The impact of electronic commerce on the publishing industry: towards a business value complementarity framework of electronic publishing
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The impact of electronic commerce on the publishing industry: towards a business value complementarity framework of electronic publishing

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Abstract.
The publishing industry, like many other industries, is exploring new markets, new services and new products in response to forces such as advances in information and communication technologies, business strategies such as mass customisation, globalisation and shorter production cycles. This paper focuses on the way in which electronic commerce (e-commerce) technologies are changing and could change the publishing processes, and develops a business value complementarity model of electronic publishing. This model gives a theoretical rationale for, and can be used as a methodology to explore, complementarities between different primary activities and supporting technologies when entering the e-commerce arena in order to maximise profitability and improve the competitive position.

1. Introduction
The traditional business environment is changing very rapidly as a result of many factors: problems of being up to date with the changing information and communication technologies (ICTs); increased competition due to globalisation; stakeholders’ requirements to improve financial performance; pressure to reduce inventories and production costs; increasingly more demanding customers, requiring better service and improved quality; global regulatory changes and reduced product life-cycles [17, 18, 19]. The modern corporation is looking at many factors to innovate and stay competitive, such as internal company resources and capabilities, new industrial strategies and new ways of organising or re-engineering business processes in the adoption of the new ICTs.

The publishing industry is presently trying to use new ICTs such as the information highway and the Internet to explore new ways of doing business in order to stay competitive and increase profitability. In fact, the publishing industry is in a mature stage and many companies believe that they can improve the profit of the paper version if they also engage in electronic publishing [25]. Moreover, the low entry-barriers to establishing an electronic business to sell information on the Internet could also be a serious threat to the publisher in the long run.

2. Previous research and motivation
There are hundreds of publishing companies that have at least a presence (a home page) on the World Wide
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Web (WWW). Examples are Elsevier Science, Harvard University Press and McGraw-Hill (see [43] for a comprehensive list of publishers’ Web sites). Electronic magazines and newspapers vary from very scientific, such as The Journal of Artificial Intelligence, to business, such as the interactive edition of Wall Street Journal and Business Week, to general daily news, such as The New York Times. Publishers have started to use the Web to conduct business online. Some journals use the Web exclusively as an advertising medium; others use the Web as a distribution method, often just publishing the same content of the paper version, without taking into consideration the different needs and profile of the online community. Other journals are now starting to use the Web to speed up the production process by using it as an aid in the submission and reviewing processes, e.g. Decision Support Systems Journal (DSS Journal) at the University of Texas at Austin. Some authors are starting to point out the importance of new marketing strategies for electronic commerce (e-commerce), including commerce of information products [34]. Chellappa et al. [4] show that, until now, the publishing houses have used the Internet and the Web primarily as a distribution method. They argue that if a company wants to enter Internet commerce successfully, then it is necessary to re-engineer the business processes of publishing for the electronic marketplace. In fact, companies entering the e-commerce arena ‘compete in two worlds: a physical world of resources that managers can see and touch and a virtual world made of information’ called the marketspace [29].

In this paper, we would like to focus on scientific, technical and medical (STM) publishing, given the strategic importance of electronic publishing for this sector [6, 7]. Recently, some signs that electronic publishing can contribute to the overall profitability of the publishing business (or at least contribute to gaining a competitive advantage) are starting to appear [7]. For example, Wolters Kluwer offers 8% of its journals online and hopes to arrive at 15% by the year 2000 [26]. New advances in ICT could notably speed up the publication process and decrease the costs of producing and distributing a journal. In this paper, a business value complementarity model for electronic publishing is developed. This model should be seen as a methodology to explore potential complementarities among the value chain activities, corresponding business processes and supporting technologies when starting to plan the online process. This, of course, is much easier done by new entrepreneurial, dynamic start-ups than by big established companies. For these last ones, in fact, moving the customer from the print form to the online form could be tricky and sometimes disastrous [7].

The objective of the paper is therefore twofold: (i) to show how publishing processes can be transformed by the new ICTs and (ii) to raise questions of complementarities between the technologies used to go online and the redesigned publishing processes in order to maximise the profitability of electronic publishing (or improve the competitive advantage of the corporation). Many companies are entering the electronic publishing arena, but the trend until now has been to reorganise only one or a few processes at a time, thus not taking full advantage of the potential of the Web.

