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An Examination of the Mutual Relationship Between Information & Communications Technology and Democracy

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Thesis submitted for the Degree of Doctor of Philosophy

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Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism.

Signed: Date:

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Chapter 1   Introduction

1.1   Research Background

Philosophers through the ages have analysed most, if not all, of the phenomena we encounter in life. One significant area they had all but neglected is technology which has been a huge influence, both good and bad, on our lives for the last two centuries at least. The Greek philosophers, however, noted the work of the craftsmen which they referred to as 'technē' from which technology got its name. Heidegger, who wrote a seminal essay entitled 'The Question Concerning Technology' in 1954, turned to the work of these philosophers to investigate the essence of technology. A number of other philosophers began to address the question also from a different perspective around this time. With the exception of Heidegger, however, most philosophers and scientists, among others, regarded technology as applied science. Heidegger turned this around and insisted that the scientist was dependent on technology and technology therefore preceded science. While the field has advanced considerably in recent years, the idea of a philosophy of technology is still greeted with scepticism even among university communities. One of my objectives in undertaking the research for this thesis is to contribute in some little way to cultivating an interest in the philosophy of technology.

ICT is replacing many technologies and pervading almost all other technologies at this stage. It is based on the work of the analytic philosopher, George Boole. The force and speed with which it is being implemented makes it very difficult to determine clearly how it is affecting our lives and what impact it will have on society in the future. ICT is the zeitgeist so any questioning of ICT and the changes it is imposing on us are largely ignored.

It is understandable that computer scientists would celebrate the phenomenal growth in the volume of information we create daily through our information systems but I question the value and use of much of this information and would suggest that some of it is, in effect, only data generated from other information in order to keep the computers running and this devalues the information.

It is very rarely that the media get to the core of the significant technology issues and that is why I believe information systems specialists, philosophers and public intellectuals have a responsibility to society to take on the role of questioning the direction of developments in ICT in order to help us distinguish between those advances that are of real value to society from the developments that are primarily aimed at generating excessive profits for the ICT industry and provide little or negative value for society.

In the very near future, developments in artificial intelligence and robotics will generate demands on philosophy to provide solutions and guidance in relation to issues arising in the area of philosophy of mind, and social and cultural issues relating to work, identity, and community development etc. Similarly, the ICT community should be in a position to offer solutions that will contribute towards stable and enduring democracy.

1.2 Research Overview

We hear calls for a wider use of ICT in our democratic processes but we seldom, if ever, hear calls for more democracy in the development and deployment of ICT. In my thesis I have challenged some of the conventional wisdom about the achievements of ICT and I have highlighted some often overlooked facts about democracy.

Democracy was first implemented in Athens over 2,500 years ago and the principles laid down at that time are still relevant today. In my analysis of democracy, I've relied heavily on the work of Schumpeter, Luhmann, and Hayek among others. The significant conclusion from this was that democracy represents a delicate balance between anarchy and totalitarianism and it can degenerate to one of these if citizen participation is, respectively, very apathetic or over-enthusiastic. A question on which the theorists differ is whether democracy is of instrumental or intrinsic value. Strong democracy is a model recommended by Barber and this would require a strong commitment in the political process from citizens although not necessarily in large numbers. A significant feature is recognition of the centrality of conflict in the political process.

Between the citizen and the government in a democracy lies the bureaucracy which, according to Weber, specialises in carrying out the administrative functions objectively and according to "calculable rules and without regard for persons." This ensures that all citizens are treated fairly and equally. The bureaucracy is protected by its relative independence and can regenerate itself (autopoietically) and grow. Within the bureaucracy is the technocracy which, according to Galbraith, specialises in planning and ensuring the sustainability of the organisation. The bureaucracy is dependent on information and records and therefore it relies heavily today on ICT.

Before considering ICT, I undertake a review of technology generally and the major question arising from this is whether technology is neutral, deterministic, or autonomous. I conclude that we have to accept that technology is deterministic - i.e. it drives the course of history and autonomous technology is certainly a possibility. I also provide a review of the history of the development of modern technology during the 19th century since there are at least some parallels between the experience of the Industrial Revolution and that of the ICT revolution today and these form a pattern which provides the basis of Perez's 'Model of Technological Revolutions'. In addition, I have reviewed Heidegger's

seminal essay "The Question Concerning Technology" at some length since it is regarded as such an important work by philosophers and historians of technology and it introduced the concept of *Enframement*.

Unfortunately, ICT has got nowhere near reaching the enormous potential it has to enrich our world and the lives we live. I would have seen ICT as being the instrument to reverse climate change and to save our trees. Instead datacentres and server farms are exceptionally high electricity consumers while the production of paper continues to increase. Borders and time zones are there to protect us but the Internet has allowed them to be breached and this has caused considerable security problems and has increased the stress levels in many workplaces.

