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# Design Components for Information Market Services

*A Framework for Research and Practice*

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**Abstract**: Information services are becoming more available and gain in importance for our economy. Many of these services, though often launched with great enthusiasm by their creators and sponsors, quickly die. This article assumes that the main cause of information service failure are based on an insufficient design at its beginning. Following an alignment model, information services design needs the selection of (1) a business model, (2) a process model, (3) a system architecture, and (4) an organizational architecture. Not much explicit understanding of each of these components exists, and consequently the article describes the basic typological elements of each component. The ideas are illustrated by current examples. The article concludes with a discussion and research agenda.

**Keywords**: Information services design; Information goods; Information markets

## 1. THE INFORMATION SERVICES DESIGN CHALLENGE

Following Stamper (1973), who takes a semiotic stance, we define information as signs that represent something (e.g. knowledge, observations, illocutions and assertions). Information has at least two values (1) information helps the management of organizations, and (2) information is a value by itself (Shapiro and Varian, 1999). This article focuses on the second value, though both are not unrelated. Information as a value by itself is not a new concept, because people are inherently curious or enjoy patterns of representations in art. The efficiency of modern computers in information processing and the abilities of the Internet for communication give the following new opportunities (1) more people can be reached efficiently, and (2) information can be supplied and accessed easier, improving the cost-benefit relation of using information.

The original version of this chapter was revised: The copyright line was incorrect. This has been corrected. The Erratum to this chapter is available at DOI: 10.1007/978-0-387-35617-4_48

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Consequently, it is not surprising that many attempts are undertaken to realize information services (which deliver information goods via IT-based operations) as new economic entities. Some examples of these services are (1) free-of-charge Internet information deliveries (like CNN), (2) subscription and fee-based information resources (cf. www.Esignal.com; www.lexisnexis.com), and (3) information community resources (Hummel and Lechner, 2001). Many of these services failed because of a lacking business model. Particular problems here are insufficient advertising incomes (Bughin et al, 2001) and the problems of receiving payments from clients (Picard, 2000). This article regards these financial troubles as a representation and not the real root of the problems. It is the assumption here that many of these firms were developed rather ad hoc, as is typical for development process in an immature industry (Kotler, 2000; Mintzberg, 1983). Therefore, this article investigates the design components of an information service.

Information services are economic entities that deliver information goods via IT means. To realize such services, though, the IT means are important but cannot result in success if the IT does not fit with the intentions of the business (the so-called business models), and if the processes of delivery are not optimised to the business model requirements. Finally, though much neglected in the literature on e-commerce, any successful application of IT requires an organization, consisting of appropriate tasks and organizational structures (cf. Venkatraman and Henderson, 1994). Consequently, we distinguish four components of an information service (1) business models, (2) process models, (3) IT architectures, and (4) organizational architectures. A business model defines how the business operates, its underlying foundations, the exchange activities, and financial flows upon which it can be successful (Timmers, 1998). The business model identifies what people want to deliver to whom, and under what terms and conditions. It only marginally indicates the processes, IT and organizational means. The process models define the activities that are needed to realize the deliveries such that the aims of the business model can be realized. The IT architecture comprises the applications to realize efficient processes (like an e-commerce application), and the infrastructure that enables the applications to run (e.g. information service providers services) (Broadbent et al, 1996). The organizational architecture involves the organizational functions and task descriptions, the management, and the relations with suppliers of content (e.g. authors and research companies), other resources, and clients (e.g. virtual communities) (Bharadwaj et al, 1999). Figure 1 gives a summarizing model of information service components.

