

# LIVING THE REALITIES OF AN INFORMATION SUPER RICH WORLD

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## **Abstract**

Our world is swamped with information. Some of it is solicited and some is not. A great deal of that information is useful or potentially useful, both for individuals and organizations. By the same token, a great deal of the information that hits our computer or TV screens that vie for our attention is useless at best. There is every indication to suggest that this trend is unlikely to abate. Most likely, the trend will continue to gather pace as more people flock to the information “superhighway”. What is interesting about this phenomenon is that much of the useless information (some of which is of our own creation and some is created by others for commercial purposes) gets in the way of our quest for useful information and knowledge.

Thanks to the “disruptive” nature of the Web, publishing and distributing information have become very affordable endeavours and the consequence is that more information is flowing around than ever before. In this article, the issue of information overload will be explored in order to identify its causes. In doing so, the article will highlight the technological dimension of the problem and some of the views that sought to explain this phenomenon from a cultural perspective.

**Keywords:** Information Overload, Disruptive Innovation, Ephemeralization

## **I. GALACTIC INFORMATION**

It is probably adequate to describe the Web era in which we live as an information super rich one. A recent research report (Short, Bohn and Baru, 2011) estimated the annual global processing of data in 2008 by the world’s enterprise servers at 9.57 zettabytes. If one is to imagine this information as a stack of books (assuming each book is 4.8 centimetres thick and contains 2.5 megabytes of information) it would extend for 5.6 billion miles, enough to stretch from Earth to Neptune 20 times over. The study estimated that enterprise server workloads are doubling about every two years. This means that by 2024 the world’s enterprise servers will annually process the digital equivalent of a stack of books extending more than 4.37 light-years to Alpha Centauri, our closest neighbouring star system in the Milky Way Galaxy.

## **II. THE “DISRUPTIVE” NATURE OF THE WEB**

There is no doubt that the Web has had a disruptive impact on the way we publish and disseminate information. The world, according to Christensen *et al*, has experienced many disruptive innovations in its recent history. Bell’s telephone, Sony’s transistor radios, Apple’s

personal computers (to name but a few) are examples of those disruptive innovations (Christensen, 1997; Christensen and Raynor, 2003; Christensen, Anthony and Roth, 2004). According to this theory, the disruptive nature of those innovations originates from their ability to destabilize existing markets and create new business opportunities. Such innovations often occur less frequently and tend initially to have performance problems. Furthermore, they are also likely to be less expensive, simple and more convenient to use. It becomes evident from this description that the Web has all the characteristics of a disruptive innovation. It has destabilized some existing brick and mortar retail businesses, especially those in the music and book selling businesses, for example. Using the Web, customers can now download music and books in a few minutes from the comfort of their own homes. Moreover, the Web has created other market opportunities that did not exist before, such as enabling consumers to sell to companies (a reversal of the traditional model) through a business model that came to be known as Consumer to Business (C2B) or to sell to other consumers through a business model that came to be known as Consumer to Consumer (C2C).

None of the aforementioned business models would have been possible without the Web. Despite its popularity, the Web still suffers from a few performance problems relating to issues such as security and bandwidth (another characteristic of a disruptive innovation). Many people still do not trust the Web for conducting business. In periods of heavy business activity, bandwidth can be a real (and costly) problem. Using one's online stockbroker (as a private investor) to sell one's falling shares on the day of a stock market crash can be a traumatic experience.

One of the most significant disruptive features of the Web is the creation and disseminating of "information". The affordability of the Web has made writing and publishing of information inexpensive, a situation which has resulted in an explosion of online information, some useful and some utterly useless. This situation was described by Heylighen (2002) as the consequence of "ephemeralization" (a term coined by Buckminster Fuller<sup>1</sup>), defined as the ever increasing productivity or efficiency of all processes brought about by technological innovation. According to this view, ephemeralization has made the production and distribution of information extremely inexpensive, which made it possible for senders to spread their messages ever more widely.

New innovations in Web technology, what came to be known as Web 2.0, and communication technologies have further increased the urge to publish and disseminate information. Social networks and other technological developments (e.g., WiFi, Wikis, blogs, iPhone, iPad) are a few examples of those new innovations.

