

## **Contextual Understanding of Information Systems – Characteristics of Process Oriented Information Systems**

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### **Abstract**

*Information systems need to be understood contextually. Such contextual understanding can be gained by considering the role of information systems in business processes. Business processes and information systems are however two notions that there resolves a lot of debate around. In order to arrive at an integral understanding of business processes and information systems there is a need for common basis. In this paper some characteristics of process-oriented information systems are developed. These characteristics are based upon socio-instrumental actions as the basic unit of analysis for information systems and business processes.*

**Keywords:** Business Processes, Information Systems, Social Action, Co-ordination, Business Interaction

### **INTRODUCTION**

When information systems (IS) are being evaluated, putting requirements upon and developed it is necessary to understand such systems contextually. Information systems are parts of larger organisational work systems and the use of IS should give support to those broader work systems. It has however often been reported that IS do not fit the organisational context which it is a part of (Goldkuhl & Röstlinger, 2002).

During the 90's a number of customer-oriented approaches for business development have gained much interest. Examples of such approaches are BPR, TQM, and Process Management. All these approaches emphasise a focus on business processes as holistic concepts for addressing work performed by organisations. By regarding the performance of work in business processes one put special emphasis on the customer, value-creating activities as well as on flow of material and information. By such focus the performance of work is put in the foreground and the way to organise is put in the background. Business processes are cross-functional spanning the white spaces in the organisation chart (Rummler & Brache, 1995).

Underlying theories behind these customer-oriented approaches are concerned with organisational issues and not with information systems. On the other hand, theories on information systems are often oriented towards technological and informational aspects. It is however claimed that business processes is *the way* to understand information systems in context (Österle, 1995). Such difference in the underlying theories behind these phenomena makes it problematic to integrate the two. These different theories deal with different subject matters and their theoretical grounds are disparate and are thus hard to relate and combine (Goldkuhl & Röstlinger, 2002). It has therefore been claimed that there is a need for sufficient integral understanding of IS and organisation (ibid). This paper deals with the question of what characterises process-oriented information systems.

Since there are differences between the underlying theories of business processes and information systems this question is tricky to be dealt with. On one hand there is a lot of debate going on concerning how business processes should be conceived (Keen, 1997; Lind, 2001). On the other hand there is also a lot of debate going on how to perceive information systems (Magoulas & Pessi, 1998). There is a need for a common ontology for understanding the two phenomena and to establish an integrative view. Business processes are about organisational action and information systems should enable organisational action. The purpose of this paper is to investigate theoretical foundations for understanding business processes and information systems in order to derive some characteristics of process-oriented information systems.

After this introduction, organisational action will be dealt with. In this section two concepts will be introduced that will form the basis for understanding the notion of information systems as well as business processes. These two concepts are the notion of socio-instrumental action and the notion of work practices. Socio-instrumental action is the basic unit of analysis for understanding organisational action. The notion of work practices is a holistic concept for understanding the work performed by organisation(s). Then, a notion of information systems derived from this basic unit of analysis will be discussed. Further a notion of business process derived from the same unit of analysis and the notion of work practices will be discussed. In the analysis the relation between the

two phenomena, i.e. business processes and information systems, will be investigated. The analysis will be concluded by some preliminary results of the characteristics of process-oriented information systems.

## UNDERSTANDING ORGANISATIONAL ACTION

### The Notion of Socio-instrumental Action

The basic concept of socio-instrumental action is action. An action is a purposeful and meaningful behavioural of a human being. A human being intervenes in the world in order to create some differences. An important distinction is made between the result and the effects of the action (von Wright, 1971). The action result lies within the range of the actor and the action effects may arise as consequences outside the control of the actor. An action is performed in the present based on a history and aims for the future (Goldkuhl & Röstlinger, 2002). A social action is an action oriented towards other persons (Weber, 1978). The action can be a communicative act, e.g. someone saying something to another person, or material. Material actions count as social actions if they are directed to other persons (Goldkuhl, 2001; Goldkuhl & Röstlinger, 2002). Actor relationships between the intervening actor and the recipient are established through social actions (Habermas, 1984).

