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Some Grass Roots Concepts To Describe And Measure Information Economy

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SESSION 1 - Information Society

ABSTRACT

This contribution to the 16th meeting of the Voorburg group in Örebro, first aims at clarifying the notion of "Information and Communication Technology" (ICT). It then describes the nature of an "ICT product" as that of a tool used to handle information by electronic means. Therefore, the "ICT sector" could simply be defined as the group of industries primarily engaged in producing ICT products.

The paper also aims at defining "content" as an organised message intended for human beings. Then it defines "content product" as an open to public content published over a communication medium. In this definition corpus the content sector is the group of industries that are primarily engaged in the publishing and/or the electronic distribution of a content product.

From this conceptual work it concludes CPC and ISIC classifications now must clearly mark the limits between ICT and content products, between ICT and content industries. For this purpose it is fundamental: - not to confuse electronic tools used to process information and information subject to electronic processing - not to confuse information as an electronic signal and information as a message - to remember "Content" is the key characteristic of a "content product", not the medium on which content is available - not to confuse a message and what the message is about.

I. INTRODUCTION	2
II. BACKGROUND	2
III. SOME EMERGING CONCEPTS.....	3
IV. SOME WPIIS BREAKTHROUGHS.....	5
V. DEFINING CONTENT PRODUCTS.....	6
FROM MESSAGE ITEM TO CONTENT PRODUCT.....	7
CONTENT PRODUCT DEFINITION	9
REMARKS.....	9
VI. FROM CONTENT PRODUCT TO CONTENT SECTOR.....	11
REMARKS.....	11
VII. CONCLUSIONS FOR FUTURE CLASSIFICATIONS	12
BIBLIOGRAPHY	14
A N N E X 1 Definition of the ICT Sector using ISIC, Revision 3 (United Nations 1990).....	15
A N N E X 2 Some International Definitions	16
A N N E X 3 Proposed Definitions Of The Content Sector, Using Isic Revision 3.....	17

I. INTRODUCTION

1. The rapid development of Information and Communication Technologies (ICT) followed by the burgeoning use of the Internet have interacted to accelerate a significant alteration of the economy and society during the last decade. Many have described this ongoing transformation as the advent of the "Information Society". In symbiosis with the Voorburg group, the OECD Working Party on Indicators for the Information Society (WPIIS) has discussed and developed all sorts of concepts and indicators relating to the supply chain for information society. Some proved not being successful or not feasible, others emerged as promising. With this experience, statisticians now have a better view of "information economy" outline and features. In particular they have sufficient background to conduct revision of economic activity classifications that integrate industry transformations resulting from the ICT rapid growth. The purpose of this paper is to present some promising definitions and concepts related to the scope and measuring of "information economy". From discussions upon definitions related to ICT and content, it also derives principles and guidelines to be followed in the coming revisions of CPC and ISIC¹.

II. BACKGROUND

2. As regards measurement of ICT development and impacts, service statisticians certainly are posted on the frontline. Through a variety of channels and mechanisms, ICT development will largely alter existing service industries and lead to the creation of new service activities.

- Mechanically, the increasing use of Information and Communication Technologies (ICT) will result in the expansion and diversification of software and telecommunication industries. For example the widening use of the Internet in households and businesses resulted in a dramatic increase of telephony expenditure; it also led to the creation of internet application software and to the development of new service activities such as Internet naming, hosting or Internet access providing. For its part the creation of mobile phone devices and services also gave a new face to telecommunication industries.

- Thanks to possibilities offered by electronics and software, anyone can see IC technologies giving opportunities to create new objects and services destined to a promising future. For example, the invention of E-commerce corresponds to the creation of the on-line shop. Some existing firms now use this new form of sale either to reach new customers, diversify their distribution system or even shorten it at the expense of their usual distributors. Some entrepreneurs take the E-commerce opportunity to become "pure players" and create new businesses specialised in on-line sale or purchase activity such as : on-line sale of books, portal activity or market place activity. More generally, the introduction of E-commerce is likely to bring significant transformations in industries such as trade, travel, transport, banking and stock market trading.

- Using computers and electronic networks also allow firms to relax the distance constraint in their business process. Often, production processes which previously needed to be carried out on the same spot now can be physically separated. Naturally this new possibility offered to businesses using IC technologies gives way to either relocation of production sites, or outsourcing, or development in subcontracting activities. For example it is now easier for manufacturing firms to envisage a physical separation of their production plants, accounting office, computing department, procurement and marketing services. As a result, the use of IC technologies in production processes is likely to increase the share of service industries in GDP.

- Information and Communication Technologies are also changing broadcasting activities. Satellite or Internet transmission of TV programs and the arrival of digital TV sets and terrestrial digital transmission will contribute to the multiplication of channels and small size speciality television

¹ Note this paper is one in a set of two companion papers. The other one is to be presented by Jean-Marie Nivlet, it proposes a new list of content industries within sight of classification revision. Both papers use material from documents previously presented to WPIIS with Fred Gault and Daniel April from Statistics Canada.

services. In addition ICTs will contribute to the development of interactive television services and pay per view programs.