### **III. FINDING AND MANAGING THE INFORMATION**

Organizations and individuals need information to enable them to make effective decisions. The effectiveness of those decisions may be dependent on the quality of the information they receive and the successful management of that information. For such information to be managed successfully, it has to be filtered, stored, retrieved and transmitted in accordance with certain conventions designed to standardize procedures and minimize non-value adding activities. On that basis, there are two issues here: (a) finding the useful information and (b) managing that information.

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<sup>1</sup> Richard Buckminster Fuller was an American inventor, architect, author and futurist.

Given the ease with which information in our Web era can be created and transmitted, the world has become flooded with information. Much of that information is useless and volatile. It is estimated that 40 per cent of data on the Web changes monthly and 30 per cent of Web pages are almost duplicates (Baeza-Yates and Ribeiro-Neto, 1999, cited by Jashapara, 2011). Bearing in mind that this estimate was made more than a decade ago, the current situation is likely to be even worse. The emergence of search engines provided a useful mechanism to enable us to locate the information we need. In this respect, Google has managed to establish a formidable reputation in this field, thanks to its “Coca-cola”-like recipe of algorithm and a business model where advertisers subsidize searchers of information. Google has become the *de facto* “public” tool for locating information to the extent that the transitive verb “google” (meaning “search”) has entered into our daily language (and, in 2006, the Oxford dictionary). . Aware of its rising status in this field, Google has recently named one of its internal groups “the knowledge group”, known previously as the search group (Arrington, 2011).

Search engines have come to rely on software (known as agents, crawlers or robots) that scour the huge Web landscape in order to locate information (which is subsequently indexed by specialist software) based on certain criteria defined by the developers and managers of those search engines. This situation has made it easy for certain people (and organizations in particular) to design their websites in such ways that enable the links to those websites to appear at the top of one’s lists of search results. Most interestingly, a new and more “sophisticated” trend (known as “content farming”) has emerged during the last few years that makes this situation a way of making a living. Content farming is largely practised by organizations whose main objective is to attract Web traffic to their websites in the hope that viewers will be tempted to click on some of the advertising links on those websites (an activity that will guarantee the hosts of those advertisements an income). In order to achieve this, content farmers rely on a dedicated pool of low-paid professional writers who produce low quality articles (often a hodgepodge of information drawn from many other Web sources including Wikipedia). The articles often include keywords that receive a high number of searches in search engines, thus tricking searchers into believing that they have found what they wanted. In doing so, the content farmers hope that those searchers might be tempted to click on some hyperlinked images or texts representing advertisements, an activity that will register as “page view” and earns them a small fee from the advertisers.

Recently, Google became aware of this phenomenon and, in order to address it, made an update of its algorithm (that became known as the “Panda update”) which physically demoted a large list of websites that were identified as content farmers. Given the lucrative business of content farming it remains to be seen if Google’s move has been successful in affecting this practice.

No one can deny Google’s success in its ability to facilitate the process of finding information for millions of people. Given that this facility comes to the searchers at no cost (since the advertisers are the ones who pay the bill) one might ask if users of this search tool have any right to complain. This could change, however, if Google decides to charge for its search services (assuming it also introduces additional features that improve searching). This scenario is not far-fetched, given the precarious and competitive nature of advertising. Many people will probably be prepared to pay for a better information-retrieving service. However, the convenience, ease and maybe even “fun” of searching for information will no doubt suffer. Given the massive popularity of Google, this scenario will represent a major and sudden impact on our ability to access useful information. It is ironic that one Western company, headed by a small group of bright young people, can, at a stroke of a pen (or byte) decide if the world can have access to the information it needs.

Acquiring the useful information is probably the least problematic task when dealing with information. Managing that information is more challenging. On a more personal level, how many people can attest to having a well organized folder structure on their personal home computers underpinned by navigational and folder and file-naming conventions that facilitate the storing, retrieval and transformation of information? On a more professional or organizational level, the same question can be asked: how many people can attest to being able to find the work-related information that they need with ease? The answer to these questions is probably likely to be “not many”. A 2010 survey of 543 business leaders and IT-decision makers from 17 countries across North America, Europe and Asia Pacific revealed that more than half of business and IT executives (56%) felt overwhelmed by the amount of data their companies had to manage. Many of them reported they were often delayed in making important decisions as a result of too much information. The survey also revealed that one in three executives was regularly unable to find the right people who can provide the information they needed when they needed it (Avanade, 2010).