An organisation consists of humans, artefacts and other resources, and actions performed. Humans (often supported by artefacts) perform action in the name of the organisation (Ahrne, 1994; Taylor, 1993). Actions are performed within the organisation – internal acts - and there are also external acts towards other organisations (e.g. customers or suppliers). Humans act in order to achieve ends (von Wright, 1971). Human action often aims at making material changes. Humans do however not only act in the material world – they also act communicatively towards other humans. Austin (1962) and Searle (1969) mean that to communicate is also to act. Human action is about making a difference, where such difference can have impact in the social world as well as in the material world.

A generic model of social action including both communicative and material acts is presented by Goldkuhl (2001) and Goldkuhl & Röstlinger (2002). E.g. an order from a customer to a supplier is a communicative act. The delivery of goods from the supplier to the customer is a material act. These both actions are performed by one business party (an "interventionist") addressed to the other party (the recipient). Since they are actions directed from one actor towards another actor they must both be considered as social actions. Language is not the only medium for interacting with other people. The delivery of a product to a customer is not only to be seen as a change of place of some material stuff. In this context it must also be considered as a fulfilment of a request and a promise made earlier. Actions are often multi-functional. One example of multi-functionality is that a customer order both represents *request* to the supplier to deliver something and a *commitment* of paying for the delivery. There also exists a duality of actions. The performer of an act (in an organisational context) both acts on behalf of himself and on behalf of the organisation that the performer represents. Further, acts are multi-consequential. This means that a certain act can trigger several acts. Since there exists a duality of acts and that these are multi-consequential one can distinguish between inter-organisational acts, i.e. directed towards a party in another organisation, and intra-organisational acts.

For the performance of most actions people need instrument of different kinds. The language is used as one instrument when performing business communicative acts. For performing material acts there is often a need for an external instrument, which then extends the ability of an actor. Goldkuhl & Röstlinger (2002) have made a distinction of three different roles of artefacts and their corresponding type of action; *Static tool* (artefact-supported human action), *Dynamic tool* (human-artefact co-operative action), and *Automation* (human-defined artefact action).

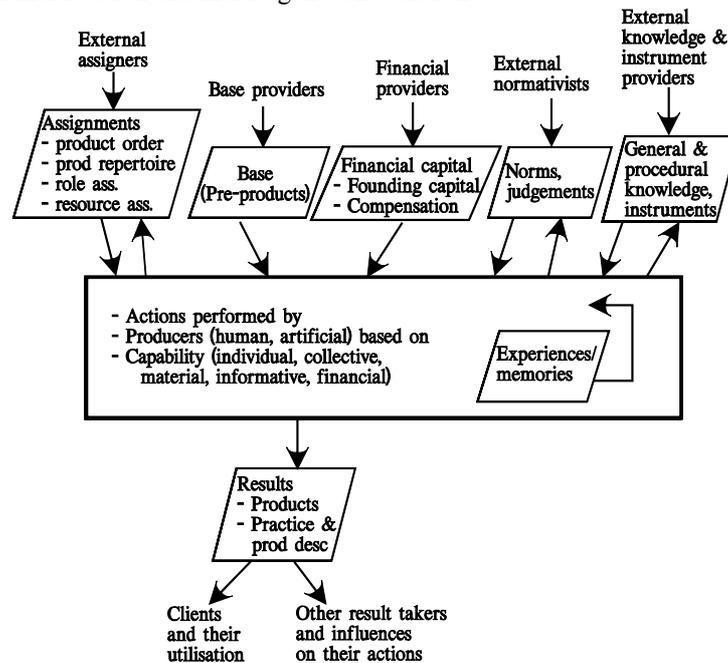
### The Notion of Work Practices

Some researchers present different kinds of generic models for developing comprehensive knowledge about organisations. Examples of such models are CATWOE (Checkland, 1981), Activity theory (Engeström, 1991) and Theory of Practice (ToP) (Goldkuhl & Röstlinger, 2002). ToP is a theory that regards the work of one or several organisations as a work practice. This theory, which core is a generic, contextual and relational model, for characterisation of work practices, is built from four basic categories (ibid). These are *actors in roles*, *actions*, *action objects*, and *relationships between actors/roles*.

