Extending the Network Approach in an Organization: The Key towards E-Procurement Adoption

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Abstract

Within the IMP group the network approach has proven to be a successful perspective for studying the incidence and effectiveness of industrial interaction. In these studies, the effect of Inter Organizational Systems (IOS) on the industrial relationships and networks has also been explored and the value potential of buy-side IOS or E-Procurement (EP) has been widely acknowledged. In order to realize this value potential, a multitude of individual-level adoptions have to take place within organizational user groups, following the organizational-level decision by management (and subsequent technological implementation). In this paper the network approach is applied to intra-organizational, individual adoption of users of EP (actors) with the objective of identifying inter actor influences that improve adoption, thereby realizing the value potential of EP in a B2B relationship or network.

Introduction

The Network Approach has turned out to be a beneficial research perspective for studying the incidence and effectiveness of industrial interaction. During the last decade, a number of authors have studied relationship functions and development using the interaction model of buyer-supplier industrial relationships. Central to this approach is the notion that firms are a part of a network of connected relationships (Håkansson and Snehotta, 1995). Industrial buying and selling, thereby, cannot be fully understood as a series of independent transactions, but rather as episodes and within a setting of complex intra-organizational relationships. To be effective, companies must constantly assess these relationships and the intentions, actions and reactions of their counterparts within this network (Ford et al. 2003). These relationships seemed to be fairly stable when studied over long periods of time; however, they can have a very dynamic nature and are susceptible to change.

IT innovations in industrial networks have altered, and will continue to transform, the basis of industrial buyer and seller interactions and relationships (Baroncelli, Adami, 2003; Müller, Holzle, Gemünden, 2003; Santema, 2003). In principal, these Inter-Organizational Systems (IOS) can cause a change in the characteristics of both organizations and their respective markets (Gurbaxani, Whang, 1991; Buxmann, Gebauer, 1999). A growing basis of literature shows how and when transactions and relationships develop by IOS (e.g. Bakos, Brynjolfsson, 1993; Santema, 2003), the applicability of various types of IOS (e.g. Hartmann, Ritter, Gemünden, 2002), and their effect on value creation (e.g. Ryssel, Ritter, Gemünden, 2000).

In this paper, we study a specific type of IOS from a buy-side perspective: Electronic Procurement. The term electronic procurement (EP) refers to the use of inter-organizational, network-based systems (such as the Internet) in the purchasing function. EP tools, such as business-to-business marketplaces, catalogue buying, and electronic reverse auctions, are not only changing the daily work of purchasing professionals, but also the nature of relationships between buyer and supplier (Bakos, 1991; Barau et al., 1995; Knudsen, 2002; Grieger, 2003, Santema and Rijt, 2003). Scholars widely recognize EP as an innovation with significant value potential (e.g. Neef, 2001; Weele, 2002).

Realizing the value potential of EP tools can only occur if and when those who are supposed to change their way of working adopt the process innovation driven by the EP. In this respect, Hartmann (2002) advocates the necessity of focal group adoption. This adoption is not self-evident. While EP can harness organizational performance through cost savings, reduced purchase prices and time savings, its introduction may be met with skepticism, resistance, or even sabotage on an *individual* level. For an organization to 'get their act together' for EP (cf. Aspenberg, Andersson, Kjellberg, 2003), the individuals in the organization have to do the same.

In this paper the network approach is extended to an intra-organizational application. The difficulty of realizing the multitude of individual level adoption, in order to realize the value potential of EP, is viewed as a social contagion process or as the dissemination of adoption in an intra-organizational network of individual actors.

The individual adoption is largely dependant on social influences. Therefore, the individual-level adoption spreads from one person to the next as a result of active or passive persuasive actions (cf. Cooper, Zmud, 1990; Rogers, 1995). How adoption spreads from one actor to another depends upon the type and effectiveness of the influences one has on the other. People influence each other using both formal and informal techniques. The process of internal dissemination of adoption could be thought of as a 'viral' spread of adoption throughout an organization. This notion of 'viral spread' underlies what is known in the marketing domain as 'word-of-mouth' and 'viral marketing' (Helm 2000), and it is known in social network theory as 'social contagion' (Jones, Jones 1995).

