1. Introduction
The publishing industry like many other industries has not escaped the impact of information technology in both the production and distribution of the information it creates. From earliest DTP techniques to the selling of books over the internet and the publishing of electronic journals the publishing industry has readily accepted technological innovation. Many publishers are now ready to embrace the potential of the web as a method of publishing and distribution rather than as a purely marketing tool.

The main aim of this paper is to suggest an appropriate business model which will enable commercial electronic publishing to occur via the internet. When this model is in place it is likely that the traditional print information chain, will be redefined, the main changes occurring at the distribution and delivery level. However the end-user input also changes as electronic commerce provides the user with the ability to purchase smaller customised fragments of information sometimes directly from the source, i.e: the content creator. Although copyright and security are crucial to developments in this area, the paper does not attempt a detailed discussion of these issues and readers should refer to Swindells et al (1998). Likewise this work does not attempt to provide a detailed history of the publishing industry or of the internet. There are software applications which facilitate electronic commerce transactions, however this paper is concerned with the development of an appropriate model which could be adapted to the electronic publishing industry and not a discussion of software packages.

The paper commences with a brief definition of electronic commerce. The relationship between electronic commerce and electronic and on-line publishing is discussed. Current models of internet commerce are presented in order to form a basis for an appropriate business model. This paper defines the traditional information chain in the print publishing context and attempts to define changes in the information chain arising from application of electronic commerce in the electronic and on-line publishing industries. There is a slight bias toward the academic environment as this is the area most familiar to the author.

2. Electronic Commerce Defined
Electronic commerce has existed in a variety of formats for a number of years. The banking and retail industries were among the first industry sectors to apply technology to business and customer transactions with the introduction of Automatic Transfer Machines (ATM) and Electronic Point of Sales (EPOS) technologies. Electronic commerce on the internet is usually
associated with the ordering and payment of goods via electronic means, but with physical delivery. The form of electronic commerce this paper is concerned with is the selling and delivery of digital goods and services via the internet.

The term "electronic commerce" concerns the buying and selling of goods and services via electronic networks involving some sort of payment. Kalakota and Whinston (1997, p18) have defined electronic commerce into three distinct classes, inter-organisational (business to business), intra-organisational (within business) and customer to business.

**Inter-organisational electronic commerce** could be defined as being the natural successor to EDI as this form of e-commerce includes document and inventory management as well as supply chain and distribution management.

**Intra-organisational electronic commerce** integrates various functions within the organisation to facilitate the flow of information, such as work flow communications and electronic publishing. Intranet technology is an example of this process

**Customer to business electronic commerce** enables customers to search for on-line goods and services, buy products via the WWW and in some instances have electronic products delivered to their desktops. Organisations undertaking this particular type of transaction often use extranet technology. Thus the customer becomes a more integral part of the organisation.

An additional class of electronic commerce which could be termed the reverse of customer to business is business to customer. Business to customer would appear to be the form of electronic commerce most often conducted via the WWW although in many cases a sale does not occur. Almost no commerce occurred on the internet until a few years ago. Most internet business presence is still in the form of the advertising and marketing products and services via a web site which is usually static apart from an email address. Banner advertising creates revenue as does icon advertising which is contained in on-line newspapers or magazines and enables the user to click on a company logo and be taken directly to the particular company web site.

The long term benefits of electronic commerce will allow businesses to make more focused use of the internet. This will ultimately alter or even replace the current business process of customer interaction, and the delivery of goods and services. Thus within the information content industry - re-designing the information chain. Traditionally within business gains in productivity and larger market share occur when technological change is combined with organisational restructuring, thus creating new business opportunities. Electronic commerce provides business with the ability to create new markets for old products or create customised products for new and existing markets. This is an area which presents a great opportunity for publishers however there are specific issues which have to be realised and addressed.


