instead claim that even if individual framing is not directly transferable to an organisational setting, there will be factors in the organisational setting which affects the individual framing of the members of the organisation. These factors will affect all members of the organisation, although the extent to which the factors will be adopted into a specific individual's patterns will vary (on the basis of the extent and type of their already existing patterns and the number of new patterns which are developed to handle work situations).

With this reasonable claim in mind, our next question is to ask what factors can contribute to, or affect, the patterns that individual members of the organisation use in their daily work. Organisation level structures (physical structures; such as buildings, machines, IT-systems and logos; as well as immaterial structures; such as the organization structure, company strategies and goals, leadership styles and the organizational culture) seem to be obvious candidates for such factors. The reason for this is that they constitute structures which the workers are in frequent contact with, and which are related to their work. Furthermore, these structures are a central source of challenges in the work place, in the sense that many of the problems handled will be related to these structures and the way they function (or not function). Finally, these structures are tools used in the handling of the challenges.

Thus, the idea is that we have a set of organisational-level structures which may affect the individual framing and create recognisable similarities in the patterns individuals evoke when they meet challenges in the workplace. We hypothesise that these factors exist, and we want to use the term "organisational framing" for them. If this hypothesis is correct, we should be able to trace such factors in the way that people present their handling of challenges. This should not, however, be taken as proof that the "organisational framing" is a correct representation of the "truth" they can see, only that it represents common elements in the way they think about this same "truth".

*Using organizational framing to analyse the case*

Above, we have argued that organisational framing is of importance for how individuals in an organisation looks at, and handle, resources in the organisation. We have also argued that even though such a frame exists, it will not affect all individuals and their patterns to the same degree. Further, the individuals will also have several patterns which they may use to handle challenges.

Thus, a number of different patterns will be present. We would also expect different patterns within subgroups of the organisation, since the organisational level structures of the subgroups are different. If this is a reasonable assumption, such differences in the patterns used to look at problems should be present in the case material, both as expressions of two different views (when comparing how one person looks at a problem with how another person look at the same problem) or straight forward as direct examples where one person talks about his or her encounters with such situations.

In the case, we can in fact see that the people interviewed constantly refer to issues which can be interpreted as related to “organisational framing”. Furthermore, they refer to these issues as crucial in their own understanding of why there are differences between the countries in regard to the extent of the use of the ISDN D-channel. It should be noted that the interesting aspect of this is not whether the presented understandings are “true” (in relation to what is actually going on), but that they seem to be an integral part of the patterns used by the involved managers when discussing the issue, and thus also presumably when handling the issue. We will present some quotations which seem to be just such references (translations from Norwegian and Swedish by the author):

“In several countries, ISDN-Pak has not been introduced because there has been a direct conflict with the part of the operator who owns similar data communication services”  
(Norwegian product manager of ISDN at Telenor)

“In the beginning, ISDN-Pak was a part of the ISDN service, but in 1996, ISDN-Pak was transferred to the Datacom department, and this has been important for how it has been seen. [...] ISDN-Pak has been seen [by the Datacom department] as a low-speed data transfer service”  
(Norwegian product manager of ISDN at Telenor)

“Duo [The Swedish name for Basic Access] is a telephony product and X.25 is a Datacom product. This means that two different schools of thought are mixed, which again means that there has been two different ways of thinking about this, both here at us, at Ericsson [key supplier] and at the customer.” (Swedish product manager of ISDN at Telia)

“When it comes to top management support, the Norwegians had much more of it than we did. However, when the responsibility for the D-channel was recently transferred from one department to another within Telia, this has changed.” (Swedish product manager for the D-channel at Telia)

“So far two factors have limited the development of ISDN and the D-channel data transfer service, and that has been Y2K and the introduction of broadband services” (Swedish product manager for the D-channel at Telia)

We can see that in all these quotations, a central theme is the organisational structure. The department you belong to is an important factor in describing how you will look at the D-channel. Or, to be more specific, the D-channel fits into the established pattern(s) of individuals at different departments in different ways. We will claim that this is not a coincidence, but rather is so because organisational structure is an example of a factor which constitutes a part of the organisational frame.

*Existing theory within the IMP perspective on the actor-resource interface*

Examining relevant literature within the IMP tradition, we can summarise the written works on actor-resource layer interaction into dealing with three different, but interdependent issues; the issue of resource control by actors; the issue of the structuring of resource use and the issue of learning and exploration of resources by actors.