- Nowadays, with IC technologies content that is available on printed material can also be available on-line. For example a newspaper reader can buy a printed copy or an "on-line information service" giving access to the publisher's database. In the first case the reader's need is fulfilled by the purchase of a good, in the second case the same need is satisfied with the purchase of a service. Similarly a directory refers to a printed book whereas an electronic directory actually refers to an on-line service that provides the same content to user. Varying with the nature of required content and customer's need, the content is made available in real-time or by means of the download of a file. Here are other patterns through which ICT development will increase the share of services in the overall GDP.

- Naturally, ICT applications have been used to create many other commercial services that are delivered through computer-mediated networks. Let's just think of - on-line video game services – music or film download services – on-line weather forecast services — on-line stock market information services – on-line bank statement services – electronic payment services...

3. Before getting into detailed discussions, let us not lose from sight that many Information Society components are much older than we may spontaneously think. For example, in the sole ICT area, this remark is confirmed with the old Morse telegraph, telephone and radio. All three are actual **tools** with which it has for long been possible to use electricity as an information vector. Similarly, printed books, news papers, music records and cinema also show that content products have been part of human society much before the upsurge of personal computers and the Internet.
4. Therefore, the trendy and newly named "Information Society" partly falls into well-known ground. What is new in our present environment is the generalised use of ICT by all types of economic agents, in all kinds of daily life situations. 25 years ago, households would not even think of using a computer at home whereas now, chips and microprocessors have been inlaid in all sorts of familiar objects. In the meantime, the range and amount of information that can be manipulated by electronic means has largely and rapidly extended.

As a result, this rapid development of ICT led to the rise of a new infrastructure of equipment, software applications, professions and service activities. Three major innovations gave impetus to this ongoing transformation of our economic and social environment. Those are: - the swing of electronic industries to digital technology - the large scale marketing of personal computers — the launching of the Internet. All three innovations still interact to produce ICT convergence and evolutions towards a "knowledge based economy" and an "information society".

III. SOME EMERGING CONCEPTS

5. The swing of electronic industries to digital technology marks a turning point, since it initiated what is referred to as ICT convergence. During the 1970's the implementation of digital technology by electronic industries suddenly intensified, pushing analogue technologies into a marginal corner. A striking example of this swing was the sudden marketing of Compact Disks followed by the vanishing presence of vinyl records. Today analogue television sets are to be replaced by digital televisions and terrestrial digital transmission will soon substitute for traditional Hertzian transmission of analogue signals.

While transforming any electronic information into standardised packets of binary signals, digital techniques made it possible to process sounds, images, texts and computer software by use of the same electronic means. In particular, the use of digital technology dramatically improved telecommunications. Since that radical transformation, sounds, images, texts, binary files and computer software have been indistinctly transmitted from one point on earth to another through large capacity channels such as telephone cable networks, fibre, and satellite channels.

With the adoption of digital techniques, it was then possible to build wide bridges between different electronic applications that were previously isolated from one another. Thus, thanks to digital technique any electronic signal produced by one specific application could be immediately interpreted by another. In this context, all electronic applications could be seen as different products of

one unified technology i.e. "Information and Communication Technology". This is how, the ever widening use of digital technology triggered a powerful momentum, leading to some convergence of industries such as: electronic equipment (components, instruments, control systems, radio-TV equipment), computer (hardware and software), telecommunication (equipment and services). In this kind of convergence those industries intensified technology crossings and their mutual supplier to customer relationships. One early example of ICT convergence is the crossing of the Xerox® machine and telecommunication leading to the creation of fax. But the most spectacular achievement in this area is convergence of the computer and telephone that resulted in the building of the Internet.

6. So, to understand the very notion of ICT, convergence is the word. Whereas different electronic products and activities had separated fates, the growing adoption of digital technology reversed the trend. Once this new evolution became visible, it then gave ground to a new perception according which, industries primarily engaged in the production of ICT products now represent a rather homogeneous group of close industries. At that stage, observers were ready to develop the concept of "ICT sector".

But convergence is not the word for every development in information economy. Regrettably, convergence is often seen where it doesn't occur. To support this view, let us remark ICT convergence is a technical convergence which mainly impacts production processes in a very limited number of industries. In addition, such a technical convergence doesn't mechanically imply market convergence for products that have been produced using converging technologies; nor does it imply convergence of the whole business centred over each such product. So, while convergence of computing and telecommunication activities is not questionable, convergence of those with content activities has not been observed yet. Producing, publishing and distributing television programs is not the same profession as producing and selling telephony services.

7. Up to recent years, a book was a book. but with the burgeoning of ICT applications and Internet activities, it has now become clear the text of a novel can be published over a variety of media such as printed book, cassette, CD-ROM, e-book, floppy disk and the publisher's web site. Similarly, a music recording, an image and a film are now available on all kinds of media (electronic and non electronic). So the widening use of ICT and the Internet have highlighted the existence and specificity of information bearing products.

Above all, the value of these products to the consumer does not lie in their tangible qualities but in their information, educational, cultural or entertainment content. For example, unlike other goods, the core value of a newspaper copy does not derive from its physical qualities but from its content. This also means the nature of a "content product" is mainly determined by its content whereas it is relatively independent from that of the medium on which content is made available. For example, a film can be shown in a cinema, on a television broadcast, through video on demand or rented at a local video shop.

