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Editorial

Thinking about *The Information Age*

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In late October 2014, a new exhibition opened at The Science Museum in London. Titled "The Information Age: Six Networks That Changed Our World" [1], the exhibition received widespread publicity when it was opened by Queen Elizabeth who used this as the opportunity to send her first tweet, using the account @BritishMonarchy.

"It is a pleasure to open the Information Age exhibition today at the @ScienceMuseum and I hope people will enjoy visiting. Elizabeth R."

The museum proudly claims that the exhibition had been several years in planning, and is their biggest and most ambitious gallery to date. Oriented in a wheel-like structure into six sections or zones, one is immediately drawn to the giant and bizarre structure at the centre; a six-meter (20-ft) high copper and wood aerial tuning inductor from Rugby Radio Station. It was built in the 1920s for the General Post Office (forerunner to BT), to carry radiotelephony between the United Kingdom and America, and was the most powerful radio transmitter in the world at that time. The circle itself is divided into six 'zones' representing key information and communication technology networks: The Cable, The Telephone Exchange, Broadcast, The Constellation, The Cell and The Web.

The historical range of these six deliberately extends well beyond popular ideas about computers and associated technologies such as smart phones and social networks, so visitors to the exhibition should find themselves moving from what has become common and everyday to more esoteric and thought-provoking aspects of these technologies and the contexts from which they developed. Moreover although the target age range is given as 11 and upwards, those in their 40s and above seem to be most attracted, given the massive changes in these technologies that have occurred in their life-times. So many of the exhibits draw frequent comments along the lines of "We had one of those at home", or "That's exactly like the one I used to have".

Some of the coverage criticised the failure to indicate the layout of the exhibits in the six zones, leaving it to the visitor to work this out for themselves if they did not go straight to the centre-piece. While others have pointed out that some of the links across the six zones are underplayed or missing. But on the other hand the range of exhibits together with the background materials and presentations is

surely meant to evoke a combination of admiration, nostalgia, and shock—the balance between these being something unique to each visitor depending on their age, technological expertise and background.

One of the guiding principles has been not only to exhibit examples of these various technologies, but also to show the context from which they emerged and the wider impact they had on people's lives. Historically this is exemplified in the reconstruction of the radio that was used to send the distress signal from *The Titanic*, and the testimony of soldiers from Gulf war I which is "when the exhibition considers that GPS really came of age" [2]. There is also a reconstruction of a mobile phone stall from Cameroon, where few people can afford their own phone, and as a consequence small-scale entrepreneurs have set up stalls from which people can make calls.

Of course once something is exhibited in a museum there is a tendency for it to be seen as old, outdated, and quaint. Moreover such exhibits are inevitably seen through the eyes of the present, and in the case of technologies, this usually means that they are classified either as precursors or less-sophisticated versions of current examples, or as dead-ends that have been overtaken and left as interesting branches on the road to the present. Those in their teens might find it hard to remember a time when no-one had a smart-phone. Those in their 20s and 30s will be hard pushed to think of an age before the World Wide Web was available. For the most part, older visitors will not be able to recall a time when there was no telephone or radio. Although it is important to understand that these strictures will not apply as widely to those from countries outside Western Europe and North America.

What is astonishing, however, is the pace of technological change in the past 30–50 years, and also the ways in which that technology has spread across the globe. Many feelings of nostalgia may well date back no more than a decade or two, and the response to some of the exhibits may well be astonishment that what now seems so primitive was at the time—perhaps only 30 or 40 years ago—seen as so sophisticated and technically advanced. Many of the inventions and innovations covered by the exhibits were heralded with great excitement at the time of their first widespread and general appearance, and it was all too easy to be caught up in this exhilaration. There were, however, always those who took a more critical view, sometimes from genuine understanding and insight rather than some curmudgeonly position that simply viewed any changes as "for the worse". But overall innovations such as telegraphy, the telephone exchange, and the internet and World Wide Web tended to be heavily *over-sold* when they first appeared.

New technologies are often developed and introduced as more efficient and effective ways of performing existing tasks, but once they have been implemented they tend to become far more powerful, with their implementations moving above and beyond their initial ones. For instance the telephone was originally intended as a one-to-many form of communication (broadcasting), while radio was seen as a one-to-one form of communication. Similarly the computer was seen as a calculating device, hence the (in)famous quote attributed—probably erroneously—to Thomas J. Watson (CEO of IBM) "I think there is a world market for maybe five computers". There is a saying that, if you want to make God laugh talk about your plans for the future: To which might be added; and for an even bigger laugh, make predictions about technology.