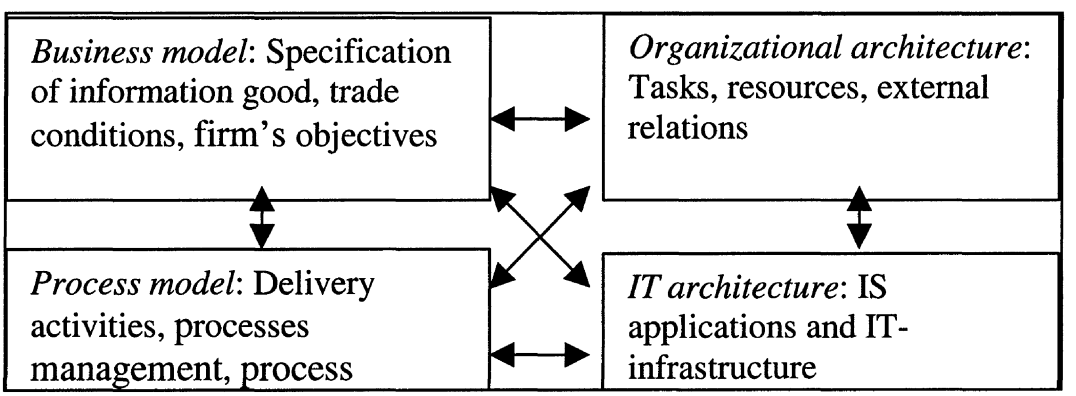


*Figure 1:* Components of an Information Service

Information goods may be (1) a by-products of other business activities (e.g. data of an e-catalog), or (2) the information good may be intended to generate an economic value by itself (e.g. commercial data created by a market research institute) (cf. Rayport and Sviokla, 1994). The second option, contains trade information goods specifically created for the purpose of a market need, or they may be conversions of already existing information goods, called shovelware (Chyi and Sylvie, 2000). Table 1 gives the related classification of information goods.

| | | Commercial objective of the good | |
|---|---|---|---|
| | | *By-product of non-information business* | *Information service* |
| Information goods creation | *Shovel ware* | By-product information good. Example: Product catalogs | Information conversion good. Example: on-line newspapers |
| | *Unique ware* | Not existing | Unique ware information good. Example: Yellow pages. |

*Table 1:* A classification of information goods

The by-product services are so much related to other business activities that their development process is integrated with the development of that business. To keep this study within relevant scope, by-product services are excluded from this study. Obviously, the creation of success for such services is not easy as well (cf. Amazon), but for Information services the value creation is even more complicated, as the supplied goods are totally virtual. This virtual nature results in high difficulties with maintaining copyrights and establishing prices (Shapiro and Varian, 1999).

Information goods content may be classified along the dimensions of their codification and abstractness (Boisot, 1998; Wijnhoven, 2001). Codification helps to give form to an asset, for instance by representing it in a language or mass-produced artifact. High codification implies that the representation is unambiguous for different receivers of the good. Abstraction refers to the level that information and knowledge can be applied more generally and is less restricted in scope (Boisot, 1998). The codification level determines the efficiency of possible exchanges (Boisot, 1998). Low codification levels obstruct the market exchange of information goods, because it may be unclear for the buyer what actually will be sold. As such low codified goods are more effectively exchanged in networks, where reputation determines much of the expected value, and higher risks of poor value deliveries are acceptable (Liebeskind, et al, 1996; Williamson, 1991). High codification, in return, enables to tag a price to the commodity. Consequently, markets only exchange highly codified information goods, though if they are highly asset specific, they will have to be exchanged via hierarchies (Williamson, 1991). Given the different levels of abstraction and codification, several information goods contents may be identified in different transaction governance environments (see table 2). This study focuses on the goods that are traded in markets and in hybrids, thus those information goods that have unit prices, and those that are priced at the aggregate level.

Though information market services can be established easily, and may be efficient in their production, they often fail (cf. Picard). The reasons for these failures may be 'soft' or 'hard'. The soft reasons are for instance a lacking motivation of people and lacking of a shared strategic view, because of poor training or conflict of interests. The hard reason may be a lacking explicit understanding of objectives, design or technical realization of the new situation. We prefer here to focus on the hard side, so that the idea of what actually could constitute an

information market service becomes clearer. Realizing this objective could contribute substantially to the soft side as well, because it gives more structure to the communications needed to gain commitment for the ideas. Additionally, this should result in better though-through designs of information services.

| | Market | Hybrid | | Hierarchy | |
|---|---|---|---|---|---|
| | **Mass market service** | **Special or community services** | | **Non-market services** | |
| | | **Level of information codification** | | | |
| | **High** | **Low** | **High** | **Low** | **High** |
| **Low abstract goods** | *Data services; News, Infotainment* | *Qualitative observations; Gossip* | *Data sets* | Gossip; Intelligence reports | Databases |
| **Moderate abstract goods** | *Magazines Commercial software retail* | *Research in progress results; Ideas & notions* | *Resources for (academic) group* | Routines and norms; Informal policies | Management reports; Business policies |
| **High abstract goods** | *Professional services; Courseware; Scientific publishing; Patents.* | *Theory ideas Paradigms* | *Scientific software; Models; Sponsored scientific publications* | Business consulting; Skills | Knowledge systems; ERP; Business models; R&D output |

*Table 2:* A classification of information goods content and examples.
Note: Examples in italics belong to the research domain.

The main research question in this article is: *What conceptual innovations are needed to introduce design in the development of information services*?