Consequently, in parallel with the development of the Internet, the perception on information bearing products gradually changed. From this new perception emerged new concepts such as "content", "content product" and that of a "content sector" distinct from the goods-producing and the service-producing sectors. It is the same new perception which led North American statisticians to propose a new industry structure for information, when building the NAICS. The content notion even earlier appeared in CPC when defining "on-line information provision services" (see annex 2).

Within the 2007 revision exercise of CPC and ISIC, French statisticians interviewed Business representatives to collect their opinion and desire relating classifications. These interviews confirmed the widening perception upon content. According to interested professionals, today it is clear content activities share strong and common features that justify their being seen as a close group of activities. While content industries are presently scattered all along the spectrum of each international industry classification (ISIC and NACE), it would therefore be sensible to group them in a specific sector. However, it would not be relevant to refer to convergence of content industries because there is no evidence of such process in this group of industries at present.

IV. SOME WPIIS BREAKTHROUGHS

8. The creation of such a group of experts reflects the fact that, in future, information will contribute a great part of the value added of most goods and services and information intensive activities will increasingly characterise households and citizens.

From the beginning of their statistical work on information society, international experts identified four promising areas of measuring:

- "ICT product" supply;
- supply of new "content products" that were created by use of "ICT products";
- use of these two types of products;
- impact of ICT development on the economy and society.

Bearing in mind the development of information society would be initiated and fuelled by the supply of new ICT and content products, they agreed to devote their first efforts to the building of indicators relating to ICT products (goods and services), ICT industries, content products and content sector.

In parallel, participants considered the scope of Information economy corresponds to that of ICT products and content products. Further into this approach, they also considered the industry base of the "information economy" as the addition of "ICT industries" and "content industries". In doing so, they took up the analysis according which – products represent the key element in the structuring of industries – the development of new products is one most powerful factor of the overall economic and social transformation. Hence the general framework for the description of information economy can be set as follows:

Information Economy Sector = ICT Sector + Content Sector

9. Ideally, the scope of IC technologies should be defined as that of ICT products and an ICT industry as an industry primarily engaged in the production of an ICT product. For practical reasons international experts could not rapidly extract a list of such products from the ageing CPC. Therefore they chose to approximate ICT scope with a direct definition of the ICT sector, that is with a list of appropriate ISIC (rev/3) industries. At least this difficulty suggests next CPC version will have to isolate ICT product items so as to obtain a comprehensive list of clearly recognisable ICT products. Similarly, next ISIC version will have to define purest possible ICT industries.
10. ICT sector has been defined as the list of (ISIC REV/3) “industries that support the electronic display, processing, storage and transmission of information”. The actual list was endorsed by the OECD in September 1998 (see annex 1).

As above defined, the ICT sector gathers three groups of industries that is:

- electronic equipment (components, radio-TV equipment, instruments, control systems);
- telecommunications (services and equipment);
- computers (hardware, software and services).

11. Though, OECD has not formally defined what is an Information and Communication Technology product (ICT product), ICT sector description implicitly suggest :

An ICT product is an **instrument** that supports the electronic display, processing, storage and transmission of information.

In other words, the intrinsic nature of an ICT product is that of a **tool** with which it is possible to handle a special kind of **object**, information. This difference in nature between a **tool** and the **material handled with the tool** explains why the ICT sector does not include content industries such as: the press, book publishing, music record production, cinema, video cassette recording, radio and TV services, etc.

12. The above underlined text is a possible ICT product definition that could be adopted in the next CPC revision. A more compact wording could also be adopted:

An ICT product is an **instrument** (a product) that enables the user to make use of electricity as an information vector.

Since both possible definitions do not exclude each other, one wording could be adopted as a definition whereas the other could be used in an explanatory note. In any case should be crystal clear about the nature of an ICT product i.e. that of a tool used to handle information by electronic means.

13. Remark. E-commerce has been identified by the OECD as a new form of sale which has some common features with mail-order sale and with sale from automated vending machines (see annex 2). As regards the four promising areas of measuring (mentioned in paragraph 8), E-commerce is to be seen as an impact of ICT development on the economy.
14. Remark. The word "information" still raises an issue because it remains largely undefined. In the above clarifications, the first word in the term "information and communication technology" is used in a very broad and vague sense. More generally, despite its permanent use, there is no common understanding of its meaning. Varying with the user and the situation, information can be understood as : - electronic binary signal – electronic information – digital information - ANSI symbol - intelligence - content of an information service - knowledge - facts - explanation - communication - news - commercial information - notification - political information - advertisement - announcement – inquiry – advice and so on. In the world of statisticians, this word may have a very specific meaning. For example, in the NAICS the term information is defined by the content of sector 51 of the classification.

Unfortunately, behind these many expressions there are still two basic and exclusive meanings attributed to "information". It may either be understood as an electronic signal or as a message. In the first case, "information" refers to the understanding of a technician interested in an electronic tool; in the second case, it refers to the more common understanding. Therefore "information" is a very ambiguous word to use. This is why the paper will refer to "content product" rather than "information product" in lines below.