Herbert Hoover, later US President, was Secretary of Commerce in 1920s at the dawn of commercial radio broadcasting, and as mass TV became a reality. He articulated a euphoric dream that this would lead to an age when "these media would exert an enormously beneficial influence on the shaping of American culture. Americans of every class, most particularly children, would, many for the first time,

be exposed to the correctly spoken word, to great literature, great drama". But as Joseph Weizenbaum wryly noted:

"The technological dream was more than realized. ... But the cultural dream was cruelly mocked …magnificent technology... [an] exquisitely refined combination of some of the human species' highest intellectual achievements....delivering an occasional gem buried in immense avalanches of everything that is most banal or insipid or pathological in our civilization." [3].

Technologies have a double-edged nature, and as Weizenbaum observed—writing as early as 1984—the imbalance between the "cultural dream" and the "banal or insipid or pathological" was even more pronounced in the computer or information age.

Moreover a common aspect of many technologies, particularly those exemplified in the exhibit at The Science Museum, is that they can readily be encompassed under the generic heading of "media"; *i.e.*, they become socially imbricated, both connecting and separating people—*i.e.*, acting in a mediating manner that simultaneously helps put people in touch with one another, but also becomes an intervening aspect in people's interactions. Technologies themselves embody social, political, cultural, economic and philosophical ideas and relationships already existing in the context in which they arise, although their existence then alters those very forces. As Castells [4] has stressed, a clear realization of this evades the thorny and highly distracting issue of technological determinism.

Of course technology does not determine society. Nor does society script the course of technological change, since many factors, including individual intuitiveness and entrepreneurialism, intervene in the process of scientific discovery, technological innovation, and social applications, so that the final outcome depends on a complex pattern of interaction. Indeed the dilemma of technological determinism is probably a false problem, ***since technology is society, and society cannot be understood or represented without its technological tools****. (Stress added).*

As such the six technologies that constitute the key zones of the exhibition must be viewed from this perspective, and indeed the curators have taken pains to do this. Thus they have eschewed simple timelines of technological development in favour of locating the technologies historically and globally. Yet it is important to stress that this complex relationship works in both directions, so that for instance initially technological innovations are often developed and implemented as offering new ways of simulating existing practices, but in so doing the practices themselves are then altered and sometimes even displaced as a consequence. To paraphrase and update Churchill (buildings) and later McLuhan (tools); "We shape our media and then our media shapes us".

The Information Age exhibition has a powerful impact, although it must necessarily simplify or underplay some important aspects. The roots of the information age are varied and complex, and it is not possible to give full scope to these in the exhibition. There are some sources of contention, such as the section on the telephone which refers to both Alexander Graham Bell and Elisha Gray, both of whom filed patents on the same day; but no mention of Antonio Meucci, who many would now claim as the inventor of the first telephone. With regard to the section on The Web, centring around computers and the internet, a wider perspective would have had to take into account the trends that helped foster and accelerate the development and uptake of these technologies, albeit that this would have resulted in a very different kind of exhibition: But is important to note them here. Castells refers to them as three

independent trends that interacted to form the foundation of 'the network society'; the invention of microelectronics and the IT revolution, the crisis of industrialism in both capitalist and *statist* societies, and the profound cultural challenge mounted by the rise of social movements in the late 1960s. I would suggest a useful shorthand set of labels for these respectively as "the nerds", "the fat cats", and "the hippies". More importantly, together these set the basis for a new social context that incorporates technologies that are characterized by "self-expanding processing and communicating capacity in terms of volume, complexity, and speed", "recombining ability on the basis of digitization and recurrent communication", and "distributing flexibility through interactive, digitized networking".

The impact of all this is a series of disturbances to existing social activities and structures as a consequence of these new technologies initiating processes of mediation, displacement, and re-placement; leading to both a disassembling and a reassembling of social contexts. Few if any of these were actually intended, although they often provide new opportunities and challenges, at the same time as they exclude or resolve others. The exhibition makes specific mention of the way in which The Samaritans (a charity, founded in 1953, aimed at providing support to people suffering from emotional distress, and particularly to those feeling suicidal) was able to make use of telephone communication in a highly specific and novel manner, offering confidential and anonymous communication since calls could be made directly without the need for an operator.