One aspect of electronic commerce is the selling of digital goods and services. As the content of electronic publishing is digital these products are suitable for on-line sale and delivery. Clarke (1997) has defined electronic commerce as a particular type of electronic publishing therefore having similar problems and issues( Clarke:1998). There are also issues and opportunities which are common solely to the electronic and on-line publishing industry which require to be tackled if electronic commerce is to develop in this environment. There is an existing market for on-line publishing and a growing potential market. A recent study showed that fifty-four percent of SMEs (Small and Medium-sized Enterprises) in the UK are now on-line. Of that fifty-four percent, thirty-six percent hope to be using electronic commerce within
the next six months(Gibson:1998). SMEs are a growth area requiring information to compete on a global and more competitive level.(Best:1996)

3.1 Issues
Although the number of businesses on the internet has grown, many organisations simply have a web presence and do not make strategic use of the opportunities the web offers. The OECD predicts a two hundred percent growth in electronic commerce transactions by 2005 (OECD:1997). At present only eighty-five percent of businesses are using the web and uptake of electronic commerce is small (Feher and Towell 1997 p3). This lack of progress is probably due to concerns over issues such as security, payment mechanisms, user authorisation and misuse of personal data. Technologies concerned with authorisation include firewalls, password access, smart cards and biometric fingerprinting. However in order to provide secure electronic transactions (SET) encryption technologies are used. Encryption technologies which are supported by the appropriate legal mechanisms have the potential to develop electronic commerce globally (Swindells & et al:1998).

These issues have to addressed not just for the development of e-commerce within the publishing industry, but for the development of global electronic commerce. The European Union (UNCITRAL: 1996), the OECD (OECD:1997a) and the US Government (Clinton & Gore:1998) are attempting to find global solutions to these problems.

The publishing industry has to address these issues as well as those particular to the sector. Intellectual property is a major issue for publishers and authors and in particular copyright. Copyright is initially retained by the author of the work, however it may be sold or a license granted to enable reproduction of the work. Any electronic transaction in the publishing industry must include a mechanism for copyright payment. Electronic commerce allows authors the opportunity to self publish, however only a small portion of authors especially in the academic sector earn enough from books sales alone to generate substantial revenue. It is an area which is worth some future consideration for commercial publishers as electronic commerce develops.

There is also the issue of quality especially if the information chain is redefined. The publishing chain at present incorporates a number of quality filters such as copy editors and proof readers which may be difficult to apply in the electronic environment. On-line publishing must be able to enforce the same quality control, although refereed electronic journals do employ strict refereeing controls.

The question of information retrieval is important as users have to be able to find exactly what they are looking for. Perhaps now is the time to create a central National Internet Library similar to the Library of Congress and British Library where all electronic works can be deposited.

3.2 Products
The web has suffered from the same drawbacks which beset multimedia publishing in its infancy - a lack of business direction and the hi-jacking of operations by technologists without any business knowledge. It is important that publishers identify the product they are selling and its suitability for on-line delivery. Electronic goods consist of:

- electronic journals, magazines and newspapers
- electronic books
- multimedia CD-ROM
• software
• computer games
• music
• on-line databases

Digital goods and services (Negroponte:1996) are those whose purchase and delivery can only be conducted via electronic channels. Thus electronic publishing products are well suited to this medium of production and delivery. The products most suited to electronic commerce are on-line databases and electronic journals, magazines and newspapers as these can be accessed, paid for and delivered directly to the users PC. The purchase of electronic books is slightly more problematic. Social and cultural issues are involved in the process of selecting and consuming books. There are however opportunities for using electronic commerce in the selling of books and these will be discussed in section 3.4.

3.3 Current Practice
The internet presents a mode of delivery which may ultimately challenge the traditional perception of publishing. Publishers have used the web as a marketing tool and not as a method of distribution and selling. Investment has been in developing web sites as an advertising tool and not in the technologies and skills required for on-line distribution and payment of digital goods. Electronic publishing is used to compliment rather than replace traditional print products. However the growing interest in on-line media and the changing role of the end-user means publishers have to address their on-line and electronic publishing strategy if they wish to exploit this area of their enterprises.

3.4 Benefits & Opportunities of E-commerce
Electronic commerce offers benefits to both the publisher and the consumer. Publishers can develop new and customised products, as well as creating new markets. Thus they are able to create new business, reduce costs and increase competition. The consumer benefits from increased choice, ease of access, possible price reductions and a better standard of service.