The IS field has much emphasized the business models as a conceptual foundations for information systems (cf. Timmers, 1998; Venkatraman and Henderson, 1994). Unfortunately, the idea of a business model became much confused with process models (Gordijn et al, 2001). This article consequently will emphasize the difference between these models. Process models have been very popular in the IS discipline for eliciting the requirements for information systems (cf. Malone et al, 1999), and they are regarded as important for the definition of IS applications and IT infrastructures for (information goods) electronic commerce (Kalakota and Whinston, 1996; Timmers, 1998). Strangely enough, these models are not often used to realize the other aspect of a working information system: the organizational architecture. This results in large problems with communicating the required organizational changes related to the new information systems, and consequently large implementation problems (cf. Mumford, 1983). This article treats the business models, the process models, the IS/IT architecture and the organizational architecture in the next four sections.

# 2. INFORMATION SERVICES BUSINESS MODELS

A business model answers the question: "who is offering what to whom and expects what in return (Gordijn et al, p.41)". This implies that we have to stipulate the goods, the markets, and the prices.

## 2.1 Information goods

An information good is any representation that is exchanged among people, and an explicit definition of what ownership will be transferred (Wijnhoven, 2001). The information good can be defined (1) per information unit delivered, or (2) as a bundle (a broad collection of units that are available for the client). These information units may have a higher or lower level of abstraction. The content may be any of the six italicised types mentioned in table 2. Four property rights may be exchanged (1) the right of use, (2) the right of changing forms and structure of the transferred good, (3) the right to reap the profits of the good, and (4) the right to sell the good (Picot, Bortenlanger, & Rohrl, 1997). In the context of information goods these distinctions are particularly important, because information goods are more sensitive on infringements of these rights, and sometimes it is less clear how to state what exactly has been transferred.

## 2.2 Information market groups

In the classical view of markets, suppliers prefer to detect homogeneous groups, groups though that can be treated in a similar way by supplying similar products. Homogeneous groups enable a supplier to optimise economies of scale and economies of scope (Kotler, 2000). In information markets some of these groups can be identified (e.g. people regularly viewing a specific TV program), but often the precise deliveries needed are hard to define in advance, because the clients may still have only loosely defined their information needs. Some information services, therefore, are a rather broad portal and give access to many interest fields and data. The users are given search engines and means to define their needs. Other services are more specialised and serve special interest groups, though a more profound understanding of specific client interests is needed, and some conceptual codification (e.g. jargon) may exists to enable the delivery of higher abstract goods (e.g. AISnet.org).

## 2.3 Prices

Information services mostly deliver their goods for free or by a subscription, because it is that it is often hard to define the volume unit and unit price. The unit prices are mostly related to the number of data transfers (which is not equivalent to information unit) or access time to the source system. Supplying the goods for free is a problem if not sufficient sponsoring can be acquired. Sponsors will probably relate their contributions to their presence and the value of the target audience for the product the sponsor wants to sell (Timmers, 1998). Several services are also

funded by click-through counts. Subscriptions are sometimes used as additions to sponsorships, or sponsorships are used to reduce the fee for the subscribers. In case of subscriptions, the clients pay for regular deliveries or access and thus do not pay for units. Subscriptions are a rather low transaction costs system. Alternatively though, the client group must be well know, so that the clients want to be engaged in a contract which is based on a positive expectation of future value.

Table 3 gives a summary of possible combinations of these main dimensions of the business model.

| | **Units** | | **Bundles** | |
|---|---|---|---|---|
| | **Mass** | **Special** | **Mass** | **Special** |
| **Unit price** | Commodity trade; e.g. commercial mass software | Uncommon units; e.g. medical check ups | Bundled information commodities, e.g. music CD albums | Systems with standardized buyer options; e.g. modular complex software like ERP |
| **Sub-scription** | Regular public reports; e.g. newspaper | Regular private reports; e.g. specific market data requests | Public resources; e.g. libraries | Specialist resources; e.g. scientific libraries |
| **Free + ads** | Internet information feeds; e.g. CNN | Special interest group feeds; e.g. ISWORLD Digests | Internet resources; e.g. search engines | Special interest group sites; e.g. www.aisnet.org |

*Table 3:* Business model dimensions of information services and examples.

# 3. INFORMATION SERVICES PROCESS MODELS

If business models define what is traded under what conditions among whom, the process model focuses on the *how*. A systematic analysis of business process models can be based on a deconstruction of the value chain in smaller processes and activities, and reconstructing these elements and their variants (Timmers, 1998). In the information systems field, this deconstruction is known as decomposition. Malone et al (1999) analyse processes in terms of generalizations and specializations. Specialized processes inherit properties of their more generic "parents", except where they explicitly add or change a property. We define the information goods creation process as consisting of several activities, which may be similar for different information goods (high or low abstract goods), though some activities may be deviating. The main processes for information goods services are (1) information goods creation, (2) information goods management, (3) information goods production, and (4) information goods retail and distribution (Wijnhoven, 2001). These processes are further decomposed in this section. Lack of space prevents us for analysing the detected processes for different information goods (cf. Wijnhoven, 2001).