A prime example of this force for disassembling and re-assembling can be seen in the example of Office Automation (OA); all the rage in 1970s and 1980s, although not a term that has endured. At that time OA was seen as heralding a new era, in which everything that happened in the office could be and would be automated. Activities such as filing, retrieval, telephony, document copying and circulation, typing and documenting would all be done electronically, and as a consequence there would little or no need for a specific location for these functions, nor for filing clerks, typists, or many secretarial positions. The reality, however, proved more complex. The technology was used to achieve certain tasks, but the result was that other, less formal and more ambiguous aspects of "the office" came to the fore; particularly the way in which such locations were the sites of rumours, gossip, information exchange, face-to-face interactions, building of alliances, and so on. An extension of this can also be found in much of the work on knowledge management, where many of the technologies that have been introduced to facilitate this have all-too-often proved to be less effective replacements for the coffee machine and the water cooler.

In our presentation at the conference that was held at The Science Museum to mark the launch of the new exhibit, Alistair Black and I presented a brief overview of our work on company magazines, particularly the ways in which they had moved from paper-based to digital formats. We coined the phrase "From Front-page to Home-page", which although not strictly accurate, does evoke the nature of the progression; a transition that involves a disassembling or unbundling of the multiple functions served by such publications. The processes involved in moving to electronic formats and on-line presentation expose what previously might well have been hidden or implicit issues such as ownership and control, the distinction between internal and external communication, and front stage and back stage issues. Without going into detail about these specifically, they involve consideration and clarification of a host of issues emanating from concern with information in organizations: including ownership, control, dissemination, audience, and influence. The move to on-line publication brings these to the fore, and also changes them as the technological potentials become apparent—often through trial-and-error.

Clearly such developments cannot be understood solely in starkly technological terms, concepts of a more sociological nature are called for and some useful ones can be found in the work of Zygmunt Bauman, Manuel Castells, and Mary Douglas. From Bauman [5] we can borrow and adapt his distinction between legislators and interpreters, Castells [6] offers an analysis of what he terms 'network power' and the distinction between programmers and switchers, and Douglas [7] provides an account of "How Institutions Think".

Douglas' work is particularly important since she offers an intriguing account of the role and nature of institutions, and one of the issues in the information age is that many of the institutions that predated this era have lost relevance or any institutional power. So what is now needed is a serious effort to take up her characterization and start to articulate how institutions for the information age might be developed. At this juncture all I can offer are a few hints, based on her ideas. She argues that institutions are "founded on analogy", that they "confer identity", play a key role in remembering and forgetting, and "do the classifying". So as consideration turns to the ways in which the internet/WWW and mobile ICTs change our perspectives on for instance participation, social interaction, and community, we need to move beyond the initial excitement engendered by new technologies, and any ensuing suspicion of their downsides, to a more considered understanding. Thus if we look at Facebook, Google, and Apple as the prime exemplars of the age, we might begin to develop insights that see the ways in which the move from "legislators" to "interpreters" has been reversed, with network power now residing in concentrated nodes on the net. Moreover the systems with which we must perforce engage can be seen to be much more than simply facilitating our interactions, and as *media* in the sense given above. Facebook, Google, and Apple certainly have a key role in classifying and in remembering and forgetting, as well as conferring identity. This is not to imply, however, that we are somehow controlled by a centralized group of powerful forces; the web of relationships is far more complex and we actively collude in its development and continued existence. This was brilliantly evoked by William Gibson [8] in his coining of the term "cyberspace".

"[A] consensual hallucination experienced daily by billions of legitimate operators, in every nation, by children being taught mathematical concepts... A graphic representation of data abstracted from the banks of every computer in the human system. Unthinkable complexity. Lines of light ranged in the nonspace of the mind, clusters and constellations of data. Like city lights, receding."

Or as Douglas observed: "For better or worse, individuals really do share their thoughts and they do to some extent harmonize their preferences, and they have no other way to make the big decisions except within the scope of institutions they build." The Information Age is one in which many cherished and traditional institutions no longer operate as such, and so where we now require the development of new ones arising in a clear and participative manner, rather than by default through the growth of the Leviathans of the internet.

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