Resource control by actors.

A crucial idea within the three entities model presented in Håkansson and Johanson (1992) is that actors control resources. The issue of control is in this model presented as the central interface between the actor level and the resource level. The concept of control is, in this reference (Håkansson and Johanson, 1992) not meant to be interpreted in a narrow sense. Rather to the contrary, the concept of control is used in a broad meaning, and covers a number of possibilities, ranging from legal ownership of a resource by an actor to access to the use of a resource through relationships that one actor have with another actor. The control issue has later been expanded upon in Håkansson & Snehota (1995), who writes that *“resources are controlled by actors and acquire value through the activities they are used in. Actors get their identity in relation to other actors through their performance of certain activities and control and use of certain resources.”* (p270). In this reference, control is related to the identity of an actor. As a simple example, we can say that a specific actor is able to acquire an identity as a bakery because of its control of certain resources; such as a bakery oven, chefs with knowledge about baking and recipes for different types of cakes and breads.

Later research, for example by Dubois (1998), has shown that the concept of control can also be understood as overlapping. This means that actors have more or less control over resources, and that several actors may be in simultaneous control of the same resource. This can be easily handled when the use of the resource by one actor does not hinder the use of the resource by another actor, but can also involve discussions about how to use the resource when several uses preclude each other. In the latter case, interaction between the different actors with a degree of control over the resource is necessary in order to settle the issue.

In this article, we will look at how control over a set of resources by an actor helps the actor to define a “zone of possibilities” for what they can use. Thus, one central dimension of actor-resource interface is always to know what resources we have at our disposal. It should also be noted that control is changing over time, although not as easily as certain other aspects of resources. Thus, the amount and types of resources an actor controls can in the short run be seen as given, but should, when considering longer time periods be considered as changeable.

Resource use

Linked to the concept of resource control, is the concept of resource use. All resources controlled by an actor are used in one or more activities. The resulting pattern of activities (Håkansson and Snehota, 1995) can be seen as a map to how the resources currently are used to create value for the actor. The actor’s role is to decide which resources are to be deployed to what activities, and in which amount. The resulting pattern of activities does not, of course, constitute an optimal resource use in anything but a very limited sense. It does, however, represent a reasonable compromise between the actors who exercise a certain degree of control over the resources, about how they are to be used. It is also necessary for these decisions to be done in an interactive way. If not, the solutions reached about how the resources are to be deployed are more likely to represent a sub-optimal way of utilising the available resources, likely

in the form of one actor making decisions on resource deployment which seriously hampers or prevents another actor from utilising the same resource.

The concept of resource use is thus closely linked to the current structure in which resources are deployed. This situation is more easily changed than the control of the same resources, but it should also be noted that since the activity patterns are embedded in other activity patterns, changing the use of one resource will often start a “chain reaction” of changes which needs to be done in order to incorporate the original change into the embedded network.

#### Resource development

A third issue related to resources is the development of resources. One side of this is linked to the individuals and their personal experience with, and learning about, resources which they encounter. This is, for example, expressed in the following way by Håkansson and Snehota (1995:272): *“Individuals are curious and learning, and the resources are heterogeneous, i.e. there are always things to learn. Thus, some changes will occur as individuals learn how to utilize new dimensions or new combinations of resources in relationships.”* Other authors, such as Holmen (2001), Håkansson and Waluszewski (2002) and Skarp (2003) echo this notion, but in more detail. At the same time, while ideas about what to do may come from individuals, or externally to the actor, they can only be acted upon by actors in interaction with each other. This is due to the complicated interaction patterns of the existing structure (see above) and is an inherent difference between the ideas of how to use resources and the actual use structures.

#### *Organisational framing as a concept related to the actor-resource interface*

Within industrial network theory we are not overly concerned with the behaviour of individuals. However, we are very concerned with the behaviour of actors, and in particular, we do attempt to analyse how actors relate to other actors, to resources controlled by actors and to activities performed by actors. Thus, if the individual concept of framing can be shown to have relevance also on the more aggregated actor level, we can defend using time to analyse such a concept.