## 3.1 Decomposition of the information goods creation

Information goods creation comprises activities that happen before a manager or producer buys-in to the idea proposed by the writer, the composer, the film director, the web-site creator, the game developer or who more is prepared to create new information goods. These processes involve the following:

1. Think about an idea. Before coming up with the idea the creator needs considerable discussions and evaluations of existing work and products. If the idea becomes clear, the creator will develop a project plan to work with, and next collects the required resources for the project.
2. Codify the idea. The creator searches for elements that belong to the product, and organizes these elements in a frame. The creator has to think about which elements are selected, but also about how these may be ordered for the reader and what possible additional information should be added.
3. Prototype the product. The creator may make a first copy of the intended product, and will test and improve the idea by using the prototype.
4. Search for a manager/producer. The creator has to find a manager/producer who is willing and prepared to buy-in so that it may be properly reproduced, traded and distributed. This involves presenting the prototype to the managers and negotiating a contract.

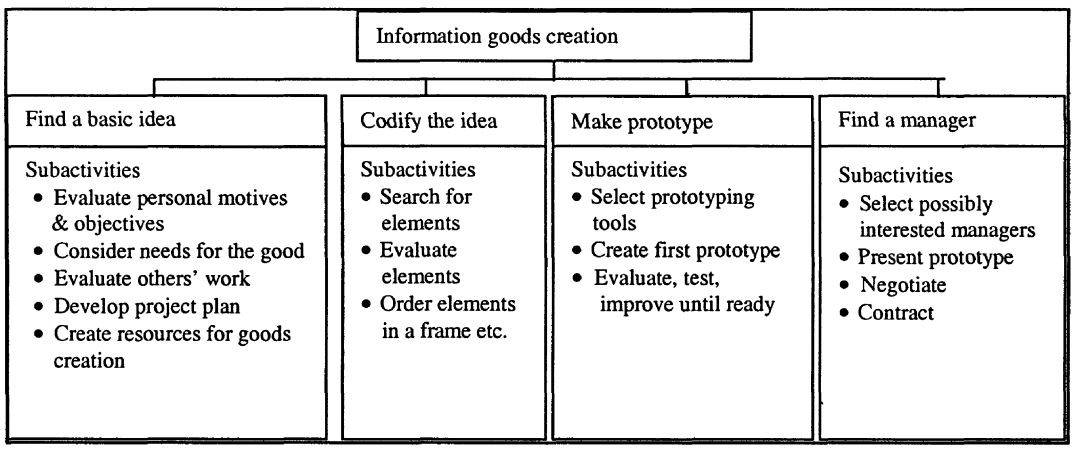


*Figure 2:* Two level decomposition of information goods creation

## 3.2 Decomposition of information goods management

The information goods manager combines choices on the type of goods to deliver, and considers market needs and pricing opportunities. Additionally, the information goods manager has to recruit the actors needed to realize a productive cooperative system (Barnard, 1938). Finally, the information goods manager realizes the facilities (organizational and information technological) to optimise the effectiveness and efficiency of the service. This results in the following decompositions of information goods management (figure 3).

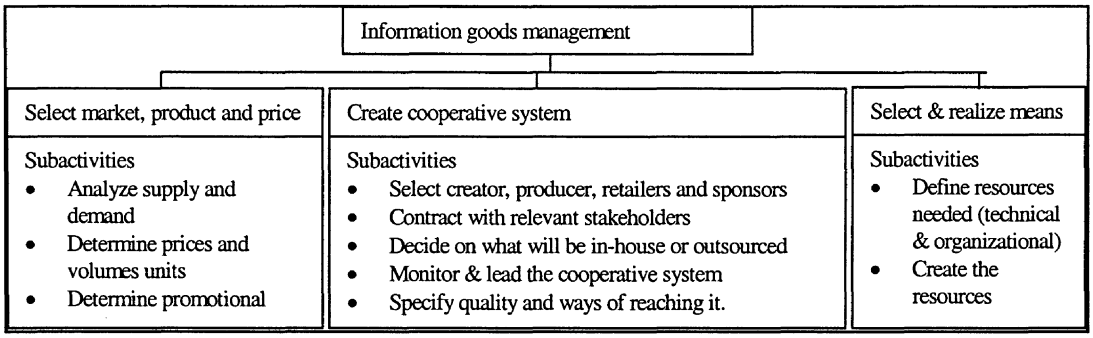


*Figure 3:* Two-level Decomposition of the information goods management process

## 3.3 Decomposition of information goods production

The information goods production process converts the information goods ideas to products that can be delivered to clients given the information goods manager's business model requirements. Hoekstra et al (1992) identify the following processes of production: (1) the acquisition and storage of raw material, (2) prepare the raw material for subassembly, (3) select the assembly mode, (4) realize the end product. Applied to information goods production, we note the following process activities:

1. The acquisition and storage of raw materials. These processes contain requirements setting for deliveries (time, formats, media) and the creation of means for reception (e.g. a post box or reliable data communication connections). Additionally, a process is needed to store the data on physical or electronic media.
2. To make the raw material useful for subassembly, it must be indexed and its format must be suitable to combine it with other material in a new subassembly product. The indexing contains a classification of the material by codes that are used in the user context. The reformatting enables the material to be technically useful in a specific production environment.
3. The subassembly products can be combined and changed in many ways, thus resulting in a diversity of products. This production flexibility is most important, so that each subassembly items has the opportunity of being sold several times, and delivery can be customised.
4. The assembly process enables the producer to produce the final product according to market-needs or specific client demands. Production for market needs is a forecast-driven information push process. When handling specific client demands, the assembly process needs personal/client profiles to enable serving specific demands.

These considerations result in the following decomposition of information goods production (see figure 4).

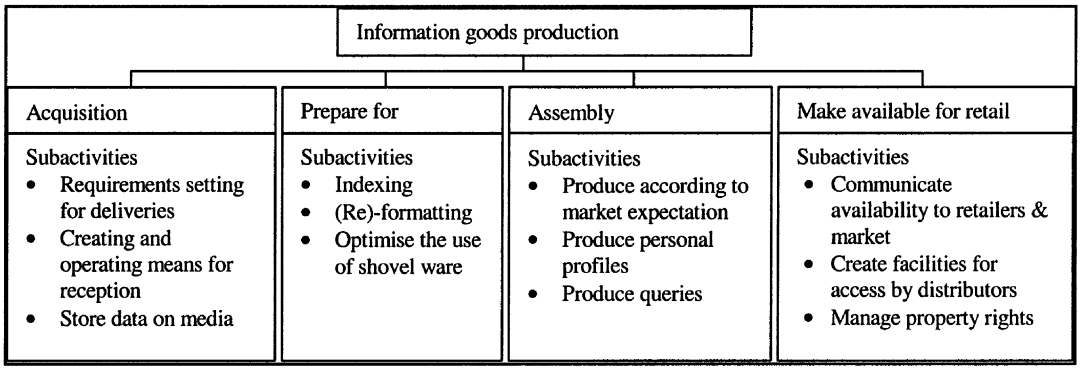


*Figure 4:* Two level decomposition of information goods production

## 3.4 Information goods distribution and retail

In the distribution of information goods the information service may use different options for the trade outlet and media used for distribution. The retail outlets may sometimes be owned by and even located at the place of the producer. For reasons of reach and efficiency though, wholesalers and shops may be important in the sales and distribution channel. The distribution media may vary from totally virtual (the internet, cable or broadcasting), physical carriage of digital goods (like game and software shops), or hardcopy media (e.g. the traditional bookstore. An outlet in an important place for clients to inspect and evaluate offerings, to decide to buy, to actually buy and pay, and to take the selected good to his home. Additionally a shop is an important place for gaining after sales services. In electronic commerce, specific attention has to be paid to trust (Timmers, 1998). Buyers want to avoid electronic commerce systems when they are uncertain with respect to privacy and security of the system. These problems also exist for the retailer, producer, and the seller of information goods. Producers may prefer the less efficient physical and hardcopy media to secure their property rights. An interesting aspect of an outlet is also its possibilities to have fixed prices or allow more flexible price determination (e.g. through auctions and negotiation systems). Figure 5 gives the resulting decomposition.