Understandably, much of this information-organising problem can be attributed to the sheer number of times that we have to deal with information. We have very little time at work or at home to devote towards this task. And once we have accumulated many gigabytes of that information, finding the time to organize it becomes a problem of its own as there is very little time left to do this activity. Most of our time is spent on processing information (e.g., reading it, understanding it and using it to produce our own information) but little time is spent on organizing it. Thomas Stewart (author of the best-selling book *Intellectual Capital*) wrote in a subsequent book, in 2001, under the title “The Wealth of Knowledge: Intellectual Capital and the Twenty-First Century Organization”:

We produce an extraordinary amount of the stuff . . . Sure, a lot of it is garbage . . . Much of this production is never sold. For example, only a fifth of the information produced on paper can be found in books, newspapers, and periodicals; the rest is office documents. (Stewart, 2001)

Indeed, the phenomenon of information overload suffered by individuals and organizations and its implications has been acknowledged by other researchers in this field as well (Edmunds and Morris, 2000; Jones, Ravid and Rafaeli, 2004, cited in Kock, Aguila-Obra and Padilla-Melendez, 2009). Communication at work on a daily basis through written information exchanges such as electronic messages and documents are responsible for much of work’s high volumes of information, in contrast to oral (face-to-face and telephone) exchanges which have lower volumes of information transferred through them (Wainfan and Davis, 2004, cited by Kock, Aguila-Obra and Padilla-Melendez, 2009). Stewart describes his experience with email in a more telling (albeit amusing) way:

If I return to the office after a few days away, the stack in my inbox is noticeably shorter than it was when I returned from trips five years ago – and the amount of weightless email is much greater. (Approximately 610 billion e-mails are sent per year, of which at least a third are cc’d to me). (Stewart, 2001)

Interestingly, many of the information processing aids at work, such as electronic collaboration technologies, can indirectly lead to an overall increase in the amount of information that an individual has to process (Schultze and Vandenbosch, 1998, cited by Kock, Aguila-Obra and Padilla-Melendez, 2009). This situation is echoed by Heylighen (2002) who argues that revolutionary technologies developed to increase productivity initially

fail in this purpose, because their introduction adds to complexity and information overload since individuals have to learn how to use them, thus creating a productivity paradox.

#### **IV. THE PRICE OF TOO MUCH INFORMATION**

One of the first researchers to recognize the problem of too much information was psychologist David Lewis who called this phenomenon “information fatigue syndrome” and associated it with many psychological and negative behaviours such as anxiety, poor decision-making, difficulties in memorizing and remembering, reduced attention span, reduced work satisfaction and strained relations with collaborators (Waddington, 1996; Shenk, 1997; Wurman, 1990, cited by Heylighen, 2002).

This issue was highlighted by Heylighen (2002) who contends that people find it ever more difficult to cope with all the new information they receive, constant changes in the organizations and technologies they use, and increasingly complex and unpredictable side-effects of their actions. This situation, according to Heylighen, often leads to growing stress and anxiety, fuels various gloom and doom scenarios about the future of our planet, and may help explain the increasingly radical movements against globalization. And the longer people are subjected to information overload, the more negative its effects on physical and mental well-being. What we normally would consider as technological progress, according to this author, brings with it a number of subtle but unavoidable side-effects that make it increasingly difficult for individuals and society to control or predict further developments.

This issue is shared by other researchers who based their findings on empirical studies. Klausegger, Sinkovics and Zou (2007), who conducted research relating to the impact of information overload in Singapore, Hong Kong, Australia, UK and USA, listed the following effects on the investigated people: decreasing job satisfaction, health problems, negative effects on social and personal contacts, and decreasing amounts of leisure time.

Given the unstoppable progress of information technology (IT), Heylighen (2002) suggests that we should develop suprahuman systems to complement our limited capacities for processing information and understanding complex systems. These systems, according to him, cannot be merely technological (the famed super-intelligent computers or robots), but must also encompass humans as essential components.

#### **V. THE CULTURAL DIMENSION**

An interesting study by Kock, Aguila-Obra and Padilla-Melendez (2009), attributes “perceived” higher levels of information overload more to cultural factors than to the volume of written information or number of transactions processed by an individual. They argue that information overload is rarely measured directly and objectively (i.e., by the amount of work load) and that attempts to measure it in that way often fall into the trap of measuring it through effects that are caused by information overload. Information overload, according to those authors, can only be measured indirectly and subjectively, through perceptions of information overload. Their study is based on data collected from 184 local managers and professionals in New Zealand, Spain and the USA. The study draws on research conducted by Geert Hofstede on the influence of culture on work relationship and their effects on staff.