V. DEFINING CONTENT PRODUCTS

15. Here it is suggested content is an organised message intended for human beings. For example, content may be the text of a novel or a speech, a photograph or a painting, music, information stored in a database, a film scenario, a lesson in mathematics, text and images of a weather forecast web site - medical or legal advice, a talk, news, a balance sheet, a technical study and so on.

In terms, the very notion of message assumes content is somewhat organised, it is legible and it makes sense to human beings. On contrary, a meaningless series of letters, sentences without syntax, a blurred image on a TV screen or the noise of car engine are not messages but shapeless sequences of signals. Still, as above defined, content remains a broad concept since it may be a text, a sound (music or a speaking person), an image (fix or animated) or any combination and series of these.

16. This definition of content highlights it is important to bear in mind the crucial difference between a message and what the message is about. For example, a television report on a war event is acceptable as content since it consists of comments, interviews sounds and images destined to viewers; still, a war event is not content. Similarly, a horse race programme or an article, clearly are contents whereas the corresponding horse race entertainment isn't. Therefore, this basic difference between a message and its subject explains why live sports events and circus entertainment do not lie in the scope of content; only reports and films and broadcasting about those can be identified as content. Thus, whereas most live events are not considered content, messages concerning these events definitely are.
17. The above content definition also implies computer software are not content. First they are destined to a machine, not to a human being. Second, they correspond to organised sets of binary electronic signals not to organised messages. Thus, despite their similar physical features, a software CD-ROM and an encyclopaedia CD-ROM are objects of different nature. In the first case, the

digital disk is used to store a software (an ICT product), in the second case, the digital disk is used to store text and pictures of an encyclopaedia (a content).

18. To be a non-perishable product, a content must be combined with a medium. The reason is there are two basic types of content that is oral content and memorised content.

- Most conversations, a play performed in a theatre or music played in a concert hall, a lesson in a classroom or a medical consultation are live events that bear short-lived messages. In this type of situations, there is no use of physical medium to deliver content. These contents correspond to a category labelled as "oral messages", which includes all kinds of content bearing live events such as cultural events, classroom setting education services, and consultation services delivered orally to business or individual.

- To be memorised and become a tangible product a content must be stored on a physical medium. For example, a text becomes a manuscript when written on paper or entered in a computer; a musical work is a tangible and permanent content only if it is written on a score, recorded on a CD or stored on a web site. Similarly, A film scenario becomes tangible item when stored on a plastic film or in a video cassette, shown on television or cinema screens.

This means, creating a content product requires storing its message material on a medium. Such a combination of content and medium is labelled as a "message item" and it is formally defined as follows:

a message item is the combination of a medium and an organised message intended for human beings.

This definition can be considered as the broadest possible definition of a content product. But if such an approach were to be taken, any written sentence or any photograph would be accepted as a "content product".

FROM MESSAGE ITEM TO CONTENT PRODUCT

19. There are several types of "message items", depending on type of content (message) and category of medium. Content products correspond to one specific type of "message item". But, it must be remembered there is a risk with a broader statistical definition of a content product. This risk is to qualify just about every output on earth as content product and then, to derive irrelevant information society indicators. The following lines present a classification relating to "message items". From this classification, it is possible to extract nested criteria, with the help of which, a narrow definition of content products can be flexibly engineered.

20. There are two major sources of content: some result from human spontaneous activity (spontaneous content), others from an implicit or explicit production activity, resulting in value creation (produced content).

- A recorded speech, a child drawing, a private letter, a garage band recording, or an Email all correspond to "message items" that are not produced. These items are not even output. As such, these "non outputs" are beyond scope of economic activity measurement. They correspond to a category labelled as "non output message". The impact of such items on the economy and society can be measured by means of social surveys or ICT usage surveys.

- At the opposite extreme, a piece of art, a manuscript, a financial report and a radio programme are all "message items" that are derived from some kind of organised economic activity. These items belong to the broader category labelled as "message products". This distinction is meant to identify content bearing objects that are information economy supplies and those outside the scope of business statistics.

21. "Message products" can be distinguished according to the type of user they are intended for.

- As a letter, a notice to staff members or an E-mail, a market study, a bank statement, written legal advice or a confidential report are intended for one person or reserved to a small group of carefully identified persons. Those are products, the content of which is by nature subject to "restricted diffusion". Generally, restricted diffusion consists of a limited list of individual names entitled to access the product content. The list of happy few is set according to the reserved nature of

content, no economic or technical criterion is taken into account at this stage. For example, the advice of a doctor in the very secrecy of the surgery is naturally reserved for just the patient coming for consultation. More generally, all consultancy services delivered to a person or a business bear reserved content that justifies a restriction on recipient names. Even access to a tutorial in a class room and written material distributed during the lesson are reserved to a predetermined and limited list of student names. This category labelled as "message products subject to restricted diffusion" comprises education services, and consultation services delivered to business or individual.