The products identified for successful electronic commerce are journals, magazines, newspapers and on-line databases. Most users subscribe to on-line newspapers and magazines or have them free for charge. In the academic environment on-line electronic journals are available to users via the library OPAC. Electronic journal provision is very costly to academic libraries. Although this is a service appreciated by students and academics the choice is limited and dependent upon the contract negotiated between the publisher and the library. The journal is usually the electronic version of the printed work, therefore convenience is the only benefit. A solution to this problem would be to establish an electronic commerce network for academia managed by the university library. The network could consist of university libraries, publishers and the funding bodies. Users could pay on a pay-per-use basis and the payments could be collected using electronic commerce technology. The premise being that funding is allocated for this purpose. This process would have to incorporate devices for tracking copyright and usage.

Many “pure” electronic scholarly journals are now available free of charge on the web, however it is not certain how long this situation can last. These journals provide an excellent medium of communicating scholarly information. Quality is also of a premium as the journals are peer reviewed. Electronic peer reviewed scholarly journals have become accepted as a viable information medium and are included in UK universities Research Assessment Exercise (RAE). There are problems associated with the maintenance of e-journals. These journals are usually
created by groups of academics or researchers and as the journal expands it can become increasingly difficult to manage. The process then starts to become commercial as web developers and authors become involved in the production and administration. Established publishers are looking at the possibility of reverse electronic publishing - taking a pure e-journal and converting it to paper form. This is a lengthy not to mention time consuming process and surely hinders the whole purpose of electronic journal development, i.e. the faster lead time, ease of access and efficient editorial procedure. Electronic commerce technology could be applied to this particular area. A small fee could be charged for a journal article and perhaps managed by the university library or in the UK case the BL Document Supply Centre. Corporate libraries could also benefit from this service. This is an issue for future debate and not within the remit of this paper.

Culturally most readers prefer physical books to “consume” however in the academic environment often only a portion of the book is required for study. Research has shown (ELIB:94) that students are prepared to pay for one-off articles and book chapters. The drawback lies with publishers who are quite rightly concerned about copyright payments and infringement of intellectual property (Diplacito:1995). Electronic publishing is regarded by some in academia as a method of publishing at a time when university libraries are cancelling monographs in favour of journals (Darnton:1999). The development of electronic commerce in the area of electronic publishing can solve these concerns, if the appropriate model is in place which can cope with all the factors involved in the on-demand publishing process.

Due to the high costs involved most subscribers to on-line databases are large commercial organisations or reference libraries. This eliminates access to smaller firms and individuals who might only require a one-off journal article or report. There are two ways of approaching this problem using electronic commerce technology. Firstly database providers allow customers the option of paying for one-off items without incurring subscription and dial-up charges. By allowing access via the internet database providers could allow individuals to purchase an electronic product using credit or debit card technology or by allowing them to set up individual accounts using an suitable model. The second method would enable the consumer to go straight to the creator of the product and make the purchase in the same way. By doing so the storage, delivery and distribution elements of the information chain are eliminated. These processes require an appropriate business model which can accommodate on-line commerce.

4. Business models
Much of the business which takes place on the internet does not involve physical cash and any business which does generate revenue tends to do so via advertising revenue. The ethos of the majority of internet users is that the internet provides information free of charge and this is going to be a difficult attitude to change. Businesses however are now beginning to make more focused use of the internet via intranet and extranet technologies. The role of information as a strategic resource within organisations is now being realised. Businesses are willing to pay for timely information which will add value to their operations. The same problems of charging and pricing which faced the first database providers (Aitchison:1988) are comparable to the problems facing those who wish to sell digital products via the internet.

Most models for internet commerce have been transplanted from the “physical marketplace”. Although some of these models are successful they do not fully embrace the concept of “pure” internet commerce. Bambury (1998) has defined models of transplanted electronic commerce and native electronic commerce, these are discussed in Sections 4.1 and 4.2 below.
4.1 Native internet models

The *library model*: Academics and librarians were the first to realise and exploit the internet for accessing and disseminating information free of charge to the research community.

The *freeware model*: This model is used by the software community to provide users with applications for free download. Netscape is the best example of this model. However often the free trial model is adopted when IPR issues are of concern to the software developer.

The *information barter model*: A similar model to direct marketing where a company purchases a database of information from an organisation (usually a utility company). In the on-line environment information is also sold to others and used to produce customised products according to user preference. Internet news sites use this method of business.