The objective of this exploratory study is to identify different types of influences on the dissemination of EP adoption between actors in an organization, not only between direct peers but also across organizational units and hierarchical levels. We build on the notion of 'viral spread' to study the influences on the dissemination of EP adoption

Initially the research focus is limited toward the *dyadic dissemination* from an individual adopter, actor A, to an adoptee, actor B. In this setting, actor A has previously adopted EP and is actively or passively influencing actor B to adopt as well. Actor A can exert both passive and active influence to stimulate adoption by actor B. Actor A will actively influence actor B when actor A benefits directly from actor B's adoption of the tool. This could be the case

when actor A is a project leader and actor B is a member of the purchasing function involved in the implementation process of an EP tool. Passive influence can occur when actor A's use of the tool in itself already influences actor B's adoption decision, without any active persuasive efforts from actor A.

In order to identify different types of influences we have executed a taxonomy study on the basis of a series of exploratory interviews. A total of 42 interviews have been conducted with both purchasing experts and senior purchasing representatives of large Dutch purchasing organizations. From these interviews nine categories of influences on the spread of EP adoption from one actor to another were identified. These influences include perceived advantage, communication, demonstration, enforcement, training, involvement, risk reduction, reward and disposition.

The paper starts with a brief theoretical background on the theoretical relevance of a network perspective, e-procurement, adoption, and the dyadic dissemination of adoption. Then, the importance of a network perspective is further supported by previous EP adoption research. Next, the nine categories of influencing factors in a dyad of actors are presented. Finally, a discussion on further extending the network approach to the dissemination of EP adoption is initiated.

Theoretical Background

Towards a Network Approach of EP adoption

EP is recognized as an innovation. Organizational adoption of innovations is a multi-stage, multi-level phenomenon (Zaltman et al. 1973, Frambach, Schillewaert, 2002). On the level of the organization, there is an initiation stage, encompassing awareness, consideration and intention to adopt the innovation. In the implementation stage, the organization decides to adopt the innovation and makes use of the innovation (Frambach, Schillewaert, 2002). Within the EP domain, this translates into the organizational decision to purchase certain EP tools and technologies, and the subsequent use of EP by individuals in the organization. Organizational adoption is not complete, unless there is intra-organizational acceptance of the innovation at the level of the individual. This is consistent with Rogers (1995, p.21) who defines adoption as "... the decision to make full use of an innovation as the best course of action available". At the organizational level this decision is made with the purchase of EP

tools and technologies. This needs to be followed by a series of discrete adoption decisions at the level of the individual.

Previous research of EP has primarily concentrated on the organizational adoption decision, influencing factors, and consequences for industrial relationships and networks. Various recent studies have explored the benefits and applicability of EP in different situations (e.g. Harink, 2003; Hartmann, 2002). In addition, concepts and tools have been developed to identify the ex-ante value of EP (e.g. De Boer, 2002). On an organizational level, research has primarily focused on organizing the prerequisites for EP. Especially, the organizational and technological issues, like standardization or infrastructure, have received considerable attention. Within IMP organizational EP adoption is primarily viewed as a decision dependent on external variables, like resources, relationship portfolio and network effects (e.g. Brehmer, Johansson, 2001; Müller, Holzle, Gemünden, 2003)

On an individual level, a vast theoretical basis exists dealing with adoption. Explanatory insights in adoption at an individual level have been identified in the social and psychological disciplines, specifically towards cognitive (innovation) adoption and behavioral mechanisms of individuals. The major concepts in these fields have also been translated towards the domain of technological innovations with TAM and UTAT as prime models (Davis 1989, Davis et al. 1989; Venkatesh et al. 2003). Also directive measures focused on specific types of individuals have been developed (cf. Bhattacharjee 1998, Pijpers 2002).

Both the individual and organizational approaches towards adoption are too limited for this study, since they limitedly address the complexity of the interplay between individual-level and organizational-level innovation adoption. In between the state where no-one has adopted the new tool and where all relevant organization members have adopted the tool, a complex process of multiple parallel and sequential individual adoptions takes place. Therefore an intermediary level needs to be chosen to enable researching the dynamics of the intra-organizational adoption processes leading towards organizational adoption. The social contagion or dissemination perspective provides in an actor-network is a more suitable means of studying the organizational adoption of EP.

Defining Electronic Procurement (EP)

The definition of EP seems to be open to some discussion (Grieger 2003). Building on the work of Harink (2003) and De Boer *et al.* (2002), we define EP as 'performing procurement electronically'. The latter authors refer to inter-organizational network-based information systems intended to facilitate or support the procurement process. This means that a broad definition of EP is used, which not only includes e-ordering systems and systems for catalogue buying (the 'narrow' definition of e-procurement), but also technologies like e-marketplaces, online exchanges, reverse e-auctions and e-RFX systems.