It is too soon to find examples of companies that have redesigned all the publishing processes for the electronic marketplace, but here an attempt is made to give examples of journals or companies in the STM sector that have redesigned at least some of them. Barriers to the diffusion of electronic publishing include advances in technologies, such as micropayments and security systems, and copyright agreements for electronic information.

In section 3, we describe the processes and value chain activities of the traditional publishing process. In section 4, we give an overview of the theories used to build the business value model of electronic publishing, described in more detail in section 5. In section 6, it is shown how the use of new e-commerce technologies can transform the processes of publishing in the marketspace. Concluding remarks and future research directions are provided in section 7.

3. The publishing process and value chain of the publishing industry

The traditional publishing process consists of the following four steps:

1. **origination**: preparing material for publication, including any necessary refereeing or approval;
2. **processing**: transformation of the material to a form suitable for widespread dissemination, usually involving text composition or other forms of re-keyboarding;
3. **dissemination**: the distribution process itself. In the traditional process, distribution means the printing or reproduction of the text in a journal and its physical transmission to a point at which it becomes accessible to the users;
4. **indexing**: the process of abstracting, cataloguing and indexing for inclusion in a secondary publication, designed as a retrieval tool to help the user to
become aware of the publications relevant to his or her particular problem [5].

Fig. 1 shows the traditional flowchart of the publishing process.

The author is the supplier of the raw content that will be refined and made ready for the customer through the pipeline of the publishing process. The editor has the function of screening the articles and appointing reviewers or referees. These make recommendations about whether the editor should accept the submission, reject it or ask for revision. The publishing firm, which adds value through its credibility and reputation, has the function of assembling the articles into a product that is delivered to the chain of distributors. Finally, the distributors make the product physically available to the end user [6].

4. Theoretical framework

E-commerce technologies are contributing to changing the processes of publishing from the marketplace to the marketspace. To analyse these changes, we use value chain analysis and the theory of business value complementarity. This is based on emerging theories of complementarity in economics [23] and its application in the management information systems (MIS) field [2]. We can envisage these as two frameworks for strategic information systems (SIS) planning. The value chain analysis, by decomposing the firm into its parts, separates the activities of a firm into two main categories: primary and secondary. Primary activities are those involved in the physical creation of the product, its marketing and delivery to buyers and its support and servicing after sale; support activities provide the inputs and infrastructure that allow the primary activities to take place [27]. These activities are interconnected by linkages. Information technology (IT) is a major support activity that affects all the other activities and linkages. Here, we focus on how the e-commerce technologies can affect and add value to each of the primary activities of the value chain of publishing.

The business value complementarity theory is based on the notion of complementarity, first applied to the field of economics by Edgeworth in 1881. This notion can be summarised as follows: the net benefit resulting from increasing one factor will increase if complementary factors can also be increased in a coordinated manner. Milgrom and Roberts [23] extend the notion of complementarity to a set of activities, by stating that two activities are complementary if the profit or values by doing both is greater than the sum of the individual profits from doing just one or the other. The traditional definition of complementarities in economics is market-oriented. Milgrom and Roberts instead introduce a more inclusive definition: ‘several activities are mutually complementary if doing more of any one activity increases (or at least does not decrease) the marginal profitability of each other activity in the group’ [23]. Complementarity among activities implies some mutual relationships and dependence among activities whose exploration can lead to higher profitability. Brynjolfsson et al. [3] also highlight interactions and complementary practices in the redesign of organisational processes. By applying the complementarity theory to the field of MIS, Barua et al. [2] develop a multilayered business value complementarity model in the field of re-engineering. In this model, they argue that ‘to maximize organizational payoff, complementary factors such as technology, decision authority, business processes and incentives must all be changed in a coordinated fashion in the right direction by the right magnitude, to move towards an ideal design configuration’. According to this theory, it is important to take a holistic approach in designing new business models, by considering all the organisational design variables in a coordinated way and avoiding considering only IT variables. In this paper, the focus is on potential complementarities between primary activities of the firm, corresponding business processes and supporting technologies when designing a new business. Further research is required to test empirically the complementarities between such variables.