- On the contrary, the daily print of a newspaper, an exhibition in a museum, an "open to public report", a film projection in a cinema, a concert, a radio programme, a language method on book and cassette are not subject to any restriction relating users' identity. These are "message product" bearing "an open to public content" intended for anyone interested. Only price (economic criterion) and the number of available seats / copies (technical criterion) may limit the number of users of an "open to public message product", not their names. A special case is that of a "message product" intended for a targeted audience (children, Paris voters, Internet users). Though it is subject to targeted diffusion, this "message product" still is not subject to any restriction on recipient names; therefore it is still an "open to public message product". For the same reason, any TV programme (even unique, even live) also is an "open to public message product", since it is intended for the largest possible audience. This category labelled as "open to public message products" comprises art assets, live cultural events, and products that will later be defined as "content products".

22. In the world of physical objects, there are prototypes, custom made or handmade unique pieces, as well as large scale production standardised products. This distinction also applies to the domain of content and "message products".

- A novel manuscript or an original score of a music composition are both original "message products", that in terms, correspond to prototypes. Mona Lisa, the latest performance of hamlet, a literature tutorial in a class room, a medical or legal consultation are unique (custom made handmade) "message products" that, in principle, are not copied or not reproduced in exactly identical copies. This category labelled as "unique message products" comprises art assets, live cultural events, education services, consultation services delivered to business or individual.

- On contrary, a printed book, a newspaper copy, a CD-ROM tutorial, a music record, a television programme or the download copy of a film are standardised "message products" that are reproduced or reproducible in series of exactly identical copies. These products are intended to a large number of users, that is intended for an audience. Even unique radio and television programmes such as news and live shows still are large scale production standardised products: they are subject to "point to multi-point" broadcasting and intended for the largest possible audience; therefore viewers and listeners get exactly identical content. This category labelled as "large scale message products" mainly comprises products that will later be defined as "content products".

23. A "communication medium" is any medium enabling the large scale communication of contents. Bearing in mind our focus on information and communication technologies, it follows that among all possible media for content storage, "communication media" represent a special category of interest. As shown by books, magazines, records, films, audio/video cassettes, cinemas, magnetic and digital compact disks or Internet sites, "communication media" are particularly suitable to disseminate "open to public contents" and achieve mass diffusion. At this stage, it is important to note contents combined with communication media constitute a special subset of "message products" namely: the "content products".

24. As regards "original message items" (non output messages, and prototypes) and other "unique message products (custom made, handmade), combining content with medium is a spontaneous operation which is jointly conducted with content creation (writing a letter, painting, playing music, audit reporting). By contrast, combining any content with a communication medium is neither an easy nor a spontaneous operation (novel printing and publishing, album recording and producing, production and broadcast of a TV programme). In addition, beyond technical aspects, combining a content with a communication medium requires involvement in publication activity. For this reason, there must be an agent who is organised to take on such functions.

The 'Publisher' is the agent who supervises the combination of content with a communication medium and the related content product publication. In fact, the "publisher" takes responsibility for whole publishing activity, including supervision of content editing and marketing, legal and commercial risks. Thus content product publishing activity clearly differs from content creation activity.

This is why the original content creator (novelist, concert musician, artist, photographer, statistician, film director, journalist, video game developer) and the "content product publisher" (record producer, book publisher, film producer, magazine publisher, photograph agency manager) generally are different agents.

Finally, as observed with content creation, the release of a content product requires some kind of organised and value creating publishing activity. For example, a non published or a non reproduced record master are still similar to prototype "unique message products". It has been argued that with the Internet any creator of a content can now easily take on its publishing. This is probably true for content creation as a social activity. However old economy examples of professional content creators that have taken on their own publishing suggests they became professional publishers.

CONTENT PRODUCT DEFINITION

25. With the above development in mind, it is proposed to define content products as follows.

A content product is a open to public content published over a communication medium.

It is also suggested that a content product has the following characteristics:

- a) It is an organised message intended for human beings.
- b) It is combined with, or carried by, a medium.
- c) It results from an organised production activity.
- d) Its diffusion is not restricted to a list of privileged recipients.
- e) Its content is a standardised message disseminated through communication medium.
- f) A content product must be published.

Using this definition, a novel, a film, an album on CD, an on-line encyclopaedia, a tutorial obtainable from the publisher's web site, a play on television, a radio broadcast, an on-line/ on-print mail order catalogue, an on-line/ on-print newspaper article, an on-line weather forecast information service... are all content products.

REMARKS

26. Among "communication media", "electronic communication media" are communication media that support the electronic display, processing, storage and transmission of information. This definition simply means "electronic communication media" are ICT products. This the reason why radio, television, Compact disks, E-books and the Internet fit in this definition.

27. At the start of its statistical work on information society, the OECD working party really had in mind to define "electronic content", "electronic content products" and the "electronic content sector". After several unsuccessful attempts, the group concluded this was a wrong track and judged it preferable to follow the "content" - "communication medium" approach. This means "electronic content" (digital content) is not an actual subject for observation. The subject is "content" available on an "electronic communication medium", or content combined with an electronic communication medium.