The unit of analysis for this research is the EP tool. This can be defined as an EP functionality or set of EP functionalities that enters the organizational system and is transferred throughout the organization as one entity. One example is an 'off-the-shelf' e-ordering system or an e-requisitioning tool. The reason for this unit of analysis is, that the tool is the level at which individuals within an organization decide about adoption or non-adoption. Individuals do not adopt an EP technology as such, but an application of an EP tool.

Adoption Behavior

In this paper, we define adoption behavior as making an active contribution towards the implementation or use of the EP tool. Adoption behavior includes using the tool, contributing towards the usage by others, or stimulating the spread of adoption of the tool. This definition implies that an actor can be considered an adopter of the tool, as soon as the actor contributes to a further spread of the tool, even without using the tool himself.

In general, adoption models only consider positive influences and exclude the possibility of one actor negatively influencing another when it comes to adoption behavior. Arguably, adoption behavior does not only have a positive dimension, but can also include a negative dimension, i.e. active deviation of the implementation objective. This deviation can manifest itself in various ways from hesitation and reluctance towards open resistance or even sabotage

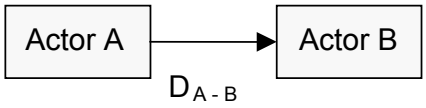
Some individuals will be inclined to adopt an innovation earlier than others, despite of any management efforts and social influences (Rogers, 1995). Argarwal and Prasad (1998) recognize this human characteristic as the personal dispositional innovativeness (PDI), which describes an individual's willingness to adapt to an innovation, independent of internal or external influences. Goldsmith and Hofacker (1991) show that PDI is domain specific, which suggests inherent differences between for instance the procurement domain and the IT domain. Other traits of a person might influence the PDI or the adoption directly. Some

authors stress certain individual factors related to PDI like innovativeness, computer self-efficacy and experience (Venkatesh, Davis, 2000).

Intra-organizational Dissemination of Adoption Behavior

In this paper, dissemination is defined as the actor-to-actor transfer of adoption behavior within an actor network. The focus will be on the *dyadic dissemination* process between two actors within the same system, i.e. within an organization. This is quite a simplification, because the actual adoption behavior of a certain actor will be determined by the summation of all the different actors with which it has a dissemination connection as well as by the actor's PDI. The dyadic dissemination takes place between actor A and B, who are individuals that respectively have and have not adopted. Between these actors a certain relation exists in which actor A can exert active or passive influence to actor B. In an organizational context many of such relations exist between different type of individuals, both embedded in organizational structures or a result of informal social contact. The dissemination between two actors is shown in figure 1.

Figure 1 – Dissemination (D) from actor A to actor B



The objective of an EP implementation process does not have to be that in the end every individual in the organization has adopted the tool. The majority of EP tools will apply to a certain subset of employees only. For instance, when an e-auction tool is introduced we usually find that only tactical purchasers and sometimes operational purchasers will have to use the tool, and employees outside the purchasing function will not. Nevertheless, managing the implementation process also includes addressing actors that are indirectly affected. This means that a broader subset of the total organization is included in the focal group than only the direct users of a new EP tool. Referring to the example of the e-auction tool, employees outside the purchasing function may not actually have to work with the system, but they do have to cooperate in the change process by providing more specific information in the definition stage of the internal request. This cooperation is crucial for the successful implementation of the tool. In this study, actor A and B can be any stakeholder that is affected by the implementation of a certain EP tool and has a certain degree of influence on the implementation process.

Previous Research: The E-Procurement Adoption Model (EPAM)

A first step in researching the complex situation of EP adoption has been made by the development of an E-Procurement Adoption Model (EPAM), in which issues are identified that influence individual level adoption for various purchasing roles and change phases (Reunis et al., 2004). The object is the atomistic adoption of one individual actor of EP (it could be called an EP variant of PDI) . It provides an in-depth exploration of influencing factors based on both theory and practice. These factors provide the basis for the identifying factors influencing adoption in a dyadic A-B ralationship.

The EPAM is based on empirical findings from narrative analysis. Over 1300 narrations are classified in a theoretical taxonomy of influencing factors and attributed toward a specific role and change phase. The frequency distribution of factors across the EPAM matrix is shown in Figure 2 as different shades of gray; a darker shade corresponds with a higher occurrence frequency. A cluster analysis is performed to obtain a more concise classification of influencing factors. The result is shown in Table 1.