These categories are derived from the generic model of social action. A work practice is however a holistic concept for understanding the prerequisites and the actions for creating different results. Practice is a notion, which permits us to change between different levels of abstraction; between the wholeness of a practice and different parts of it and also to different contexts of the practice (Goldkuhl & Röstlinger, 2002). A practice can be seen as a company, a part of a company, several companies, some parts of several companies or some other meaningful unit of activities. A practice is defined in the following way:

*A practice means that some actor(s) – based on assignments from some actor(s) – makes something in favour of some actor(s), and sometimes against some actor(s), and this acting is based on material, immaterial and financial conditions and a work practice ability which is established and can continuously be changed (Goldkuhl & Röstlinger, 2002).*

This definition guides the construction of a generic model (see figure 1), the ToP-model (Theory of Practice), of organisations as practice systems. This generic model both emphasises the transformation of raw material to finished products and the different assignments for co-ordinating the creation of value for clients. For further discussions about used categories, confer Goldkuhl & Röstlinger (2002). The existence of many actors involved, in the creation of value for the clients, give rise to a need for co-ordination. According to Goldkuhl & Röstlinger (ibid) organisations are constituted and established through communication, they exist through recurrent patterns of actions and through multi-action and multi-agent constellations.



**Figure 1: A generic model of work practices (ToP model) (Goldkuhl & Röstlinger, 2002)**

Goldkuhl & Röstlinger (ibid) use the concept of agent to address the IT-system as a performer. IT-systems and actors are agents of the organisation. Work practices are co-ordinated based on different kinds of assignments. Lind & Goldkuhl (2002) identify three types of assignments (c.f. also Olausson & Lind, 2005), for distinguishing between vertical and horizontal co-ordination as well as between external and internal co-ordination (see table 1).

**Table 1: Characterizations of different types of assignments (Lind & Goldkuhl, 2002)**

Type of assignment	Communication place	Organizational dimension	Degree of specificity	Communication roles
Role assignment	Internal	Vertical	Typical products and customers (type level)	Organization (principal) → Agent
External product assignment (Customer order)	External	Horizontal	Particular products and customers (instance level)	Customer → Organization (supplier)
Internal product assignment (Forwarded order)	Internal	Horizontal	Particular products and customers (instance level)	Agent → Agent

## UNDERSTANDING INFORMATION SYSTEMS

### From Information Systems to Communication Systems

An information system is according to Langefors (1973) a system whose task is to collect, store, treat and distribute information. He makes a distinction between operative and directive information. Operative information is used for decision-making concerning the operative business in an organisation. Directive information is used for decision-making concerning strategic and long-term issues. Such view on information means that governing of the business is in focus, which is rooted in classical systems theory (Lind, 2001).

Further Langefors (1973) makes a distinction between data (as representation) and information (as knowledge). Data is used for representing information, but is not information. Langefors uses the notion of e-message to define information. An e-message consists of three parts: object, property and time reference.

Magoulas & Pessi (1998) calls such a view a system infological paradigm, which means that the reality is regarded as consisting of technical and social systems. Goldkuhl & Lyytinen (1982) transcend this view and mean that information systems are social systems in which parts are technically implemented. They regard *information systems as linguistic systems for communication* between humans and as a support in their action. Magoulas & Pessi (1998) call this view action paradigm (human infological paradigm). Information systems can thus be interpreted as systems of communication. Information can not exist without communication. By adopting the notion of social action on information systems one would say that information is something that is said by someone to somebody.

### **Information Systems Actability**

Information systems are closely related to human action. Such social and organisational issues are handled within linguistic (Dietz & Widdershoven, 1991; Goldkuhl & Lyytinen, 1982; Winograd & Flores, 1986) and semiotic perspectives (Stamper, 2000) for understanding information systems. Lyytinen (1981) claims that a substantial part of a practice is the business language, which includes vocabulary as well as rules for communicative action.