28. Still expressions like electronic product, digital product, electronic content or digital content are commonly used. Since these words are not defined, they can be rather misleading. For example the word electronic newspaper suggests it is an ICT product whereas it corresponds to the combination of the newspaper content with the Internet (an electronic medium). This word also suggests

the reader can buy the electronic version of the newspaper, whereas what is actually offered is a content delivery service. This service consists in the provision of the newspaper content by electronic means. In other words, the deep nature of a "content product" available on-line is not that of an "ICT product", but that of a "content" (information) electronically processed by means of an "ICT product" (a tool).

Hence, the word electronic newspaper is quite misleading, it does not even correspond to an observable subject. Here The good concept to use is that of a newspaper content combined with an electronic communication medium, or that of a newspaper (content) available on-line (medium). To obtain this news paper content, the reader has to buy an "on-line information provision service" (content product) which consists of a newspaper content delivery by electronic means. Though not ambiguous, expressions such as: electronic newspaper service electronic directory service – e-content services – digital content services would be less misleading.

29. The content product definition suggests it bears an open to public content intended for the largest possible number of recipients. This means a content product is intended for an audience.
30. As above defined, content products are standardised crude products, the only utility of which is the delivery of an "open to public" content and nothing else. Broader services offering content delivery as one possibility in a larger functionality package are to be identified as value-added services not as content products.
31. An on-line bank statement looks as the combination of a message intended for a human being combined with an electronic communication medium. Yet it is not a content product. The reason is the message is intended to only one person, the owner of the account. In other words, the content of a bank statement is not open to public. Therefore the on-line delivery of a bank statement to customer is not a content product; but a restricted content on-line delivery service. The actual nature of such a bank statement delivery service is that of a customised bank service which is provided through the Internet or a computerised-telephone. In general, drawing the border line between a content service and a value-added service may turn out to be a delicate task. However, the above definitions of "content product" look to be a discriminating tool.
32. A private Internet letter or an organisation email restricted to personnel is not a content product. Despite being stored on an electronic communication medium, these messages still are intended for an explicitly limited list of names. Secondly, these emails are not intended to be published. Thirdly, both private letters and internal notices are not identified as economic outputs, they correspond to "spontaneous contents" resulting from human beings' private or professional activity. So the increasing use of Emails can be interpreted as an ICT impact on the Economy and Society, occurring through emerging new practices and uses. Information society statisticians are well advised to measure the development of Email practices, but not by means of production statistics.
33. Paradoxically, advertising services provided by advertising agencies are not content products. While there is no doubt advertising material such as films, recorded messages and advertising posters are content products, these also are components of a custom made service purchased by an advertiser from an advertising agency. In other words, these advertising materials only are inputs integrated into a broader service supplied by the agency, which actually is a "communication consultant" delivering its service to a specific advertiser. Incidentally, two decades ago, The French advertising business association choose to name itself as the French association of communication consultants.

At that stage, it may be useful to remember the advertiser holds the crucial part in an advertising campaign. The advertiser is the agent who orders the whole campaign, takes the initiative, bears its commercial risk and purchases any advertising agency service as an input integrated in its own product. It has been argued consumer is the actual purchaser of an advertisement since it is the indirect payer. But this argument is not discriminating since it could be equally applied to any other input purchased by a business producing consumer products.

VI. FROM CONTENT PRODUCT TO CONTENT SECTOR

34. The content sector is the group of industries that are primarily engaged in the publishing and/or the electronic distribution of a content product.

The application of the criteria outlined in this paper leads to the following list of the content sector ISIC industries (see annex 3 and companion paper).

- 2211 Publishing of books, brochures, musical books and other publications
- 2212 Publishing of newspapers, journals and periodicals
- 2213 Publishing of recorded media
- 2219 Other publishing
- 2221 Printing
- 2230 Reproduction of recorded media
- 7240 Data base activities
- 7494 Photographic activities
- 9211 Motion picture and video production and distribution
- 9212 Motion picture projection
- 9213 Radio and television activities
- 9220 News agency activities

REMARKS

35. Most of businesses and organisations get involved in some content publishing when performing their main activity (users instructions, advertising leaflets, catalogues). Fortunately enough, most of them are not identified as publishers and therefore are not included in the “content sector”. The reason is: content publishing is not their core business, nor is it their main source of revenue, or their purpose to be.

For example, a trader publishing a catalogue is not identified as a publisher because: catalogue publishing is not the purpose of the trader’s main activity; is just a means to achieve it. Similarly, a machine tool manufacturer editing a technical guide on a CD-ROM is not identified as a publisher specialised in CD-ROM publishing. Consequently, a large proportion of content products is published by businesses that are not in the scope of the content sector.

36. In line with content product definition and previous remark, the education industry is not included in the “content sector”. Access to a tutorial in a class room setting is reserved to a predetermined and limited list of student names. Moreover, the provision of a lesson in a class room is a unique live event that never identically re-occurs from session to session. Even if a teacher or a tutor edits the lesson content on a leaflet, a CD-ROM or the school Internet site, this publishing activity still remains far from being the main activity of schools and universities; it is not either their main delivery mode of knowledge, nor is it their main financing source or the very fundament of their existence.