Figure 2 –E-Procurement Adoption Model (EPAM)

	Sense of Urgency	*Leading Coalition*	*Vision and Strategy*	*Comm-unicate Vision*	*Create Buy-in*	*Celebrate Success*	*Consoli-date and create more change*	*Anchor Change*	*General*
Operational Purchaser				A1, A2, A3, B1, B2, B3	A1, A2, A3, B1, B2, B3	A3, B1, B2, B3	A2, A3, B1, B2,		B1, B2
Tactical Purchaser			B2	A2, A3, B1, B2, B3	A2, B1, B2, B3	B2	A3, B2, B3		A2, B1, B2
Strategic Purchaser	B2	A1, B3	A1, A2, B1, B2, B3	A3	A3	B2, B3	B2	A3, C1	A1, A2, B1, B2
Management	A2, B2, C1	B1, C1	A1, A3, B1, B2, C1	A1, A2	A2, B2, B3, C1	B2	C1	C1	A1, A2, A3, B1, B2
Support: IT			A1, A2, C1	C1	A3, B1, B2, C1	B1, C1			A2, B1, B2, C1
Project Team			A2, A3, B1	A2, A3, B1, B2	A1, A2, A3, B2, C1		A1, A2, A3	A1, A3, C1	A1, A2, A3, B1, B2, B3
Business User	B2	B2	A2, B1	A2, A3, B1, B2, B3	A1, A2, A3, B1, B2, B3	A2, A3, B1, B2, B3	A2, B1, B2	A2, B2	A2, A3, B1, B2, B3
General	A1, A2, A3, B3, C2	A1, A2, A3, B1	A1, A2, A3, B3, C1, C2	A1, A2, A3, B1, B2, B3	A1, A2, A3, B1, B2, B3, C1	A1, A2, A3, B1, B2, B3, C1, C2	A1, A2, A3, B1, B2, B3, C1	A2, A3, B2, C2	A1, A2, A3, B1, B2, B3, C1, C2

Table 1 – Clusters of Influencing Factors of Individual Adoption

Code	Cluster	%	Code	Sub-cluster	%	Short Explanation
A	Change	44,0%	A1	Design	13,6%	Issues depending on the change strategy
			A2	Organization	17,2%	Issues depending on the organization of change
			A3	Execution	13,2%	Issues depending on the execution of change
B	EP Attitude	31,6%	B1	Personality	12,8%	Issues depending on a person
			B2	Role Myopia	9,5%	Issues depending on a role of a person
			B3	EP	9,3%	Issues depending on the type of EP
C	Business Context	14,6%	C1	Business definition	11,2%	Issues depending on business characteristics
			C2	Business Arena	3,4%	Issues depending on the business context
D	Other	9,7%			9,7%	

A more detailed analysis of the factors found in the EPAM reveal the importance of a dissemination perspective for finding ways to influence individual adoption. The EPAM confirms that the majority of factors are related to the social context: adopters can influence non-adopters through various types of influences prior to the actual adoption decision being made and cause adoption to spread. Next, the dissemination in a dyad is further explored.

Dissemination of Adoption in a Dyad

In this paper we focus on one particular aspect of EP adoption in organizations. Given a setting where there are two organization members, actor A and actor B, of which A has adopted an EP tool, and B has not, we explore what factors exert an influence on actor B's decision whether or not to adopt that EP tool. We assume that actor A and actor B have a relationship, in the sense that they have some level of interaction, and actor B is aware that actor A has adopted the EP tool.

Data Collection

A total of 42 exploratory interviews were conducted with people that have relevant experience with EP. After a short introduction about the background of the interviewee, a generic change process of an implementation of EP was discussed and interviewees were asked to describe

critical incidents with respect to various parties influencing each other to spread the adoption of the tool. The 42 interviewees are divided into experts and industry representatives. The industry representatives come from five large purchasing organizations across different industries and their functions cover different functions relevant in the implementation of EP, including operational, tactical and strategic purchasing functions. The industry representatives all have a direct experience with one or more EP implementations and have had an active role in the change process. The experts can be subdivided into academics, consultants and suppliers of EP tools. All of the experts have had direct or indirect experience with EP implementations and have a function of respectively researching, supporting or selling EP tools. Across the 42 interviews, the whole spectrum of different types of EP tools, varying from e-sourcing, e-RFx, e-auction, e-ordering, ERP integration and collaborative supply tools was covered.