Goldkuhl (1995) base his view on information systems on a communicative action perspective. This view is based upon, but transcends, the notion of e-message proposed by Langefors. "A communicative action perspective gives an alternate definition of information and information systems. This definition transcends a narrow objectivistic view of information; i.e. just seeing information as reality descriptions. Information and information systems are parts of action games in organizations" (ibid, pp 77).

According to Goldkuhl & Röstlinger (2002) a computerised system is an action system. It is both an instrument for performance of action and a support tool for humans to perform their actions. Information systems should be actable. IS actability is defined as "an information system's ability to perform actions, and to permit, promote and facilitate the performance of actions by users both through the system and based on information from the system, in some business context" (ibid). The theory of information systems actability has two essential ingredients. The first one is the distinction between three type of IS usage situations; *Interactive usage situation* (where users performs actions interactively together with and through the system), *Automatic usage situations* (where the system performs actions by itself based on predefined rules), and *Consequential usage situations* (where users performs actions based on the information from the system).

Sjöström & Goldkuhl (2002) have further related these different usage situations to different types of actions. Sjöström & Goldkuhl (ibid) claim the need for focusing on social actions and the action relationships between the involved actors instead of focusing on usage situations. Thereby the focus is aimed towards human-to-human communication in which the IT-system takes part. The different types of actions that Sjöström & Goldkuhl (ibid) acknowledge in this context are *interactive action*, *automatic action* and *consequential action*.

The second ingredient is the interpretation of an IS as consisting of (Goldkuhl & Röstlinger, 2002) an *action potential* (a predefined and regulated repertoire of actions), *actions* performed through and by the systems, an *action memory* (a memory of earlier performed actions including prerequisites for actions), and *messages* and *document* (where some documents are action media for user's interactive actions).

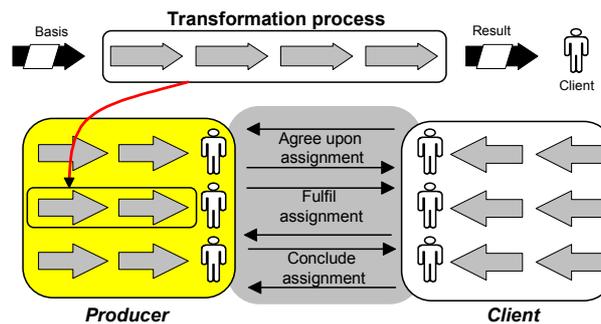
## **UNDERSTANDING BUSINESS PROCESSES**

### **Perspective on Business Processes**

Two main views of how to conceive business processes can be identified (Keen, 1997; Lind, 2001). The most dominant one is the transformative view (c.f. e.g. Davenport, 1993; Hammer & Champy, 1993), which uses material acts as the unit of analysis. The other one is the communicational view on business processes (c.f. e.g. Dietz, 1999; Winograd & Flores, 1986), which uses communicative acts as the unit of analysis.

The two views on business processes are in conflict with each other (Lind, 2001). A notion of processes used for developing the work of organisations, including information systems, needs to be based upon an understanding of how communication is performed within and between organisations. There is however also a need to understand the transformation performed by the organisation. It is therefore not possible to reduce our understanding of an organisation to just communicative acts *or* material acts. We need to base our understanding on the notion of social action (Goldkuhl & Röstlinger, 2002) and the notion of work practices (ibid), which have the consequence that transformative aspects of processes are regarded from an assignment point of view. Assignments are agreed upon, fulfilled and concluded through communicative and material acts. The

transformation of basis to results is part of the fulfilment of the assignment. This view on business processes is depicted in figure 2.



**Figure 2: Transformation in an assignment perspective (Lind, 2001)**

One of the fundamental characteristics of business processes is customer-orientation. It is therefore necessary to understand ways that organisations interact with their customers. In business interaction, actions (Goldkuhl & Lind, 2004) are directed from the supplier to the customer as well as from the customer to the supplier. These actions, which are derived from the notion of social action, are parts of the interaction logic between the organisation and its surroundings. Genuine business interaction is about exchanges between supplier and customer.