Last but not least, most of education material such as books, cassettes or CD-ROM tutorials are not edited by education organisation but by professional publishers that are not part of the education industry. As regards, businesses specialised in the training of personnel at work, they do not live either on their sales of books, cassettes and CD-ROM tutorials. Their main activity and source of revenue still is the delivery of a custom made training service to businesses.

37. For similar reasons, health industry is not included in the “content sector”. First, as mentioned above, a doctor consultation, is not a content product. Like any consulting activity intended for persons, it is a restricted and custom made content bearing service. Secondly, it is obvious a medical treatment cannot be identified to the only consultation of a doctor. Actually, health activity

involves many other actions and many other knowledgeable professionals. This means the main activity of health industry is to provide a broader service, in which, content delivery (doctor's advice) only represents one element among many others.

38. As above suggested, the advertising industry is not part of the content sector. The reason is advertising services are not content products.
39. So far, the most difficult case is that of database industry. It includes database developers as an electronic communication medium (software service), strict data input services (software subcontracting service), open to public database consultation services, custom made value-added service. Actually, this problem mainly arises from the ambiguous definition of this ISIC industry.
40. In this definition, printing is considered as part of publishing activity. According to interviewed professionals, they see themselves as part of as part of communication activities and wish to be considered as such, not as part of wood or paper processing activity. Similarly, reproduction of recorded media has been considered as part of the recorded media publishing activity, film projection as part of the motion picture production and distribution activity and press agency activity as part of the press publishing activity. The reason for these inclusions is the entanglement of interested industries.

VII. CONCLUSIONS FOR FUTURE CLASSIFICATIONS

41. When to be revised, product and industry classifications now must integrate economic transformations resulting from the ICT rapid growth. Naturally, these classifications must be designed so as to contribute to appropriate measurement of information economy development. For this purpose, it would be most fruitful to take advantage from the conceptual approach that has just been reviewed.
42. ICT convergence is the first transformation that has to be taken into consideration. This means ICT convergence justifies the gathering of ICT industries in the smallest possible number of homogeneous groups. As already done for agriculture, manufacturing, construction or trade, future industry classifications should include two new sections, each one being clearly identified. Namely, an ICT manufacturing subsector and an ICT services subsector should be created.

From the only view point of the information society statistician, ICT industries should ideally be gathered in only one compact ICT sector. But such grouping of industries would lead to get rid of the traditional distinction between manufacturing and services, which may still be premature in this case.

Yet, the only grouping of ICT industries in two subsectors raises the question of what to do with wholesale activities in ICT product.

- Are those to be gathered with ICT services?
- Are those to be split between ICT manufacturing, ICT retail trade and ICT services?
- Are those still to be kept as a specific item in the trade sector.

Whatever decision is taken in this matter, any relevant industry classification now requires new items specifically related to ICT product wholesale and retail trade activities.

43. Now it is clear content activities share strong and common features that justify to group them in one homogeneous section of an industry classification. Up today, content industries are scattered all along the spectrum of each international industry classification (ISIC and NACE); this is why statistical coverage of content industries is much below the average compared to other industries. In particular, product classifications relating content are grossly out of date; as to content industry classifications, they also need serious improvements.

Therefore, future industry classifications should adopt the content sector, as above defined and distinct from the goods-producing and service-producing sectors. With these innovations in mind, an international framework for the description of the information economy can be set as follows:

ICT manufacturing + ICT services + content sector = information economy sector ;
ICT manufacturing + ICT services = ICT sector ;
ICT services + content sector = NAICS information sector.

44. The intrinsic nature of an ICT product is that of an electronic tool with which it is possible to handle a special kind of object, information. This difference in nature between a tool and the material to handle with explains why ICT products do not encompass content products such as: newspapers, books and their electronic versions, music records and CDs, films, video cassettes, on-off line manuals, tutorials and video games, on line data base consultancy services.

In particular, radio and TV services are not either recognized as ICT products. The reason for this exclusion is a radio TV service is not a technology to process information but a program (a content) transmitted by means of an electronic communication medium (by means of an ICT product).

Hence to achieve sensible classifications which clearly mark the limits between ICT products and content products, between ICT and content industries, it is fundamental not to confuse the electronic tool used to process information and information subject to electronic processing.

45. Content products can be published over any kind of "communication medium". These can be gathered in two main categories i.e. "electronic communication media" and "non electronic communication media". Electronic communication media are ICT products. But the object that is designated with the misleading digital content denomination is not an ICT product; it actually corresponds to the combination of a content and an electronic communication medium (an ICT product).

In other words, the intrinsic nature of a content product available on an electronic communication medium is not that of an ICT product, but that of a content (information) electronically processed by means of an ICT product (a tool). In particular, what is designated as an on-line content (digital content electronic content) actually is a content service.

46. Nowadays, one specific "content" can be published in different versions, each one corresponding to a different "communication medium". This means "content" is the core value of a "content product", it represents its central characteristics. For its part, the communication medium represents a peripheral characteristics of a "content product". Thus the deep nature of a "content product" is determined by its content whereas it is relatively independent from that of the medium on which content is available. For classification matters, the nature of "content" prevails, that of the "medium" is secondary.