Typical interview length was 90 minutes and the interview notes were checked by the interviewee. The interview data were analyzed to extract different influences of one actor towards another to stimulate adoption behavior. These influences were clustered into nine categories. These nine categories are presented in the following section.

From the interviews, the following influences for the dissemination of adoption behavior from actor A towards actor B were identified: perceived advantage, communication, demonstration, enforcement, training, involvement, risk reduction and reward. Disposition, as a ninth factor, moderates the effect of the other factors on B's decision to adopt. All influences between actor A and B, except disposition, represent a portfolio of possible interactions that actor A can passively or actively use to spread adoption behavior. Below we describe the nine factors one by one.

Perceived Advantage$_{A\text{-}B}$

Perceived Advantage$_{A\text{-}B}$ is the advantage actor A has created for himself by using the EP tool, as perceived by actor B. Interviewees suggested that people might decide to adopt a tool because they see others working successfully with it. In a peer environment where a person sees a colleague working more effectively or efficiently by the use of an EP tool, he/she might become convinced about the advantages of the tool and copy the behavior. Perceived advantage is of a non-verbal nature.

Communication$_{A\text{-}B}$

In nearly all interviews, communication was mentioned as one of the key influencing factors. Communication$_{A\text{-}B}$ is communication from actor A towards actor B about the EP tool, which can be active communication or passive communication. Active communication is communication from actor A toward actor B to influence the attitude of actor B towards the EP tool. This communication is active and directed toward actor B. Marvis *et al.* (1991) found persuasion and peer communication to influence adoption. Different types of communication can be identified: one containing a tailored message versus a generic message to convince B, rational versus emotional / emphatic communication, informal versus formal, and personal versus professional. Not only verbal communication can be used, but also newsletters, presentations, leaflets, etc.

Passive communication is communication about the EP tool, without the direct intention of actor A to spread the adoption behavior. This type of communication does not include the persuasive techniques that can be adopted in direct and active communication. In this case, people might communicate about an experience with a tool that they have not experienced themselves, but heard from another party or read somewhere. The many publications on the potential advantages of an EP tool can be a potential source of this 'word-of-mouth'. In addition, the marketing message from suppliers of EP also contributes to this.

The effectiveness of the influence of communication depends on the persuasive capabilities of Actor A in his/her communication and on the receptiveness of actor B. Actor A can use persuasive techniques like stressing the advantage specific for the situation of actor B. The persuasiveness of the communication depends on the ability of actor A to move actor B through the stages in an adoption process (e.g. from awareness towards commitment and finally involvement). In short, actor A has to create enthusiasm for the EP tool by its communication. Interviewees mentioned the danger of creating expectations that cannot be met. A disappointing first experience can inhibit a further spread of adoption behavior, because actor B may decide not to adopt the tool and can even initiate the spread of negative adoption behavior.

Several interviewees mentioned the need for peripheral communication, also referred to as indirect or supportive communication. This is communication about the implementation process and organizational change instead of about the tool. Providing clarity about 'what's about to come' is mentioned on various occasions in the interviews as a contribution towards the spread of adoption behavior.

Demonstration$_{A\text{-}B}$

The majority of interviewees agree that 'seeing a tool work is much more convincing than hearing the advantages'. From the perspective of someone stimulating the adoption behavior, this can be seen as showing or demonstrating a working system. Demonstration does not only create buy-in for the tool, but also increases the confidence of people of being able to work with it (self-efficacy). Demonstration$_{A\text{-}B}$ refers to actor A showing the EP tool to actor B. Demonstrations can have different forms, for instance 'proof-of-concept' sessions, 'conference room pilots', video-presentations, etc. In addition to seeing a working system, the recognizability of the demonstration is mentioned in several interviews. Demonstrations that use a familiar dataset, products or have a similar appearance or layout as hardcopy forms tend to be more convincing than other demonstrations.

Enforcement$_{A\text{-}B}$

The well-known individual adoption models often presume a voluntary adoption decision. However, in practice hierarchical pressure is often used in implementing EP. The interviewees mentioned the limited effect of this measure in the Dutch culture and in certain decentralized and highly autonomous business lines. Certain instances were described were enforcement initiated discussions about the tool instead of about actual usage. On the contrary, success stories were described in the US and in Asian regions. In both cases, enforcement did influence adoption behavior. In this paper, Enforcement$_{A\text{-}B}$ is the exertion of power (e.g., hierarchical power) by actor A towards actor B to create compulsory involvement in the EP tool. The implicit threat of using measures associated with a position of power, like increased control, punitive measures, a budget cut, including usage in a performance review, etc., are all part of enforcement. Interviewees mention a limited effect of these negative incentives.