Organisational framing in the way we have introduced it in this article is basically a concept which describes factors which affect the way in which individual actors believe that the resources under their control (in the wide definition of the concept) are organised. As such, it is a structural concept, which fits well with the concepts already developed on resource use. Above, we claimed that we can make “map” of how resources are currently used. This “map” would then represent an “objective” description of the current situation, or at least one which is as objective as is methodologically possible in a given situation. However, we also know that actors make deployment decisions based upon their view of the current situation; they invoke patterns. The key point is that this pattern may or may not fit well with the “objective” description, depending for example on the role of the actor in the organisation, his or her experience and background, and the type and degree of interaction with other external and internal actors. It is this situation that the concept of organisational framing is meant to fill. In other words, we can talk about how the actors have one or more organisational frames which are related to the resource constellation and the activity pattern (Håkansson and Snehota, 1995), and which decides how they attempt to act in relation to the constellation and the pattern. What differentiates the concept of organisational framing from resource use would then be that organisational framing would include the perceptual side of the issue, thus opening for



perceptual bias which may lead to a difference between “What Is” (The “real” use of the resources) and “How it is seen” (the organisational framing of the same resources).

Although the concept of organisational framing is proposed as a structural concept, one of the interesting aspects of this concept can also be related to resource development. From the beginning of this article, we remember that patterns are usually not changed. Development within an individual is instead achieved by developing new patterns, as well as by enriching old ones. Development of new patterns is usually achieved either by confrontation (between two existing patterns) or through a conscious process of provocation.

In short, this means that radical change springs from new patterns, whereas incremental change springs from actors striving to enrich patterns. In relation to resource development, this means that in order to develop resources, actors need to ensure confrontation between two or more existing organisational frames, or to ensure that an existing organisational frame is provoked. To move the responsibility for the D-channel from one department within Telia to another fits very well with a conscious provocation of a central factor within the organisational frame (the departmental control).

#### Other relevant contributions

One recent article which explicitly uses the word “framing” in relation to industrial network theory is an article by Holmen et al. (2003). This article considers frames as a way of describing the different pictures which different actors can have, and explicitly state that “...these pictures affect the party’s own actions (and reactions) as well as each party’s understanding of the (re)actions by others” (ibid. p391). This use of framing as a concept is similar to the way in which we propose to use the concept organisational framing in this article. However, whereas we want to propose the concept as a way to describe how actors view resources, Holmen et al. (2003) uses it primarily to describe which actors are included in which other actors’ network pictures. We do agree, however, that the framing modes adopted will affect the party’s actions. This is exactly the same point we are trying to make about organisational frames.

Holmen et al. (2003) also makes the point that the framing mode does not necessarily need to be centred on one actor. Some of the framing modes presented are modes in which two (or more) actors together view other actors. This idea is harder to reconcile with our idea, not in principle, but because we have based our discussion on what organisational framing is on organisation-level structures of a single organisation. However, if two parties from different organisations interact over time (as for example happens in large construction projects and in supplier relationships), it should be possible for these parties to develop their own pattern or patterns for the tasks that they are faced with, thus creating the kind of intra-organisational patterns which Holmen et al. (ibid) describes.

Another concept which is related to the concept of organisational framing proposed in this article is the concept of “network pictures”. In Ford et al. (2003, p176), network pictures are explained as “*the views of the network held by participants in that network*”. Similar to the framing concept proposed by Holmen et al. (2003) above, it proposes that the network picture “*forms the basis for their analysis and actions.*” (Ford et al., 2003, p176). This too is a concept which relates the actors to the network, and not specifically to the resource level. An interesting aspect of their concept is that they specifically state that changing the network pictures “*...requires both time and a systematic approach.*” (Ibid, p178).

*Comments and consequences*

It is the belief of this author that a concept of organisational framing could be a useful addition to the way in which we conceptualise the actor-resources interface in industrial networks. I have tried through the case presented to show that such a concept can be used to partially explain differences in how two organisations handle seemingly similar resources. This may be a useful application of this concept.

Perhaps a more powerful use is that if we are aware of which organisational frame or frames are used by an actor, it is possible to consciously attempt to confront this frame in certain situations, thus creating the possibility of more radical change. In other words; when keeping within an organisational frame, incremental change is possible (in fact likely), as existing resources are continually worked with in order to produce more efficiently. When crossing an organisational frame, new resource combinations may occur, which gives the possibility of radical change. However, as with the pattern recognition system of the individual, the organisational framing guides understanding towards already existing patterns, and it is therefore necessary to consciously confront the existing organisational frame(s) in order for individual actors to be able to cross from one pattern to another (or to form new patterns).

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