5. Towards a business value model of electronic publishing

Electronic publishing (even though the term is used in many different ways) falls traditionally into two categories, which overlap in some parts of the process [6]: (1) the use of computers to facilitate the production of a conventional product;
The use of computers and telecommunications systems to distribute data electronically. By using ICTs in each activity of the value chain of Fig. 1, electronic publishing can be redefined as the use of computer and Internet-based technologies to redesign as many publishing processes as possible for the electronic marketplace. For example, these include the use of ICT in the creation of the product (e.g. article) at author level, the submission for review, the distribution to the reader/end user, marketing, sales and customer support. In order to distinguish the primary activities in the marketplace from the activities in the market-space, the concepts of online production, online distribution, online marketing, online sales and online customer support as the primary activities of an electronic publishing business are introduced (see sections 6.1 to 6.5 for detailed definitions).

In this section, a business value complementarity model of electronic publishing is developed. This model can be used as a guiding methodology to explore complementarities between the different activities, publishing processes and supporting technologies (see Fig. 2). The application of the complementarity theory gives a theoretical rationale for taking simultaneously into consideration all the primary activities of the value chain, their business processes and supporting technologies when first entering e-commerce. The business value model in Fig. 2 has to be seen, therefore, in the light of the complementarity theory at all the levels of the hierarchy.

Complementarities might exist between the primary activities, between the business processes constituting each activity, as well as between the technologies. Finally, complementarity might exist also between the business processes and the supporting technologies.

5.1. Complementarity at value chain activity level

It is important to explore complementarities at value chain level, when entering e-commerce, if a corporation wants to be innovative and have a business model that really takes advantage of the Web to create and enhance competitive advantage, i.e. the more that activities of the value chain are transformed for the market-space, the more likely it is to add value to the electronic publishing overall profitability or competitive advantage. It is suggested that the adoption of a holistic approach for a new start-up or a company that for the first time is redesigning the primary activities for e-commerce would be a more successful strategy than changing only one or some at a time. This is due to the potential complementarities between the different

![Business value complementarity model of electronic publishing.](image-url)
activities, which would lead to a better performance in one if the others are also re-engineered for online commerce.

For example, the corporate value created by adopting electronic production, online distribution and online marketing in tandem in the same company could be much higher than the sum of the values created by the adoption of such functions in two or three distinct corporations. In fact, a corporation that uses and integrates WWW and database technologies in the production, distribution and marketing of the magazine could have a competitive advantage in the marketplace over a company that, for example, uses such technologies only in production and distribution. This is because online production and distribution contribute to shortening the time lag between submission, publication and delivery, but the company might still not be very successful because it might not properly understand the customer’s needs and expectations, due to a marketing paradigm shift taking place in the online community. Right now, business on the Web is still weak and has many problems.

5.2. Complementarity at business process level

Theoretically, each publishing process could be reorganised for e-commerce independently from the others. We argue, though, that complementarities could exist and therefore should be explored among these processes and that the simultaneous re-engineering of all the possible processes of a particular activity for online business could lead to a higher profitability or success (among all the possible processes) than if only some of the processes were reorganised online. For example, in production, the manuscript could be electronically submitted, but not accessed electronically for review (see [33] for an example of the latter). This would imply a longer time to review the article, given that the conventional mail is much slower than e-mail or file-download procedures. The simultaneous adoption of electronic authoring, electronic submission, and electronic access for reviewing would lead, for example, to a shorter production time and to a potential productivity increase than if only a subset of such processes were to be implemented online. Similarly, in distribution, a company that provides for search, retrieval, selection and physical transmission of a document over a network could be better off than a company that, for example, at the end, delivers only the paper version of the document (even with overnight delivery, as does the Harvard Business Press Online). Hence the complementarity among these processes. In marketing, the online implementation of a marketing program that includes advertising, market research, promotions, public relations and ad hoc online pricing models would be better than a program that has only re-engineered some of these processes for e-commerce. For example, the use of market research data collected at the company Web site, in addition to the data gathered in the marketplace about the customers accessing that particular site, could lead to better online advertising programs than if only data collected on the marketplace were used. Hence the complementarity between the online market research and the advertising processes. In online sales, providing for electronic payment/settlement (instead of having to make a telephone call or fax the order), in addition to information searching and gathering, would make the shopping process easier and decrease the chance that the customer might change ideas and not buy the product at the end of the Web session. Hence the complementarity between the processes of online settlement/making a purchase and online information gathering and searching. In this case, cultural barriers (reluctance to give the credit card number on the Internet) and technological barriers (not secure payment systems) are some of the factors than could affect the diffusion of document shopping on the Internet.