Training$_{A\text{-}B}$

Training$_{A\text{-}B}$ is the interactive training executed by actor A for the benefit of actor B, before actor B has adopted the tool. Clegg *et al.* (1997) and Mirvis *et al.* (1991) identified training and education as an important aspect of internal stimulation and nearly all interviewees mention training as an influence mechanism. First of all, training can contribute to the perceived ease of use, one of the major constructs in the technology acceptance model (Davis 1989; Davis *et al.* 1989), by increasing the capability to work with the EP tool. Training often includes 'hands-on' experience with a tool in a safe environment. The perception of the

complexity of the tool can be reduced and the trialability of the tool can be increased. In addition, training can be applied to address cognitive barriers to adoption behavior. For instance, sessions can be held to deal with personal disposition towards change or deal with emotion-based resistance. Interviewees mentioned different training issues for different types of tools, depending on the self-explanatory level of the tool and the required change. Also the challenges of the scope of the training-base and the training across different locations were mentioned. Several interviewees agree that the best effect is achieved with face-to-face training, either personal or for a group, but that second-order training through a train-the-trainer process is often necessary in multi-country, multi-site situations.

Involvement$_{A-B}$

In change management literature, the involvement of people in the change process is a recognized success factor (see also the 'buy in' phase in figure 2). This was recognized by many interviewees and paraphrased by one as 'no end-result, without including end-users'. Involvement$_{A-B}$ is the perception of actor B of being included by actor A in decisional matters in the implementation process. Involvement takes place in close interaction between actor A and B, for instance through sessions like design workshops or group decision processes. More formal possibilities of involvement are including actor B in a test environment, 'shadow stage' or in a pilot. Actor B can also be included in a project team and be given responsibilities for the implementation process. In the interviews, the involvement of key-users and highly motivated innovators is advocated. The increased feeling of ownership creates adoption behavior, but can also invoke a high degree of participation in the project.

Risk reduction$_{A-B}$

One of the promises that actor A can give actor B to convince him/her to adopt an EP tool is risk reduction. Here, risk reduction$_{A-B}$ refers to actor B's expectation of reduced risk during future adoption of the EP tool due to expected future actions of actor A. The promise of support and facilitation in the adoption process can reduce the risk for actor B to adopt. Another form of risk reduction by actor A is reducing the personal consequences for actor B if the EP project fails, thus providing personal security. This especially applies to actors who take a personal risk when adopting in an early stage of the project, for instance people who are involved in a pilot or in the role of project leader.

Reward$_{A-B}$

Reward$_{A-B}$ refers to incentives for adopting the EP tool presented to actor B by actor A. Bhattacharjee (1998) stresses the importance of incentives. Such rewards can include a bonus, perks or a promotion. Informal favors can be promised as well, like personal favoritism. Some interviewees mentioned the politics of negotiating favors before adopting a tool at senior management level. Furthermore, symbols, awards, distinction or recognition can be promised. Interviewees mention a limited effect of all types of incentives on adoption behavior.

Disposition$_{B-A}$

Some people are easier to influence than others and some people have more influence. Disposition$_{B-A}$ can be seen as actor B's personal disposition towards influence in general and specifically towards the influence from actor A. The disposition towards actor A includes cognitive issues of trust, reliability, seniority, respect, reputation, etc. and is based on the perception by actor B of actor A. This perception does not necessarily have to be based on previous interaction with actor A and does not have to be merely rational. Specific to an EP tool, some actors 'A' will have a more important role in the process than others. The perception of the importance of the role of that actor 'A' in the adoption process could also influence the personal disposition of actor B towards actor A. This could be both a formal role, like program manager or project leader, but also an informal role, like a key-user or an opinion leader, or even a cultural aspect like power distance.