In particular, the issue of “power distance”<sup>2</sup> is identified as a contributor of stress at work. The rationale for this hypothesis is that individuals who are more accepting of power differentials in organizations are also likely to feel more time pressure to perform work well. The conclusion of Kock, Aguila-Obra and Padilla-Melendez’s study is that information overload intensity was observed to be more strongly related to power distance than to the volume of written information or number of information transactions processed by an individual. This conclusion is referred to by these authors as the “information overload paradox”. On that basis, according to their reasoning, it is logical to argue that reducing power distance in an organization may reduce perceived information overload and possibly lead to better overall performance.

The aforementioned empirical study of Kock, Aguila-Obra and Padilla-Melendez seems to imply that workers from countries with low power distance are more likely to perceive information overload as less of a problem than workers from countries with high power distance. If so, these findings seem counter-intuitive. Indeed the authors themselves also acknowledge this fact. Many of the low power distance countries are ranked amongst the world’s developed countries where IT is one of their main contributors to growth and competitive advantage. This should suggest therefore that any employee perceptions of low information overload should logically come from these countries.

Interestingly, but not surprisingly, the aforementioned study by Klausegger, Sinkovics and Zou (2007), which is based on five countries (Singapore, Hong Kong, Australia, UK and USA) concludes that much of the information overload problems and their negative impact on people (as one would expect) are most dramatic in the UK, Australia and the USA (low power distance countries).

It would be more interesting to see such empirical studies include some of the high power distance and high context cultures (especially those in the Arab World for example) where personal and face-to-face contact is of more importance than the faceless and distant means of electronic communication. High and low context cultures are terms coined by anthropologist Edward Hall in his 1976 book *Beyond Culture*. According to Hall, people of a high context culture have a tendency to use high context messages over low context messages (used by people of low context cultures) in routine communication. In a high context culture, for example, many things are left unsaid, letting the culture explain them. Words and word choice become very important in high context communications. A few words can often communicate a powerful message very effectively in contrast to a low context culture where the communicator needs to be much more explicit and the value of a single word is less important. In Arab societies, one often hears the term “the meaning is in the poet’s heart” to refer to a situation where much can be read from a just few words. Given the cultural idiosyncrasies of such societies (high power distance and high context) and their relatively developing IT infrastructures one is likely to expect information overload to be perceived as less of a problem, contrary to what is suggested (or implied) by the empirical findings of Kock, Aguila-Obra and Padilla-Melendez.

Rather than focussing on the cultural backgrounds of the people that deal with information, it will probably make sense to focus on the cultures of organizations themselves and their ability (or inability) to deal with technological innovations. Zeldes, Sward and Louchheim, (2007) commented:

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<sup>2</sup> Defined as the extent to which less (and more) powerful members of organizations (e.g., employees and their superordinates) accept that power is distributed unequally.

Technology and organizational culture have failed to properly co-evolve. Rapid advances in technology enable new work modes, but there is insufficient study, if any, upfront to predict opportunities and risks. This intelligence would allow implementation of parallel changes in the paradigms defining work ethics, management expectations and employee behavior. Instead, corporations deploy technology without that intelligence, and the culture adapts to the new technology in a haphazard and clearly sub-optimal manner. Infomania is an emergent phenomenon resulting from this uncoordinated evolution.

This view is echoed by Tang *et al.* (2010) who argued that “The diversity of understanding required for the use, capture and reuse of information, information system and knowledge management creates a culture that inhibits employees’ capability and full functioning of the adopted systems in an organisation”.