5.3. Complementarity between business processes and supporting technologies

Complementarities should also be explored between the business processes and the supporting technologies. This is due to the fact that the more advanced and up to date the technologies used, the more likely it is that the business processes will be conducted in a satisfying way for the user. For example, electronic search will give more accurate and quicker results, the faster and more advanced the search engine is and better built are the user interface and the repository systems. Hence the complementarity between the search process and the technologies required for its implementation. In electronic production, the level of customisation that can be offered to the user by having both sophisticated object-oriented databases and high-level mark-up languages is going to be higher than if the database architecture or the mark-up language chosen does not allow for a high level of customisation. Consequently, it is important to decide on the database system, by taking simultaneously into consideration the structure of the documents to be stored and the level of granularity desired. Hence the complementarity between databases, authoring systems and customisation level in production.
5.4. Complementarity at technology level

Complementarity might also exist between the different technologies used to implement the system for electronic publishing. For example, end-user interfaces and repositories are complementary technologies, in the sense that the better designed the repository system the simpler the user interface can be. In online distribution, a system with the most advanced search engines, the most user-friendly search forms, or that makes use of push technology for delivery of the information, would be much more effective than a system where the user interfaces are not so friendly or the search engine is not so powerful. Theoretically, the total value of a system using both a repository system supporting a very high level of granularity and a sophisticated micropayment system would be much higher than a system not providing for micropayments, where the user has to use the credit card even for small transactions. In reality, the majority of users are still afraid of using the new Net-based payment systems.

6. The value chain activities, corresponding business processes and supporting technologies

In this section, we give a definition of the primary activities of electronic publishing and a description of their business processes and corresponding supporting technologies. These are summarised respectively in Tables 1 and 2.

6.1. Online production

Online production is a distributed (over a network) way of handling the process of creating a journal in a format ready to be sent to the customer. In the networked environment, interactivity among the different actors plays a major role. In online production, we distinguish the following business processes.

(1) **Electronic authoring**: the process of writing the article in a format that can be manipulated electronically. It is important to take into consideration the requirements of the online environment when choosing a word processing package to minimise the work required to put the manuscript in a form that can be manipulated electronically for online retrieval, search and distribution. The publisher might establish rules regarding the word processing packages to be used by the authors. For example, *First Monday* [36], an Internet-based electronic journal, requires that the documents sent for publication are in either plain ASCII (American Standard Code for Information Interchange) text or in hypertext mark-up language (HTML). The technologies supporting the document creation process are the authoring systems. They can be distinguished as...
Table 2  
Technologies supporting the business processes and the primary activities

<table>
<thead>
<tr>
<th>Value chain activities/technologies</th>
<th>Online production (6.1)</th>
<th>Online distribution (6.2)</th>
<th>Online marketing (6.3)</th>
<th>Online sales (6.4)</th>
<th>Online customer service (6.5)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Networking and communication technologies (6.1)</td>
<td>Internet WWW</td>
<td>Internet WWW</td>
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<td>Internet WWW</td>
<td>Internet WWW</td>
</tr>
<tr>
<td></td>
<td>Client/Server Web-database integration</td>
<td>Client/Server Storage and printing devices</td>
<td>Client/Server Web-database integration</td>
<td>Client/Server</td>
<td></td>
</tr>
<tr>
<td>Database technology and DBMS (6.2)</td>
<td>Repositories Object-oriented and relational databases</td>
<td>Databases Query languages</td>
<td>Datawarehouse inverted file and relational databases</td>
<td>Databases Query languages</td>
<td>Relational databases (e.g. databases of FAQs)</td>
</tr>
<tr>
<td>Application software (6.3)</td>
<td>Authoring systems (e.g. Microsoft Word, Latex, SGML, HTML)</td>
<td>Search engines User interface (e.g. fill-out forms)</td>
<td>Data mining Cookies Profile matching Push and pull technologies</td>
<td>Payment systems (e.g. electronic cash, electronic cheques, encrypted credit cards)</td>
<td>FAQs files Mailbots Mailing lists Discussion forums</td>
</tr>
<tr>
<td></td>
<td>User interfaces Browsers (e.g. Mosaic, Netscape)</td>
<td>Browsers Push and pull technology Profile matching</td>
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</tr>
</tbody>
</table>

low-level procedural mark-up languages, such as Adobe Acrobat, and generalised or descriptive mark-up languages such as SGML (standard generalised mark-up language), which supports HTML as document-type definition [17, 18, 19].