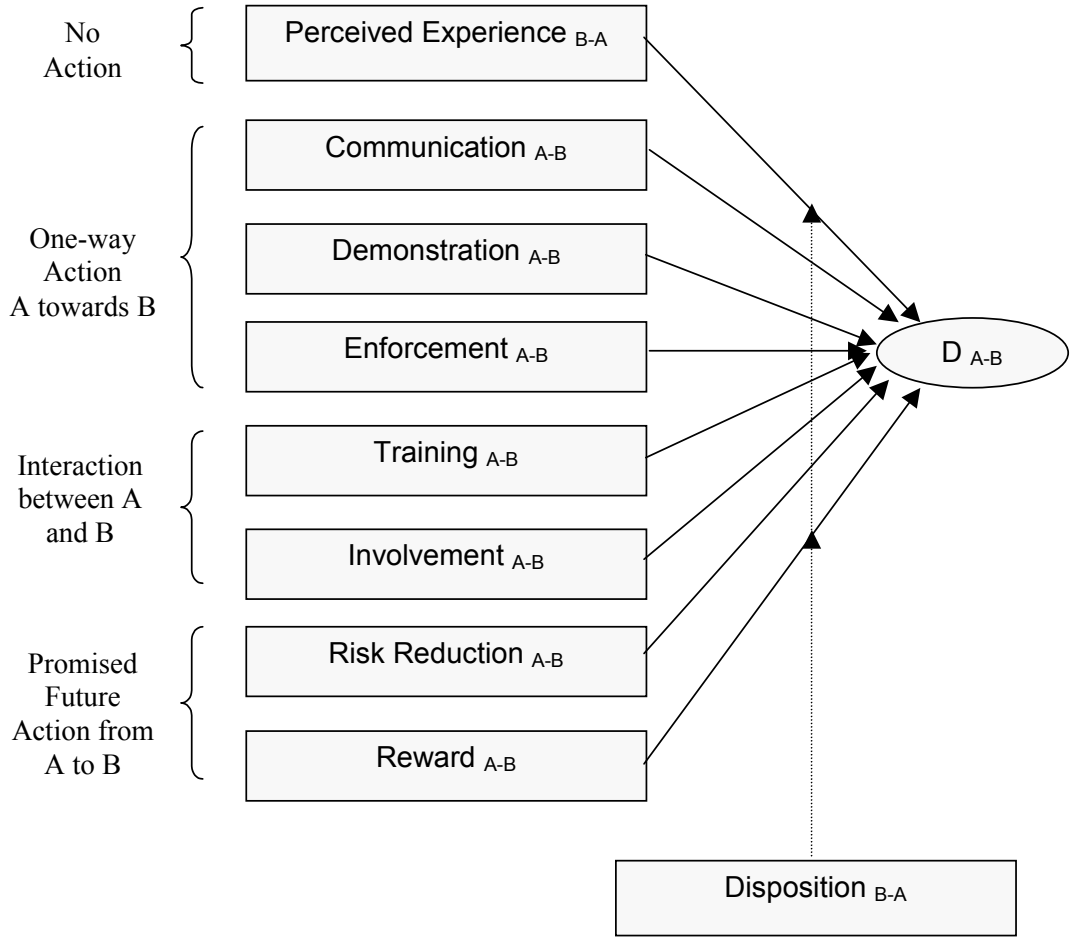
Especially the role of an opinion leader was stressed in the interviews and his/her pivotal role in stimulating and even facilitating the spread of adoption behavior. Ideally, the role of the project leader should be that of an opinion leader or a charismatic leader (instead of a manager) who is the project owner or sponsor.

Conceptual model

In the conceptual model, the factors are grouped according to the character of the interaction between actor A and B. Perceived advantage has its influence on dissemination without any deliberate interaction between actor A and B (although previous interaction between A and B is likely to have an effect on perceived advantage). Communication, demonstration, and enforcement are based on one-way action from A towards B. Training and involvement require an interaction between actor A and B. Risk reduction and reward are founded upon promises of future action by actor A towards actor B.

The categories of influencing factors can be seen as a portfolio of possible influences that actor A can use to convince actor B to adopt a certain EP tool, thus contributing to the spread of adoption behavior through the organization. Figure 3 shows a conceptual model of the factors (clustered in types of action) having impact on the dissemination of adoption behavior from actor A to actor B (D_{A-B}).

Figure 3 – conceptual model for the dissemination of adoption behavior from actor A to actor B (D_{A-B})



In the discussion section below we will make two remarks on this conceptual model, further contributing to the relevance of the usage of the model, first of all in research settings.