## **VI. TECHNOLOGY OR SELF-DISCIPLINE?**

Given the unregulated nature of the Web, the problem of information overload is unlikely to be addressed on a global level. What will be important in the years to come will be our ability to adopt certain conventions or disciplines for dealing with information (particularly that which is of use to us for our practical and intellectual purposes). It is ironic that, despite huge investments in productivity desktop applications and the continuous updating of those applications, very little attention has been given to the issue of information in terms of how best to store it, organize it and retrieve it. Much of this task is often left to the user. Assigning names to files and creating folders and sub-folders to store, organize and retrieve our files is a task that many of us have become used to. However, we all know how much time we often spend trying to find a document that we need urgently to retrieve but found it difficult to do so without too much effort and resorting to using the “search” tools that have become a feature of many of those desktop productivity applications. Prior to 1995 (before the release of Windows 95 and Windows NT 3.51) we were constrained by an eight-character naming limit for our files and folders due to technological limitations inherent in the way operating systems functioned. This situation created an impediment for any meaningful way to organize information. Even when useful work information is hosted on company websites, finding that information is often a struggle. Many people (including this author) often resort to Google to find information that is expected to be found in certain websites because they are unable to find it in those websites due to bad design.

There are now many information and Knowledge Management (KM)-oriented software tools aimed at helping organizations make better use of their data. Those systems do not come cheap. What is worrying, however, is that rather than helping those organizations overcome problems of information overload they may run the risk of adding to information overload as suggested above.

Some authors (see Tsui, Cheong and Sabetzadeh, 2011) even conceptualize the adoption of new technologies such as cloud computing for managing information at the individual level as a means of Knowledge as a Service (KaaS). Using such a platform, cloud users, according to those authors, will be able to store, retrieve, evaluate and organize their personal information. Most importantly, they will be able to access their cloud-hosted information at anytime and anywhere. In fact, many of the available (free and subscription-based) productivity applications (e.g., Google Apps, Google Apps for Education, Google Apps for Business, Microsoft’s Office.live.com, Education Live@edu, Office 365) are cloud-based

and they already offer, more or less, the same functionality proposed by such authors. However, the benefit of using such cloud-based systems will need to be investigated further. Many of them, nevertheless, are still fundamentally based on the traditional model of productivity applications.

In the absence of useful, affordable and novel information and/or knowledge-oriented software solutions, what is needed is perhaps universal (but simple) conventions and techniques for helping individuals (and organizations) make better use of their information through current and familiar software and ICT tools. It might even be useful to introduce such conventions and techniques as part of students and professionals' schooling in soft skills. Taking this task more seriously by way of introducing it as part of a college or university curriculum might turn out to be potentially rewarding for our future ability to deal and cope with information overload.

Interestingly, there is an international standard for record management agreed in 2001 that came to be known as ISO 15489. The standard is a best-practice for records management in all organizations, large or small, public or private and provides guidance on the design and implementation of records management systems. It defines a record as "information created, received, and maintained as evidence and information by an organization or person, in pursuance of legal obligations or in the transaction of business" and define a document as "recorded information or object which can be treated as a unit" (Gunnlaugsdottir, 2002).

It is not clear the extent to which this standard has been adopted or proved to be useful. In the UK, for example, its impact on organizations, senior management and other staff, has been limited (McLeod and Childs, 2005). Some analysts (see Joseph, Debowski and Goldschmidt, 2012) even question its applicability in the Web 2.0 era by arguing that there have been notable paradigm shifts in traditional recordkeeping responsibilities, particularly stemming from the devolution of records management roles from skilled records managers to individual knowledge workers, who now create, receive and maintain records relevant to their roles. According to these authors, the principles (e.g., policies, procedures, metadata standards, classification schemes and thesauri, retention and disposition schedules, security permissions, training, monitoring and auditing) upon which the ISO 15489 was created, were designed for managing paper-based and electronic records in the pre-Web 2.0 era, when organizational control of records was substantially overseen by trained record information management professionals. Understandably, the ISO 15489 standard is currently in the process of being revised to (hopefully) account for the changes (and challenges) in the ICT world during the last decade.

## VII. CONCLUSION

Information overload, as explained in this article, is a phenomenon that is likely to continue to be a feature of our Web era. As a consequence, many of the negative side-effects of this phenomenon will persist, both at the personal and organizational levels. There will be no shortage of software tools to help (as would be claimed by their developers) to manage our information. Given the negative (and in some cases unknown) track record of such tools, their future success will depend on their ability to help individuals and organizations cope with information overload.

Meanwhile, as suggested in this article, a great deal can be achieved with what we already have in terms of ICT tools provided that we begin to establish some universal (and simple) conventions on how we search, store, retrieve and transmit our personal and organizational

data in order to facilitate our access to useful information and reduce some of the other negative consequences that are associated with feelings of being lost and/or overwhelmed with too much information.

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