Procedural mark-up languages do not provide any interactivity function, do not allow for incorporation of the document information necessary for online publishing and do not allow for manipulation of the information accessed: limiting, therefore, the advantages of electronic publishing. Generalised or descriptive mark-up languages, instead, work on the basis of a logical description of documents and should be flexible in order to be able to use search and retrieval techniques on the documents [17, 18, 19].

For example, Munksgaard Publishing is requiring that articles for First Monday are produced in HTML in order to facilitate the work at the publishing house.

(2) **Electronic submission:** the transmission of the article over a network to an editor. This could be done, for example, by e-mail or by downloading the article directly to the journal’s Web site. The main technologies supporting this process are the Internet, client/server computing and the WWW. For example, the University of Texas at Austin has developed an electronic system to speed up the submission, reviewing and publication process for the DSS Journal paper version [35]. In this system, the author connects directly to the Web site of the journal and can electronically download the first version of a document file directly to the DSS Journal server, where it can be accessed for revision by the reviewers. The technologies used by DSS Journal are Internet technologies and Oracle database management system (DBMS). Another example is provided by First Monday, which accepts submissions of articles only in electronic format via e-mail and preference is given to articles which take advantage of the Internet, by using graphics, programs, HTML and other features not possible in print [36].

(3) **Electronic reviewing:** Web technology can be used mainly to speed up this process, by allowing for faster transmission of the document, instead of traditional mail. Here, the editor could electronically notify two or three reviewers about the article, or this could be done directly by the computer system, as it happens in the DSS Journal described in (2) above. It should be possible for the reviewers to access the article through the Web, view the article on-screen, add notes and comments to it in an electronic fashion and even interact with each other to exchange comments and opinions [35]. Important issues here are security (both of the manuscript and submission processes).
of the comments made by the reviewers) and copyright that deal with electrocopying of information in electronic format. Many solutions (technical or not) are presently being looked at both by the European Union and by the US Government [25]. Technologies supporting this process are the networking technologies described in (2) above.

(4) **Document formatting:** in the traditional environment, publishers used proprietary and presentations-based systems to type set the original document into the desired production format (see the Elsevier Science example at the end of this section). This was done by typesetters, after the article had been checked by copy editors. In the online environment, the role of copy editors might not change, while the typesetting process could be either eliminated [7], if the journal is totally electronic, or, in the present situation, at least streamlined by having, for example, the typesetters working directly in an SGML environment. Authoring systems (see (1) above) and application software such as *ad hoc* micros play an important role in the implementation of this process. Elsevier Science is an example of a publishing house that has started to re-engineer the production process by streamlining many different departments into an SGML-based environment [31].

(5) **Electronic storage:** the process of putting the document into a repository or database for further search, retrieval and distribution through networking and computer technologies. Issues are performance, integrity, method of distribution and level of granularity for mass customisation purposes. In fact, as we are moving beyond the era of mass production in the manufacturing arena, it is likewise reasonable to move beyond mass production and towards mass customisation of journals. To provide for electronic storage of all the published material for further search, retrieval and sale, the publisher has to build a local digital library. Regarding the costs for storage, Collier [7] shows that, in the electronic environment, these are lower than in the marketplace. The same is also true for distribution costs and for physical costs such as paper, printing, disc, etc. Repositories, databases and user interfaces are the technologies that support the electronic storage process. The relational and the object-oriented databases and DBMS are the best suited to build repositories of complex data such as documents containing text, images, graphics, audio and video for customisation of information products [30]. For example, the *DSS Journal* information repository is built with a relational DBMS, Oracle.

A publishing house that is re-engineering production for e-commerce is Elsevier Science. Elsevier Science originally entered the field of electronic publishing with the Tulip Project, which connected the company with many university libraries in the USA for electronic creation and delivery of many journals. In this project, they first produced the paper version by using many different formats and production methods and then scanned the paper versions with an optical scanner to obtain the electronic version ready for network delivery. ‘At present, Elsevier Science is consolidating all these different production methods to streamline the output into standard electronic format such as SGML, Postscript, PDF, JPEG and TIFF, which then becomes the basic material to not only produce paper versions of the journals in the most appropriate typeset form, but also to provide real electronic versions of the journals based on SGML. In the future, we should experience a state where paper is the derivative of the electronic journals, the reverse of the situation in Tulip’ [31].