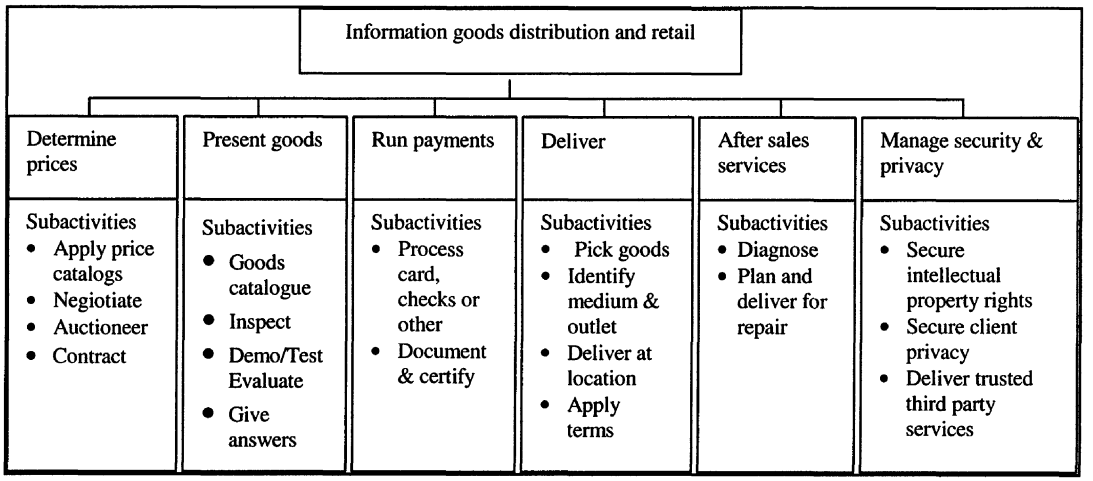


*Figure 5:* Two level decomposition of information goods distribution and retail

# 4. INFORMATION SERVICES ORGANIZATIONAL MODELS

Information services, like any organization, have (1) internal and (2) external differentiation and coordination (Mintzberg, 1983). The first splits internal tasks and responsibilities related to the processes of the service. The second describes how the firm collaborates with its suppliers and clients.

## 4.1 Internal tasks

Each information goods service requires an information goods manager, who is able to select appropriate options of the service, and uses these selections as criteria for organizing and leading the processes of the service. This manager acquires other actors for creating the cooperative systems that grounds the social basis of the service (Barnard, 1938). This cooperative system consists of information goods creators, information goods management, information goods producers, and information goods retailers and distributors. These responsibilities are comparable to Mintzberg's organizational functions, and include several subtasks as listed in table 5.

| **Organizational functions** | **Task descriptions in Mintzberg's terms** |
|---|---|
| Information goods manager | Strategic apex: Determine identity of the firm, select goods, make firm policies, contract with suppliers and organization members, manage the cooperative system.<br>Support staff: Final responsibility for legal issues and pricing policies<br>Techno structure: Organizing operations and defining requirements for operations and goods |
| Information goods creation | Support staff: Research and development. The R&D groups may have functional (e.g. per product component) and managerial differentiations |

| Organizational functions | Task descriptions in Mintzberg's terms |
|---|---|
| | (e.g. project leaders), and also may use potential users (e.g. in β-testing of products). |
| Information goods production | Middle line: manager of operations.<br>Techno structure: production scheduling and design of production environment.<br>Support staff: Researching efficiency and quality, and improve where needed. Run IT-support.<br>Operating core: Operatoring, system management, purchasing raw materials and equipment |
| Information goods retail and distribution | Middle line: manager of marketing and sales.<br>Techno structure: organize and schedule distribution and retail. R&D of processes.<br>Support staff: run administration (catalogs, payments). Settle legal issues. Pricing (within constraints set by the apex). Run public relations and advertise. Run IT support.<br>Operating core: Run sales process, ship and deliver. |

*Table 5:* Information Service Organizational Functions and Tasks

## 4.2 Organization and environment

We may distinguish integrated services process models (managing all aspects of the value chain), and specialist service process models. The last group comprise several groups that combine two or three of the processes mentioned, and are called process combinators. The true process specialists are creation specialist, management specialist, production specialist, or retailers-distributors. The non-integrators require insourcing certain activities of the business processes. The resulting option, categories and names are listed in table 6.

| Process model combinations | Examples |
|---|---|
| *1. Integrators (of creation, management, production & retail)* | Press agencies with hired journalists (e.g. www.reuters.com). |
| *2. Process combinators* | |
| 2.1. Creation-management-production combination. | Software firms, who sell via independent outlets |
| 2.2. Management-production-retail combination | Publishers, who need the copyrights from authors to bring a book on the market |
| 2.3. Creation-production-retail combination | Musicians who make and produce their own CDs and sell it themselves. They may hire agents to facilitate promotions. |
| 2.4. Creation-management-retail combination | Research institutes, who create, manage and sell their reports, but use a specialist printing and layout company. |
| 2.5. Creation-management combination | An academic workshop, which has to look for a publisher to create high quality copies and sell the proceedings on the market. |
| 2.6. Creation-production combination | A painter who creates and directly produces the unique product, and hires an agent or auctioneer to bring the product to the market. If many copies have |

| Process model combinations | Examples |
|---|---|
| | to be produced, the creator and producer will separate. |
| 2.7. Creation-retail combination | Someone who sells ideas right on the market, without realizing them. |
| 2.8. Management-production combination | The publisher, who does not sell directly and realizes ideas from independent creators. |
| 2.9. Management-retail combination | Helps artist, researcher or independent journalists to get their products sold. Example: www.elance.com. |
| 2.10.Production-retail combination | Helps creators and/or managers to get their ideas realized and delivered. |
| 3. Process specialists: 3.1. Creators; 3.2. Managers; 3.3. Producers; 3.4. Retailers-distributors | From the previous task descriptions it may be clear where these specialists focus on. |