A business process consists of a number of exchanges between the organisation and a particular customer (ibid). The fundamental building block of business processes (Lind, 2001) should thus be social action. In *Business interAction & Transaction framework (BAT)* developed by Goldkuhl & Lind (2004) distinctions are made between market and dyadic business interaction. Within the scope of dyadic interaction there is a distinction made between frame contracting (with embedded business transactions), long-term business interaction, and single (separate) business transaction, short-term business interaction. A business transaction consists of exchanges of proposals, commitments, fulfilments, and assessments.

### Different Process Types

Business processes are thus about commercial interaction *and* the organisational conditions as well as the organisational consequences of such interaction. This means that the interaction patterns between the supplier and the customer needs to be taken into consideration, but also the actions performed “internally” in each organisation. Therefore a division is often made between different types of business processes. By distinguishing the characteristics of actions performed for producing and delivering different results of the work practice three different business process types can be distinguished. These are (Lind, 2003):

- **Delivery processes**, which includes action that takes place in the supplier’s interaction with *particular clients*. Delivery processes cover both *operative and development-oriented actions*.
- **Providing processes**, which includes *operative actions* for establishing delivery potential. Actions covered by providing processes are performed for *potential clients*.
- **Condition creating processes**, which include *development-oriented actions* performed for *potential clients*.

### Different Variant Processes

One way to express the diversity of work practices is thus to distinguish between the different process types. The diversity of work practices can further be understood by identifying variants of the different process types. Business processes come in variants since many organisations have different ways of fulfilling customer needs. Delivery processes, for example, exist as delivery variants. A delivery variant is determined by a certain actor relationship and handles a certain product. Actor relationships and products determine the way interaction between supplier and customer takes place, which is covered within delivery variants. It is common that different actor relationships (between customer and supplier) and different products are handled within the same practice, which motivates thinking in variant processes. Examples of different actor relationships are long-term and short-term agreements, which imply different interaction patterns. Generic interaction patterns for long-term and short-term business interaction is described in the BAT (Goldkuhl & Lind, 2004). Products exist in different classes (Goldkuhl & Röstlinger, 2000), can be of different types, with different characteristics. Examples of different product classes are goods for transfer and treatment of client. Some products can be standardised and some products are customised, which are the extremities of product types. The possibility of handling standardised

products is determined by the basis needed for a certain product class. Dependent on the actor relationship and the product handled the interaction with the particular client will vary. A unique combination of a certain kind of actor relationship and a certain product determines a delivery variant, i.e. a variant of delivery process (Lind, 2001). Each delivery variant includes and supports a logic of interaction.

Since delivery processes exist in variants there is also a need for providing processes to exist in variants. This idea is based on the foundation that different delivery variants need different bases for their refinement of products. The basis used for possible further refinement in a delivery variant is dependent on the degree of client-orientation, i.e. the degree of adaptation of the product for the particular client (Wortmann, 1991). Performing business with a *high* degree of client-orientation implies that delivery processes cover a lot of the work, and performing business with a *low* degree of client-orientation implies that a lot of work is instead covered within providing processes. There is often a mix of client-orientation in many practices, which is handled by variants of delivery processes and consequently variants of providing processes.

### **Re-usable Sub-processes**

Variant processes consist of sub processes where some are re-usable. They are re-usable in the sense that one sub process can be used in several variant processes. This means that one sub process can be part of one or several variant processes and that variant processes can consist of several (re-used) sub processes. Variant processes often, however, consist of one or several unique sub processes (Lind, 2001).

Variant processes are overlaid in the sense that they co-exist and co-use infrastructures. One example of such infrastructure is the computerised information systems. This means that there will be actions supported by common information systems that facilitate the performance of actions in several variant processes at the same time.