6.2. **Online distribution**

Online distribution implies the use of a telecommunications network such as the Internet to send the electronic journal, article, etc., to the reader for reading, downloading or printing. The main processes in online distribution from the standpoint of the final user are as follows.

(1) **Electronic search:** the user first formulates a query about the information needed, by filling out a form provided interactively by the browser (such as Netscape navigator, Mosaic, etc), and then sends the form back to the system, which searches for the required information. End-user interfaces, databases (see (5) in section 6.1) and browsers play a very important role in this process. The browser, which is used in the interactive part of the process, is an application which allows users to manipulate the information located on different servers, once it has been found by the search engine. User interfaces should provide a user-friendly screen to search the queries and to browse matched documents. For example, Ovid Technologies has a very friendly graphical interface which is the same across all platforms, obviating the need for user retraining [39].

(2) **Selection and retrieval:** the system presents the list of items retrieved, the user selects the most appealing ones and then the actual retrieval of the object takes place. Supporting technologies in this process are databases and DBMS (see (5) in section
6.1), user interfaces (see (1) above) and search engines. The problem with search engines is that often they find too much information that matches the query, most of which may be irrelevant. Recently, filtering systems have been added to many search engines to filter the information retrieved or rank-order the items in some order of importance. WAIS is a search engine often used by publishers that are entering the electronic publishing business, as, for example, Springer-Verlag. This system is very popular because it uses natural language queries. Many search engines, including WAIS, use a technique known as profile matching to automatically run searches and alert users when new documents of interest to them become available. Profile matching is based on a personal profile built for each user, indicating the reader’s interests and parameters for customised interaction. Springer-Verlag uses profile matching in its online system LINK [37]. Elsevier Science has also established a system as part of the Contents Direct and Contents Alert service, which sends via e-mail the prepublication of the table of contents of each journal to interested users [38].

(3) **Electronic transmission:** physical transmission over the network of the retrieved information, on-screen displaying and eventual storing on, or printing from, the personal computer of the final user. Technologies supporting this process are the Internet and WWW, computers, printers and software packages that can get the information stored in the database and transmit it to the Web. These packages also have the capability of creating a paper or a CD-ROM version of the document. See the examples of Ovid Technologies and LINK in (1) and (2) above.

The recent developments in push technology should start a new era in online distribution. Push technology promises, in fact, to deliver proactively the customised information needed, when needed, directly to the user desktop, thus avoiding the lengthy searches for information that often characterise the phase of search, retrieval and transmission. It is a substitute for pull technology, which is basically how the Web works today.

**6.3. Online marketing**

In this section, we begin by describing how Internet can contribute to the implementation of micromarketing and target marketing and then we describe the processes of online marketing.

From the point of view of marketing communication, online marketing is not a one-to-many, one-way form of communication, as it is in the mass communication media of the marketplace. The hypertext, interactive and mass customisation possibilities of the Web make the customer in charge of what he or she wants to explore and investigate [14]. Finally, marketing communication and advertising on the Web should be much cheaper than in the traditional media [21].

**6.3.1. Online target and micromarketing**

Micromarketing means focusing on a specific segment with particular characteristics within the total target population. In the marketplace, micromarketing is implemented mainly by direct mail, telemarketing and sales people. In the marketspace, micromarketing can be implemented by producing, possibly on the fly, highly customised ‘publication products’ (promotions, discounts and advertising) that address the specific needs of the particular customer. Internet advertising agencies (e.g. DoubleClick) are now emerging. They collect data about customers and sell them to companies for the development of targeted online advertising campaigns [24]. Customer targeting, within the selected segment, is also a way to come closer to the consumer and to sustain a two-way communication between the seller and the buyer. Important technologies for the implementation of micromarketing and target marketing are Internet, WWW and Web-database integration, profile matching (see (2) in section 6.2) and push technology (see end of section 6.2).

**6.3.2. Processes of online marketing**

Within the marketing function, we distinguish online advertising, market research, promotion and public relations and, finally, pricing models.