*Table 6:* Classification of process model combinations

# 5. INFORMATION SERVICES TECHNOLOGICAL MODELS

Buyers and suppliers interact via information services through Internet communication media. We distinguish the user specific (search and ordering) systems, from the supplier specific content management systems and the market interaction platform (see figure 6).

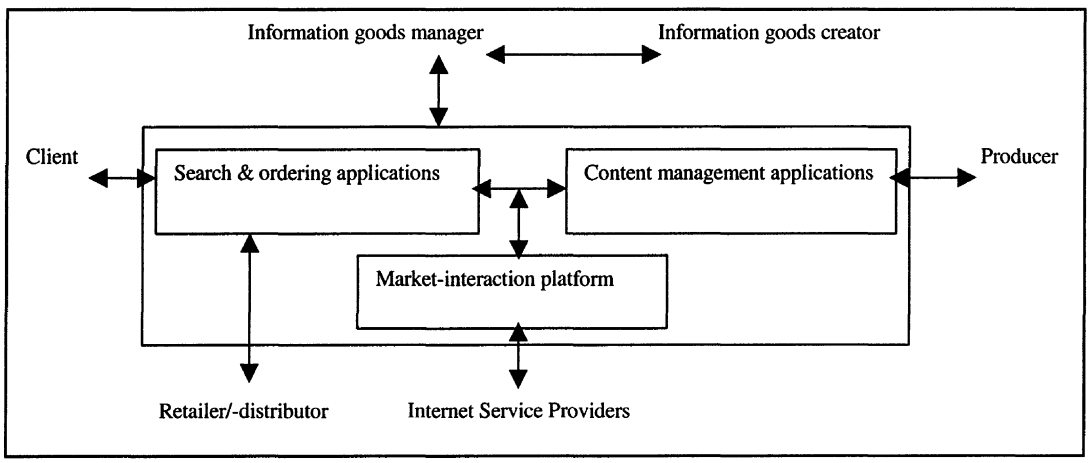


*Figure 6:* Actors and technologies for information services

## 5.1 Supplier content management applications

Suppliers of information goods need to supply their good (text, movie, software, data, sound) to a catalogue, which clients can interrogate to find out what is possibly there. It is important to have a clear data model or ontology to manage fragments of information goods and combine them in the way as needed (cf. Glezer and Yadav,

2001). This is also important from the perspective of pricing and invoicing clients. The management of privacy and security is vital in two ways (1) the supplier will not want to deliver more than what is absolutely needed in the pre sales stage and (2) information goods bases are extremely sensitive to hacking and steeling. The topicality of the information goods may be extremely important (cf. news services), and thus high quality and efficient content maintenance and renewal is needed (Perry, 2001). Finally, if the goods are priced, a revenue collection mechanism must work properly. This results in the following list of content management applications: (1) multi-media databases, (2) data and ontology management, (3) privacy and security arrangement for suppliers, (4) content submission and editing system, (5) catalog management and content management, (6) interface to market-interaction platform and client search and ordering system, (7) production system to enable deliveries as requested, (8) revenue collection system, and (9) supply chain-monitoring system, to manage and coordinate the cooperative system.

## 5.2 Client search and ordering applications

Clients need information search and retrieval mechanisms or want an alert or information push when a specific relevant new item has become available. These search systems should be easy to use and deliver high quality information. Additionally such search systems should be able to process the specific personal profiles of the client (containing e.g. information with regard to interest areas and satisfaction scores with past deliveries), if the client wants the system to do so. This profile reduces the number of irrelevant offerings. An ordering functionality should be able to legally buy, or to negotiate with the supplier, or also to advice the client. A payment system should be safe and guarantee the legal aspects of the transactions. Delivery functionality should be able to give clients the opportunity to download files, to interact with the information good (without downloads but possibly with upload options), or delivers information goods as attachment to emails. The delivery system should be able to use the medium the client wants, and adjust the delivery to client's technical environment. This results in the following requirements: (1) ordering functionality, (2) payment functionality, (3) personal profile management and personal profile processing, (4) content presentation modes selection and creation opportunities, (5) information retrieval systems, search engines, alerting and information push facilities, (6) delivery functionality, including the selection of specific media and outlets, (7) buyer privacy and security arrangements, and (8) interrogation functionalities.