Sub-processes are constituted by contextually related social actions. These social actions are contextually related to each other by the result of one action as condition for other actions. In order to relate different sub-processes to each other, both as parts of a certain process type as well as parts of different process types, business processes need to be regarded as contextually overlapping.

## **ANALYSIS: TOWARDS AN INTEGRAL UNDERSTANDING OF PROCESS-ORIENTED INFORMATION SYSTEMS**

### **Example: IT-system in an Organisational Context**

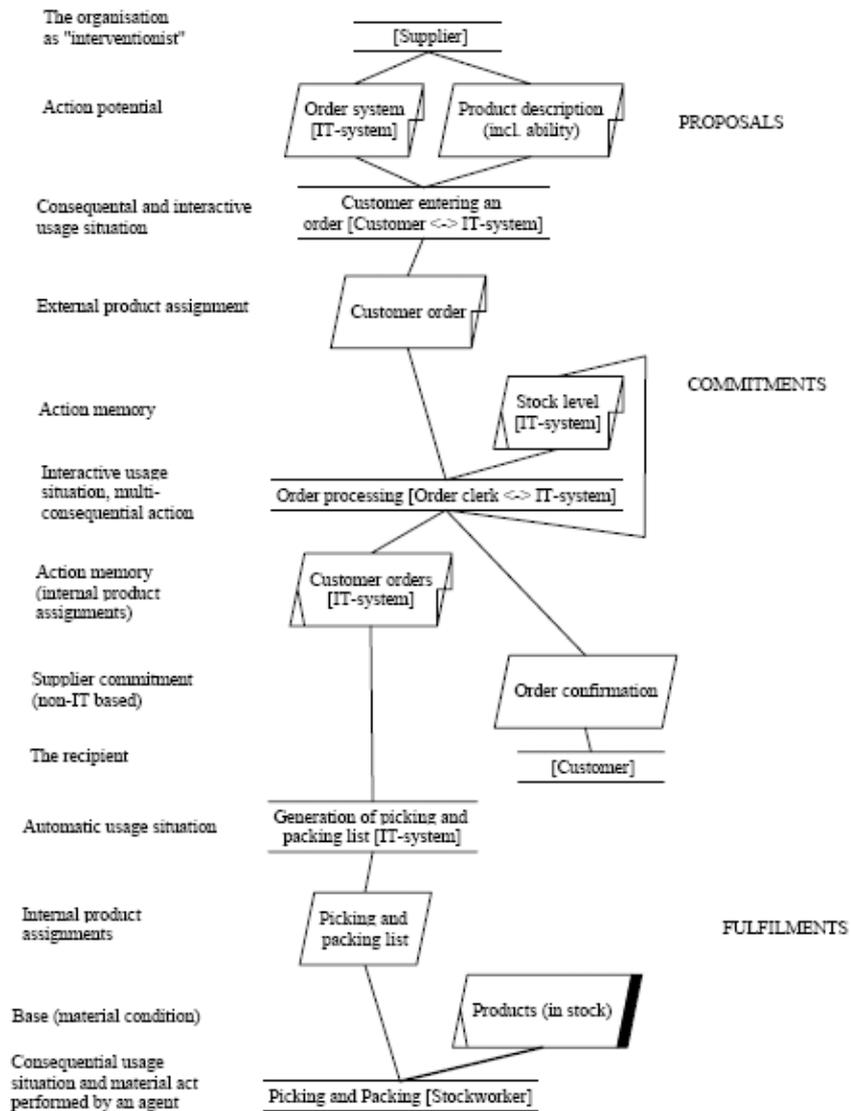
In figure 3 an example of an IT-system integrated in a business process is shown. The business process is depicted in an action diagram showing actions, actors (agents), action objects and inter-relations between different actions. The used business process is a part of a delivery variant – from offering to parts of fulfilment. In order to show the integrative role of the IT-system, with its usage situations, this example has been chosen.