(1) **Online advertising:** online or interactive advertising is the use of Internet and other online systems both to advertise in electronic journals and to advertise on networks to create awareness. There are two ways of advertising on the Internet: the pull-based and the push-based model. In the pull-based advertising model, the message is put out in generally available areas (e.g. a banner on a WWW page) from which the consumer must pull the information. In the push-based advertising model, specific consumers are niched out and addressed directly, traditionally by sales people or direct mail, in the online marketplace by e-mail. New intermediate advertising models, based on the idea of a
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broker who contracts with advertising agencies and negotiates with customers on whether they want, and what kind of, advertising to see while browsing, are now emerging [22]. The technologies that enable interactive advertising are the networking technologies, database systems (see (5) in section 6.1), profile matching (see (2) in section 6.2), push technology (see end of section 6.2) and cookies or similar software. For example, Infoseek uses cookies to capture behaviour information in order to provide more direct future searches. Springer-Verlag uses a software to track the users connecting to the LINK system, which is different from the cookies and follows a session concept [43].

(2) **Online market research:** online market research is the process of collecting information online about the consumer, such as the types of sections or articles he or she reads and other collectable types of information. Many are raising ethical issues regarding the collection of information about the customer during an online session, without the customer knowing about it. The main purpose of market research is to understand the customer’s profile, demographics, etc. This information can be used for on-demand mass customisation of journals or to develop a push or pull strategy. Market research data can be collected via discussion forums, creation of information databases about the customers visiting the site (similar to the POS (point of sale) systems) or by buying data from third-party companies. The most important technologies supporting this process are Web-database integration, data-warehouses, databases (see (5) in section 6.1) and datamining tools such as intelligent agents, multi-dimensional analysis, traditional querying and reporting tools [32]. Many companies are buying software packages from third-party companies to collect data on their customers (see the example of Springer-Verlag in (1) above).

3) **Online promotions and public relations:** this is the activity of finding successful strategies to promote a company and its products in the online environment by posting that company’s information to newsgroups, list-servers and e-mail lists. Promotional tactics from large companies show that consumers are genuinely interested in online promotions [15]. The technologies supporting this process are Internet services such as e-mails and newsgroups. A strategy could be to combine online promotional activities with marketplace activities, as the following example shows. Elsevier Science, in the Tulip project, used both online and traditional types of promotions (direct mail campaigns, announcements on traditional bulletin boards) to make the electronic version of its journals known and accepted by the user community. Some online promotional activities undertaken by Elsevier Science on the launch of the Tulip Programme were the introduction of the Tulip home page on the Elsevier WWW, announcements on electronic bulletin boards and targeted e-mail messages. As is stated in the **Tulip Report** [31, p. 2]: ‘Recognizing that meeting user needs is primary, promotion and training are crucial for a service such as Tulip to develop a base of regular users’.

(4) **Pricing models for online business:** this involves finding the most suitable pricing models for the online community in order to diversify the company’s products and generate high revenues. Emerging pricing models are pay per drink, pay per site (site licensing), pay by subscription, pay by connect time, pay by search time, and no direct pay (free information subsidised by advertising). The pricing model that a company can adopt is strongly dependent upon the technologies used to build the repository and payment systems. Until now, in STM publishing, the dominating pricing model has been the subscription model. Recently, Ovid Technologies, an electronic intermediary, is offering the subscription model, the pay per drink model and a combination of both [39].

6.4. **Online sales**

Online sales means the possibility for a customer to retrieve, order and pay for information over a network (Internet). Among the issues here are safe network payment systems and search engines to locate the information. According to traditional economic theory, the market is characterised by market transactions between actors having different roles, where the aim of the transaction is a trading agreement between a supplier and a customer and the subsequent settlement of goods and/or services. In a market transaction the following players can be distinguished: the suppliers that have goods or services to sell, the buyers that engage in a purchase transaction and, finally, the intermediaries that perform supporting functions (such as banking) to improve the efficiency of the transaction process. In the traditional marketplace, the prevailing types of sales are face-to-face sales, telephone sales and mail order. On the Internet, there are two types of sales; ordinary commerce, in tangible things, and information commerce. Electronic publishing falls into the information commerce category, where both parties will conduct the sale
or market transaction electronically: the buyer will send digital cash (or credit or debit card number) and the seller will send digital information over the network.

Market transactions (from the buyer and seller’s point of view) can be separated into three phases, as follows.