## 5.3 Market-interaction platform

Rawolle and Hess (2000) state that the media industry may be grouped in actors that use different technologies for the transportation of its goods (media) and different devices for it reception by its consumers. These transportation media may be online (narrowband or broadband) or offline. The devices for input and output may be mobile or stationary (pc-based or tv/broadcast based). The choices of these technologies determines in many

ways what content can be effectively and efficiently transported between the goods creator and the client. Differently, also the producer chooses certain devices for the complete coding of the good. Though these media and devices determine much of the opportunities of what can be traded, they only fill in the lowest (network infrastructure) layer of Kalakota and Whinston's (1996) six layered electronic commerce architectural framework. The three highest layers (Interface layers, Brokerage and datamanagement layer, and Application services) have been treated under other names while discussing the supplier and client systems. Additionally, any electronic commerce also need middle ware services and secure messaging. The middle ware includes the opportunities of processing and transporting different types of structured documents (like SGML and HTML) and compound documents (like OLI and OpenDoc). The secure messaging involves the opportunities of delivering messages reliably fault tolerant and free from viruses and fraud. Encryption and the use of keys are important developments here. This results in the following requirements: (1) a platform (network and devices) for information goods transportation, (2) middle ware for handling different document structure, and (3) secure messaging.

# 6. CONCLUSIONS AND DISCUSSIONS

This article stated the need for a design approach on information services development, using a typological approach centered around business and process models, and information and organization architectures. We followed Timmers and Gordijn et al who state that a business model comprises a specification of the good to be delivered, an identification of the type of market to be served, and a pricing policy. This results in at least twelve different business models. We decomposed each main activity (information goods creation, management, production, and distribution & retail) of the information market value chain in two levels, aiming at generic typological insights. We split the internal organization from the external organization. The generic value chain activities have been transferred, using Mintzberg's classification, to organizational tasks related to functions for the apex, middle line, operating core, support staff, and techo-structure. The external organization consists of a typology of service firms that may specialize in one or several value chain activities. We split the higher three levels of Kalakota and Whinston's layers of e-commerce from the lowest three. The higher three comprise the supplier content management applications and the client search and ordering applications. The lower three are called the market-interaction platform and contain the networking infrastructure, the middle ware services, and the secure messaging services. As such the article contributed major, high-level, component definitions for information services, which may help to guide practice and structure further research. We want to conclude with three streams of further research:

1. Research into the further elaboration of each component. This research may consist of collecting more operational design parameters for each of the component elements already mentioned, but even more interesting is the

question how the design parameters should be chosen given several conditional factors. For instance Wijnhoven (2001) argues that content characteristics of the information goods would determine the choice for certain business model and process model parameters. In line with research in strategic information systems, an alternative approach would be to emphasize the business strategy as determiner of choices here. Also cultural and organizational conditions may be important. An answer on the question of what is a proper component-context fit does not exist yet, and consequently many misfits of information services with its conditions may lead to service failures. Researchers and practitioners may profit much through joining forces by collecting and analysing experiences of information service design practices. They may use an information service for the exchange of their expertise. Practitioners may submit their experiences to this service, a creator may help to gain insights out of experience descriptions, and a producer may help in giving back valuable content. The business model for such a knowledge distribution and augmentation service is not yet known, though some kind of financial returns may be needed to cover the costs (see www.kinx-europe.com for an example in another field).

2. Though the components of information services have been defined here, an information service will need the integration or linkage of these components. To reduce complexity here, the researcher (and designer as well) may first study bi-lateral component interfaces and next study the relation among three components, and finally all together. Additionally, not sufficient practical experience with the concepts exists to allow evaluation of the typological knowledge in practice. Specifically, the impact of specializations is not known. To follow Malone et al (1999), we are interested to find out if the generic findings of this study are sufficiently practical and more interesting if different types of services (especially in terms of the goods they want to sell to what markets), result in significantly different generic models.
3. Even if we have been able to design a beautiful information system, its organizational introduction seems not to be a trivial issue (Orlikowsky and Hofman, 1997). This may be very true for information services as well. This issue is rooted first in the IS research literature, which has put much emphasis on letting the stakeholders be involved in the design process. This helps in letting them understand what will be realized, anticipate on the new future, and let them be committed and give the opportunities to submit their expertise. Second, we may state that information services are involved in such dynamic and unpredictable environments that only a very limited part of it can be planned, thus designed, and so more attention has to be paid to evolutionary development of these services (cf. Orlikowski and Hofman, 1997). It may be hard to study and compare a designed versus evolutionary approach, but it is possible to measure dynamics and complexities of a service, and from there indicate what balance between design and evolution is needed.

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