The example consists of three business interaction exchanges. These are the exchange of proposals, the exchange of commitments and (parts of the suppliers) fulfilment of made commitment. In the example, this delivery variant starts out with the supplier (as the interventionist) exposing its ability by a product description to the customer. The supplier also provides an IT-system for the customer to use as the media for placing orders. This IT-system consists of an action potential in terms of different possible actions for the customer to perform. The customer placing an order is a consequential usage situation in which the user (the customer) performs acts based on information from the system. The act of placing the order in the IT-system is done in an interactive usage situation.

By this act the customer order, which is the external product assignment, is registered in the IT-system. The order clerk will then process this order, in a new interactive usage situation. This act of order processing is a multi-consequential act of the customer placing an order. It is multi-consequential since it results in both internal product assignments (forwarded orders) directed towards an internal agent and an order confirmation. The order confirmation is a supplier commitment directed towards the customer (as the recipient). In order for the order clerk to fulfil this act of order processing there is a need for the order clerk to look into the stock level for the products desired by the customer. The stock level is represented in the IT-system as an action memory. A stock level as an action memory is a result of actions reserving products as well as actions for increasing the stock of products.

The act of order processing results in another action memory, customer orders, which is a memory of made commitments and forwarded customer orders. This action memory is the basis for an act of generating a picking and packing list. This generation is done automatically by the IT-system (automatic usage situation). This act is also the start of the fulfilment phase. The picking and packing list is a refined internal product assignment directed to stock workers. In the example this list of products to pick and pack is a document (sheet of paper) to

be used by the stock workers. The act of picking and packing is a consequential usage situation in which the stock worker performs material acts. The basis for this act is products (physical goods) in stock. The fulfilment phase then continues, however not revealed by the example covered in figure 3, with other acts of fulfilment and acts of completion.



**Figure 3: Action diagram - IT-system integrated in a part of a business process**

The example with its different acts reveals that different agents are involved in the business process. There are both agents of human actors and IT-system. As can be seen from the example it is vital that the IT-system is regarded as an agent, otherwise the fulfilment of the commitment made to the customer would never be initiated. The example also reveals the need for distinguishing between different organisational levels. This is done by regarding the agents as performing acts on behalf of the organisation (the duality of actions).

A delivery variant consists of different exchanges performed between the customer and supplier. These exchanges are both of communicative and material characteristics. In the example the exchange of commitments can be revealed. These exchanges are the multi-functional acts as the customer placing an order (as a request of a product *and* a commitment of paying) and the supplier issuing an order confirmation (as a commitment). Such exchanges constitute the core of business processes in the sense that acts covered by business processes are aimed towards establishing, fulfilling and assessing fulfilled expectations by such exchanges.

### The characteristic of Process-oriented Information Systems

Information systems need to be understood contextually. In this paper it is claimed that such understanding can be achieved by regarding IT-systems as part of business processes. In the example the different theoretical constructs from the theories discussed above have been integrated. These different theories can help us in

understanding different aspect of the business and the role of information systems. In table 2 the different *performed actions* is identified and analysed by the help of the different theoretical constructs brought forward above.

**Table 2: Analysis of the different characteristics in the example**

<i>Performed action</i>	<i>Agent</i>	<i>Type of action</i>	<i>ToP</i>	<i>ISAT</i>	<i>BAT</i>	<i>Co-ordination</i>
Supplier (exposed product repertoire, action potential)	Supplier (via IT-system)	Communicative	Product description on the web Web site = instrument for exposing the product repertoire	Interactive action: Exposure and search for possible offers	Offer (proposal)	Product repertoire
Customer entering an order	Customer	Communicative	Customer order = product order Web site = instrument for product ordering	Consequential and interactive usage situation	Customer sending an order to supplier (commitment)	External product assignment
Order processing	Order Clerk and IT-system (acting on behalf of the supplier)	Communicative	IT-system = instrument as memory for customer orders and stock level	Interactive usage situation IT-system: Action memory	Order confirmation (generation) (commitment)	Forwarded order (Multi-consequential action)
Receiving order confirmation	Customer	Communicative		Consequential usage situation	Order confirmation reception (commitment)	(Multi-consequential action)
Generation of picking and packing list	IT-system	Communicative	IT-system = instrument for generation	Automatic usage situation	(fulfilment)	Forwarded order
Picking and packing	Stockworker (acting on behalf of the supplier)	Material	Manual actions performed by stock worker	Consequential usage situation	(fulfilment)	Forwarded order