Digital products and digital delivery mode: Digital products exist in the virtual world and can be delivered via digital methods, e.g.: WWW, CD-ROM or on-line databases. There is a distinct difference between these products and those which involve digital purchase but physical delivery.

Access provision: Used to provide access to the internet and is therefore the model adopted by Internet Service Providers (ISPs)

Web site hosting: Many ISPs provide additional services to users such as email and web servers free of charge but sustained by advertising revenue.

4.2 Transplanted “real world” business models

Mail order model: this is the model used in most electronic commerce web sites. The user purchases goods from a web “shop” and pays for them via the web using credit or debit card. The goods are then physically delivered to the consumer.

Advertising based model: adopted by most of the search engines and other free sites. The most common form is the banner advertising hypertext link which takes the web user to a particular site or service. Revenue is generated by the advertiser.

Free trial model: normally used in the software industry. Users can “try before you buy”, the user is provided with downloaded software sometimes with limited functions and given a period of time to use the product before deciding to purchase.

Subscription model: users subscribe to products and services such as electronic journals or databases for a limited period before deciding whether to make a permanent subscription. Similar to the free trial model, however the user continues to pay a subscription rather than the one off payment associated with the free trial model.

Direct marketing model: the use of electronic mail to promote goods and services. Know as spamming and universally loathed by most of the internet community.

Real estate model: selling of space on web sites. For example an estate agent advertising property might also sell space to other actors in the property market such as solicitors or
surveyors.

**Incentive scheme model:** combined with advertising and often offering the chance to win prizes or attain free goods.

These models and additional models defined by Clarke (1998a) form a basis to develop a potential electronic commerce model. A combination of models is the most likely solution. Pure internet commerce redesigns the business processes involved in the publishing industry, thus key actors in the information chain are either redefined or eliminated.

5. **The Information Chain**

The information chain continues to redefine itself according to technology and culture (Clarke:1998a). There are many versions of the information chain (Aitchson:1988), (Williams:1986), (Feather:1991), (Catenazzi & Gibb:1995) however there are two parts of the chain which have always remained unchanged:

![Figure 1](image)

For the purpose of this paper an attempt has been made to keep the information chain as simple as possible.
5.1 Traditional publishing information chain
The traditional publishing chain is outlined in figure 2. The main actors involved in this process are:

- **the content creators**
- **publishers** who are responsible for selecting material, ensuring quality, editing, copyright, marketing and production
- **distribution**: usually physical delivery of the product
- **storage & access**: either libraries, bookshops, secondary information providers
- **user**: the consumer of the information

Authors create the initial product which is then sent to the publisher who subsumes the roles mentioned above. Distribution is distinct from the actual publishing process and is usually undertaken by a third party. In the case of journal publishing subscription agents manage the distribution to libraries and other organisations. The advantage is that libraries deal with only one agency rather than several publishers. Secondary information providers can also be involved in the distribution process. These parties provide indexing, abstracting and cataloguing services and offer access to sources via an information gateway. Products are stored at some physical location usually a library or bookshop. Often there is a cost involved in the storage of these products however this would usually be at the distribution level where stock may have to be
warehoused. The consumer of the information is the last level but the most important.

5.2 Electronic Publishing information chain
Technological innovation within the publishing industry has changed the publishing process. These changes are outlined in Fig 3. Basically although the actors remain the same the publishing process is different in that the delivery can be directly from the source thus intermediaries are eliminated. In this case it is assumed that distribution exists albeit electronically.

![Diagram of the publishing information chain](image)

6. A potential model for commercial web publishing
Any model for electronic commerce in the publishing industry has to address certain issues -

- security
- copyright
- payment (micro and macro payments)
- delivery

From the models suggested by Bambury (1998) three models which when combined could form the basis of an attempt at a solution.
**Digital products and delivery model:** defines the products which are being sold. Electronic goods which have no “physical” delivery process. The products are delivered via data streams and involve no delivery cost or time either to the vendor or the consumer.

**Mail order model:** this model is associated with the electronic ordering and payment of goods. Combining this model with the digital products and delivery model the vendor is able to adapt the model for digital delivery. The nature of electronic publishing products make a “shop front” unnecessary however some method of selecting items is necessary. Therefore the shop front could be linked to the information retrieval, cataloguing and indexing system used by the information content provider. The mail order model incorporates SET, therefore users can use credit and debit card or set up an account with the site involving encryption software. This is ideal for one-off items where users may not find it necessary to subscribe to a database provider.