47. In particular, a television program available on cable or satellite still is a television program (a content product) not a telecommunication service (an ICT product). Consequently, cable televisions the main activity of which is to distribute television programs, clearly belong to television service industry not to telecommunication service industry. This is an area for which present classifications must be revised.

48. More generally, it is not either justified to gather services available over the Internet in a "telecommunication service" category. The reason is: services available over the Internet medium have totally different functionality. For example, an on-line version of a newspaper, a music downloading web site, an on-line travel agency, a virtual market place, on-line video games, chats or e-mail meet completely different needs and therefore are services of totally different nature.

Similarly, there is no reason to group producers of such services in one telecommunication industry should it be named "Internet services". Did one ever had the idea to group all products available in a supermarket under the same item in a product classification? Would anyone dare say that producers of such goods and services should be included in the same industry as large size department stores? For similar reasons, a computer software, an encyclopaedia, a tutorial, a video game or a music album on CD are products of different natures. Their storage on the CD-ROM is not sufficient to justify the opposite.

49. Up to recent years, the confusion between the medium and the functionality of a product did not have bad consequence for product classifications, because, as a book or a record, a medium generally was used to fulfil only one function. But nowadays, ICT applications have led to the crea-

tion of a variety of new "electronic communication media", on which many products of totally different nature are available.

This means we have to bear in mind the nature of a medium is that of a tool used to make things available to users. Therefore the medium function cannot be confused with that of products it delivers. Consequently, the central characteristics of an electronically delivered product is the product functionality; the electronic medium only is a peripheral characteristics of the delivered product. So it is with products delivered on non electronic media.

Hence, more than ever, products must be classified according to their central functionality, not according to the medium over which they are made available. If the medium were to be the structuring element of a classification, products made of paper or deliverable by lorry could be gathered under the item "paper products" or "lorry deliverable products"; producers of such products could then be grouped in "paper industry" or "road transport".

50. The WPIIS difficulties also show new items will have to be introduced in future product and industry classifications, noticeably items related to: video game, database consultancy services, wholesale trade in ICT products, retail trade in ICT products, renting of ICT products, electronic wholesale activity, electronic retail trade activity, electronic market place activity. Some existing industries will probably have to be redefined to mark clear limits between content activities and ICT activities.

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ANNEX 1
Definition of the ICT Sector using ISIC, Revision 3
(United Nations 1990).

Manufacturing

- 3000 Manufacture of office, accounting and computing machinery
- 3130 Manufacture of insulated wire and cable
- 3210 Manufacture of electronic valves and tubes and other electronic components
- 3220 Manufacture of television and radio transmitters and apparatus for line telephony and line telegraphy
- 3230 Manufacture of television and radio receivers, sound or video recording or reproducing apparatus, and associated goods
- 3312 Manufacture of instruments and appliances for measuring, checking, testing, navigating and other purposes, except industrial process control equipment
- 3313 Manufacture of industrial process control equipment

Services -- goods related

- 5150 Wholesale of machinery, equipment and supplies²
- 7123 Renting of office machinery and equipment (including computers)

Services -- intangible

- 6420 Telecommunications³
- 7200 Computer and related activities

². Where available, countries should only include those subsectors of this industry that directly provide ICT wholesaling services. This will avoid the inclusion of extraneous wholesaling activity. For example, using the NACE nomenclature, only NACE categories 5143, 5164 and 5165 should be included.

³. In those instances where countries include telecommunication activities as part of radio and television activities (ISIC 9213), radio and television activities (9213) should be included in this definition. Otherwise, it should not be included.

ANNEX 2 Some International Definitions

CPC explanatory note on 843 On-line information provision services

This subclass includes:

- database services
- provision of information on web-sites
- provision of on-line data retrieval services from databases and other information, to all or limited number of users
- provision of on-line information by content providers

This subclass does not include:

- provision of telecommunication net-services such as internet access services, necessary to access the databases or information holdings of information content providers, cf. 842
- on-line access to web-sites, cf. 842
- services involving document searches, cf. 845
- internet sales, cf. 623

OECD e-commerce transaction definition (broad definition)

An electronic transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over computer-mediated networks. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted on or off-line.

OECD Internet transaction definition (narrow definition)

An Internet transaction is the sale or purchase of goods or services, whether between businesses, households, individuals, governments, and other public or private organisations, conducted over the Internet. The goods and services are ordered over those networks, but the payment and the ultimate delivery of the good or service may be conducted on or off-line.

ANNEX 3
Proposed Definitions Of The Content Sector, Using Isic Revision 3

2211	Publishing of books, brochures, musical books and other publications
2212	Publishing of newspapers, journals and periodicals
2213	Publishing of recorded media
2219	Other publishing
2221	Printing
2230	Reproduction of recorded media
7240	Data base activities
7494	Photographic activities
9211	Motion picture and video production and distribution
9212	Motion picture projection
9213	Radio and television activities
9220	News agency activities

Remarks:

It could be argued businesses that trade and rent content sector products should drag their related industry into content sector. But there is not any detailed ISIC industry in which these businesses play a prominent part. Therefore the above table does not mention any trading or renting service industry.