Based on the theory and the example presented in the section above some characteristics of a process-oriented information system can be identified. A process-oriented information system should:

1. Support the action pattern in which it is a part of
2. Support different usage situations, i.e. interactive, automatic and consequential usage situations
3. Support the different types of exchanges that constitute the business process.
4. Be regarded as an action system supporting communicative actions between different agents
5. Be regarded as a support for individual actions with the scope of the action pattern constituting the business process. This means that the IT-system gets its contextual meaning by the action pattern. It is thus necessary to shift between individual acts supported by the IT-system and the action pattern constituted by different individual acts.
6. Support the diversity of work practices. This means that the IT-system should support both action patterns of different variant processes and action patterns of different process types.
7. Reflect different characteristics of work practices, business processes, business interaction patterns, co-ordination principles, and social actions as e.g.
  - Different kinds of clients (Potential vs. particular)
  - Different kinds of business interaction (market, dyadic)
  - Different kinds of assignments
  - Different product characteristics
  - Different actor relationships (frame contracting vs. single (separate) business transactions)
  - The multi-functionality of actions
  - The multi-consequentiality of actions
  - The duality of actions
  - The different roles of co-ordination (taking, giving and forwarding external product assignments, internal product assignments and role assignments)
8. Reflect the diversity of work practices by letting the action potential (the repertoire) be constituted by the differences identified in issue #7 above.

9. Use the action memory as a memory for earlier performed action, as e.g. made commitments, but also as a way to assess performed actions. Such assessment can be done on different levels of abstraction, from the level of social action to the level of work practice.

In order for IT-systems to be process-oriented there is a need to regard them as actable. The strongest incitement for such a view of IT-systems is that business processes consist of social actions and that IT-systems as well as other agents are performers of such actions that constitute the business processes.

It is important to arrive at a view of the role of IT-systems as contextually bounded to business processes. An IT-system is an action system and actions come in pairs (initiative and response). This means that the result of one action is the incentive for another action, where this other action then will be a response to the first action. In these action patterns the IT-system can play different roles, e.g. as a support for the interactive usage situation, as an automatic usage situation or as a consequential usage situation. IT-mediated actions must thus be regarded in context with other actions

## CONCLUSIONS

An IT-system can not be evaluated, put requirements on or developed without taking its role in the work practice in to consideration. In this paper we have looked into what it would mean to contextually relate the role of IT-systems to business processes. Some characterisations of process-oriented information systems have been made. The basis for this characterisation has been derived from different notions of information systems, business processes, and work practices. All of these are derived from the notion of socio-instrumental action.

The preliminary characterisations show that a process-oriented information system should be regarded as an actable action system supporting *both* individual actions *and* being a part in constituting action patterns. These action patterns constitute different business processes.

The notion of business processes and the notion of information systems are debated a lot in different fields. By adopting a view on both these phenomena using the same grounds creates a good potential in deriving solid foundations for:

- The notion of information systems
- The notion of business processes
- The relation between business processes and information systems

All the potential in the notion of business processes advocated for in this paper has not yet been dealt with. What is a preferred way of contextually regard your information system when using concepts such as sub-processes, variant processes and process types? It has been reported upon that IT-systems many times do not fully support the diversity of work practices. We need to adopt an integrative perspective on IT-system and business processes to ensure that such weaknesses can be revealed.

One issue of further research identified when dealing with an integrative perspective on business processes and information systems are how IT-systems can play a role of enable the contextual overlaps between business processes oriented towards potential customers and business processes oriented towards particular customers. Another issue of further research would be to investigate domain-specific characteristics of process-oriented information systems for different settings. Examples of such settings are bank and insurance, customer-intensive organisations (such as mail order) and health care. Another issue is also to develop a framework for evaluating and putting requirements upon ERP-systems.

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