1. **Information gathering or search:** from the buyer’s point of view, information regarding available products, their specifications, suppliers and delivery terms is gathered. From the seller’s point of view, information regarding the needs of the potential customers is gathered. The information needed in this process can be found by searching the WWW with the use of search engines such as, for example, Yahoo and Lycos. Customers can obtain answers to the specific questions that arise during the buying process directly from the online seller’s site if it is well constructed.

2. **Contact and negotiation:** as soon as the relevant information has been gathered and evaluated, potential transaction partners are contacted and terms and conditions (terms of payment and delivery, additional services, etc) are negotiated. This process is supported mainly by networking technologies and by the online customer service centre, described in section 6.5. The Web site also constitutes an important sales tool, because customers can choose the product that they want to see, read as much information as they want about the product and ask questions if necessary.

3. **Settlement:** in this phase (which may consist of a number of sub-transactions), the deal is settled and goods and services are exchanged for payment. The Web site should allow placement of an order when the customer has found the information needed [20].

The main technologies supporting the settlement phase are the networking technologies, databases and repositories (see (5) in section 6.1), search engines (see (2) in section 6.2) and the payment systems. The preferred method of payment on the Internet is still the credit card (encrypted or not). Normally, the user fills out an online order form with personal information and the credit card account number and sends it over the network. Due to security issues, many people prefer to make a phone call or to fax the information. Multi-site micropayment systems are starting to appear that give the possibility to the customer of shopping around on different Web sites for items worth quite small amounts of money.

6.5. **Online customer service**

The customer support function should be designed to answer all enquiries that customers might have about the company and its products, in as satisfactory a way as possible. Online customer support is the use of Internet and other online systems to answer customers’ enquiries regarding subscription policies, pricing, old issues, etc. The use of the online systems to answer support questions should be faster, quicker, easier and less expensive than the more traditional methods, such as 1–800 numbers. Online customer support centres are open 24 hours per day, seven days a week, and this system can be used to build loyal customer relationships, even though there is still the cultural and psychological barrier that many people prefer to speak personally to an agent. Jarvanpaa and Todd [16] have surveyed the reactions of shoppers on the WWW in relation to product perceptions, shopping experience, service quality and perceived risk. They found that consumers are generally dissatisfied with the customer service that online companies are offering, therefore it is very important to focus on this activity to gain a competitive advantage in the marketspace. They state: ‘In essence, the consumers found that the merchant or mall was not attuned to the customer’s needs and expectations. Even when customers found a site in which they were interested, they often found it uninformative, poorly organized, and difficult to order from. In addition to a lack of information about products and how to order them, the consumers noted a lack of basic information on company policies with respect to pricing, returns, delivery time and guarantees that would allow them to evaluate customer service. Others were also looking for added services such as online assistance in the purchasing process’ [16, p. 73]. The customer support processes can be summarised as follows.

1. **Customer enquiries:** the customer has some questions, contacts the company and looks for answers. This can be done by either searching for the company Web site, where it should be possible to pull out information about the company and its products, or by sending e-mail messages to the customer service address.

2. **Answers to customers:** the company provides answers to the questions posed by the customers. This can be implemented by sending personalised e-mail messages to enquiries by e-mail, by files posted on the site that deal with FAQs (frequently asked questions) or by using mailbots. The main technologies supporting the customer service activity are networking technologies such as the Internet and its applications (e.g. e-mail), WWW and client/server computing.

So far, the online customer service has been mainly used as a complementary activity to the more traditional
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customer service centre. For example, Springer-Verlag has a customer support centre for the LINK system that provides support by traditional means such as telephone, telefax and e-mail. The opening hours are still between 9.00 am and 5.00 pm.

7. Conclusions

There are many STM publishers that have a presence on the WWW. Some journals are only published electronically, such as First Monday; others are published on paper and also have an electronic version. In organising a publishing business for e-commerce, a number of choices have to be made about how to change the processes and what technologies to use to support them. For example, what types of editing tools (SGML, standard files) should be used in production? What policies for the article’s submission format should be adopted? What type of databases should be used in building the document repository? In the distribution stage, decisions have to be made about the search engine, the user interface, etc. Similarly, in marketing, should a push or a pull advertising strategy be used? A subscription model or a pay-per-drink model? Should a company have a customer support centre? How should it be organised? In this paper, we have argued that complementarities between publishing processes, primary activities and supporting technologies should be explored in the attempt to operate in both the marketplace and the marketplace or only in the marketplace as new entrants do.

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