Discussion

General

Based on 42 exploratory interviews, we have identified nine categories of influences for the dissemination of EP adoption behavior between two actors in an organization. This research project shows a successful application of a network perspective for researching an intra-organizational issue. Our research makes a contribution to the literature by opening up the academic discussion of actor-to-actor dissemination of EP adoption. In addition, the incidence and to some extent the effectiveness of influencing factors in actor-to-actor dissemination are explored. These insights can be used by academia to further develop the network approach for EP adoption or various other intra-organizational issues. We therefore think that the issues raised in this paper and the development of the conceptual model help to better understand individual adoption of EP in an intra organizational context by applying the network approach in an organization. Further research will provide evidence for and further development of the keys to EP adoption.

Remarks to the conceptual model

We would like to make two remarks on the conceptual model. First is that dissemination of adoption behavior always takes place in a specific context. This might be the organizational context, eg. the organizational culture towards innovations and change. It might also be a more cultural or societal context, for instance young people that have a specific disposition towards innovation. We feel that further research is needed to discover whether the context should be added to the model or is sufficiently covered by the factors (eg. disposition).

The second remark is related to the inter factor influence in the conceptual model. For instance involvement might have effect on perceived experience, which in turn might have effect on the reception of communication. We know that inter factor influence might occur and we will therefore integrate that in future research.

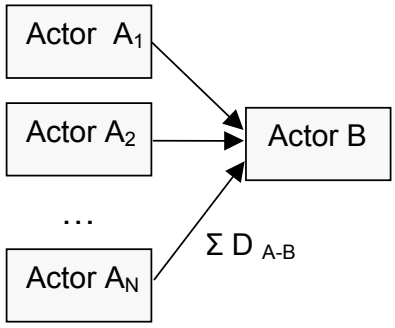
Limitations to the research

This paper focuses solely on influencing factors that could explain the spread of EP adoption from one individual actor to another. Although this kind of interaction-based influence is recognized as an important aspect of the human issues during an implementation process of EP, other aspects of the change process remain relevant as well. For instance, the issues of

adoption discussed in this paper are only relevant when it is *possible* to adopt the EP tool. Enablers that underlie the feasibility of using the EP tool are not discussed in this paper and are seen as a prerequisite before adoption behavior can take place. Relevant issues in this respect include technical infrastructure, licenses, IT maturity, standardization, legal issues, etc.

In this article we do not make a distinction between different types of actors A and B. We expect however, that it may be worthwhile to categorize actor types A and B on the basis of functions or hierarchical levels (as in the EPAM model, see figure 2). In the interviews we have seen some indications for a different relative impact of influence factors depending on which hierarchical level actor A and B belong to. Enforcement, for instance, will be a more effective influence when actor A has a higher hierarchical position than actor B. As another example, perceived advantage is most likely to be of influence when actors A and B are peers. In addition, in an organizational setting, actor B will not only be influenced by actor A, but by many actors inside and outside of the organization. The actual adoption behavior of actor B will depend on the sum of all these interpersonal influences. This idea is shown in Figure 4. The distinction between different types of actors and the combined influence of multiple actors form the basis for future research discussed later on.

Figure 4 – Dissemination (D) from multiple actors A to actor B



Finally, there are methodological limitations inherent to an exploratory study of this kind. The 42 interviews were chosen to cover a wide range of functions within five large companies, complemented with academic experts, consultants and EP suppliers. As a consequence, the range of companies represented in this study is limited, which restricts the generalizability of the findings. However, this study provides interesting initial insights in the influences between actors.

Future research

This project has an exploratory nature and yielded initial insights into the factors that may cause EP adoption behavior to spread from one actor to another. These findings provide several leads for continued research.

Further studies could extend the study of influences towards different types of actors, for instance based on different functions or hierarchical positions. A network of different types of actors can then be developed in which the incidence and effectiveness of influences between actors differ according to the position of the actors in the network. Propositions can be developed based on this exploratory study, on further literature studies, and the aforementioned network of different types of actors. These propositions can then be empirically tested. A simple network is already likely to yield interesting insights into the dissemination process of EP and how influences vary between different types of actors. Naturally, the complexity and the scope of the network can easily be extended, to include also actors from outside the boundaries of the organization. Influences of suppliers, consultants, and other experts could then be included. Further extensions could include more complex interaction relationships, like actor C influencing the dissemination of actor A to B and vice versa. In short, various ways can be pursued where dyadic dissemination is extended towards network dissemination.

The exploratory study presented in this paper is a part of our research agenda with the objective of identifying the effectiveness of interventions for managing the organizational adoption process of EP.

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