**Subscription model:** this model is already familiar to electronic publishers and users. There are two ways of adapting this model one which is very traditional and the other which could facilitate on-demand publishing in one of its various formats.

The traditional model is perhaps more suited to the individual user or smaller organisation. The user subscribes to the content provider for a period of time and if the products are suitable for business purposes the subscription is continued. If the user decides the products are not suitable for their business then the subscription is cancelled. The subscription could be returned to the user, although problems could arise in the transfer of funds. It is not suggested that the content provider offer full service to a subscriber before the decision is taken to take out a subscription is made. The scenario would be for the consumer to have access to a limited selection of products, abstracts or a shorter version of the document. The user could have a credit limit set aside for purchasing goods. Password access could control this process.

The second method is aimed at larger organisations and academic libraries although there is no reason why individuals and smaller organisations could not also participate in this model. As previously stated the choice of electronic journals within university libraries is limited and dependent on individual publishing contracts. The choice of electronic books is practically non-existent. Academic libraries could in theory at least provide a wider choice of journals, if publishers were willing to loosen the stranglehold they have on universities. In the UK academic funding is provided by two main bodies Higher Education Funding Council England & Wales (HEFCEW) and Scottish Higher Education Funding Council (SHEFC). These bodies negotiated the current electronic journal provision with publishers. An ideal scenario would be for HEFCEW and SHEFC to allocate a set amount of money to university libraries for the purpose of on-demand publishing. Previously this had been considered impossible (Diplacito:1995), however electronic commerce technology can control payments, and systems would be able to track copyright and usage. Of course this is a very radical proposal which would require a great deal of research and investigation on the part of the publishers and libraries, not to mention the goodwill of the funding council! However it is a feasible proposal in light of electronic commerce developments especially in the legal area (Swindells et al:1998).

7. **Redefining the information chain**

Electronic commerce technology can redefine the traditional print and electronic publishing chain as the ability to deliver electronic goods and services directly to the user eliminates the need for distribution or physical storage. Figure 4 illustrates this process.
traditional publishing information chain

electronic publishing information chain

indicates the alterations in the chain when the content creator is also the publisher. This would encompass self publishing by individuals, but also includes organisations, government bodies and producers of financial and commercial information products.

the publishing chain when the publisher also becomes the distributor and point of access. The need for third parties is eliminated as publishers can use the web directly to reach the user.

this stage gives libraries the ability to use electronic commerce. This would occur when libraries are able to negotiate terms with publishers, thereby accessing material directly from source.
Ultimately the chain could have three actors (figure 5)

These models are only suggestions and are intended to stimulate discussion. An applied solution of electronic commerce adoption is discussed in greater detail by White (1998). Payment methods have deliberately not been mentioned in any great detail as this is a vast area and currently one of great debate (Weber:1998). There are software applications which provide electronic commerce solutions and there is no reason why these could not be adapted to accommodate electronic publishing.

8. Conclusion
Consumers are hungry for products and services and are now beginning to realise the potential of electronic commerce to obtain these goods. Gradually consumers will become used to paying for information created on the internet and this will be the first step to developing the potential of commercial electronic publishing via the internet. There are opportunities to develop new markets such as individual consumers and SMEs, while developing and customising new products and services for existing customers such as libraries and large commercial organisations. Government and industry bodies are taking steps to ensure consumers are protected in the on-line environment and this will surely play an important role in developing electronic commerce. The publishing industry has to address the added problem of intellectual property and copyright. Any business model adopted by the publishing industry for the purpose of electronic commerce would have to accommodate these areas. This paper has suggested a combination of models originally defined by Bambury (1998) as a starting point in developing a solution. When an appropriate model for business is applied electronic commerce has the ability to redefine the publishing information chain. The two static entities in the information chain are the content creator and the user. These two actors have existed since man started to communicate information. It is interesting to note that in redefining the information chain in an age of high technology the chain returns to those two actors.

<http://www.firstmonday.dk/issues/issue3_10/bambury/index.html##d5>


OECD (1997) Electronic Policy Briefing 1


<http://www.law.warwick.ac.uk/jilt/98-3/swindells.html>