It is difficult to see how we can avoid security problems when we promulgate concepts such as 'Big Data' and 'The Internet of Things' (anti-definitions). Management and planning have been made much more complex as we try to make sense of huge volumes of data, much of which is generated through many cycles from other sets of data/information so it becomes more and more abstract and there may be the added danger that the provenance will be lost. While too little information can impede decision-making, there is always the possibility that too much could do the same.

Abstraction strips away context and meaning and the greater the level of abstraction, the more one is moved away from the tangible reality as in the financial crash in 2008 when the linkages between derivatives and other financial products and the funds supporting them were very difficult to track down.

Disintermediation represents one of the great advantages for many internet users. However, it is only when the intermediaries or 'middlemen' are removed that their contribution is recognised and even more so today when many are calling for mediators to oversee the material appearing on social media. Carr uses the term hypermediation to indicate the number of intermediaries in internet transactions.

The overall problem with our use of ICT, however, is that the emphasis is on the means rather than the ends - i.e. on the technology itself rather than on what we want it to do. This indicates a lack direction on our part; we're unsure of where we're going or being taken because we seem incapable of asking the right questions. To quote Luhmann "we can search in vain among the social function systems for an *a priori*." Meanwhile we're allowing ICT to take the social out of society.

Most of us, at least in the developed world, are connected to the Internet. It affects various aspects of our lives, in many cases transforming them. Therefore we should ask how democratic were the decisions to bring about these transformations? This thesis is my attempt to address this issue. It comprises an examination of the relationship between ICT and democracy. More specifically, I provide the evidence to prove the following two propositions:

- The development of ICT is one of the two most significant and transformative technological revolutions since the invention of the wheel six thousand years ago (the other being the development of electricity distribution networks on which ICT is dependent). But in this development the ICT industry has adopted a disingenuous business model which leaves no room for democratic input from users.

- There are negative attributes of ICT which are anti-democratic. The positive attributes can contribute much to the peripheral aspects of democracy but achieving consensus in situations of conflict in order to steer a middle course between anarchy at one extreme and totalitarianism at the other, which is the essence of democracy, requires sagacity which only humans, rather than the cold rationality of ICT, can provide.

1.3   Research Design

Initially my plan was to identify, through the literature review, those areas of potential impact or influence between systems of democracy and ICT systems. An analysis of those areas would then be undertaken using Luhmann's Theory of Social Systems and Ihde's Phenomenology of Technics focusing on democracy and ICT respectively. Following further scrutiny, however, I concluded that Luhmann's *Theory of Social Systems* is too reductionist and abstract to fully represent the nebulous character of democratic politics where traditions, myths and culture play a significant role. Even Luhmann himself raises some doubts with his comment that "one should not begin with the critique of [democracy] but should marvel that it functions at all". Despite this, I have cited Luhmann extensively throughout the thesis because, in his prodigious output, he regularly steps outside his formal theories and offers very practical and incisive comments on various aspects of management and organisations such as bureaucracy, decision making, risk management trust etc.

It became apparent also that Ihde's Phenomenology of Technics, while useful in providing an understanding of the individual's experience of ICT, it does not help significantly in understanding the societal impact of ICT.

There are many definitions of democracy and the practise of democracy varies from country to country and from antiquity to modern times even in some of its most fundamental attributes. ICT, being ubiquitous and multifunctional, is also difficult to define comprehensively. As a philosophical study, therefore, I decided that a scholarship approach rather than a quantitative or qualitative analysis was more appropriate.

For my analysis of democracy I have relied on the works of various theorists and their reflections on applications of democracy from ancient Athens to the present day. Held provides a very comprehensive

overview of democracy in all its manifestations. Some of the theorists, particularly those with a background in economics including Drucker, Galbraith, Hayek and Schumpeter, tended to focus on areas such as bureaucracy, technocracy, and the welfare state - areas in which ICT has proved to be especially relevant and which therefore provide a significant connection between ICT and democracy. Hayek and Schumpeter, in particular, consider the question of whether democracy is purely instrumental or has intrinsic value while Dahl examines the effectiveness of democracy in small communities within a globalised society. Geuss is a realist and, like Schumpeter, provides a worthwhile contrast to some of the other theorists while Barber comes nearest to providing a practical model for strong and deliberative democracy. Weber's *Economy and Society* includes an invaluable guide on bureaucracy and on political systems. I have relied on Luhmann's work for insights into both democracy and technology and King and Thornhill have provided a useful commentary particularly for some of his more obscure work. Habermas has made the public sphere very topical and has also written on the relationship between the the political system and the market. But for space constraints, I would have delved deeper into his work. For the same reason I have omitted Marx and although his work is very relevant to the development of both democracy and technology, I felt I could not do justice to it in the space available.

One of the pivotal questions I had to address in the thesis was whether technology is neutral, deterministic or autonomous. To say that it's deterministic is to accept that it drives the course of history and this also applies in the case of autonomous technology since it presupposes technological determinism. It was clear therefore that to answer the question concerning technology, it was necessary to trace its development against the background of historical events with a particular emphasis on The Industrial Revolution when modern, that is machine-powered, technology came into being. The historians Thompson and Hobsbawm provided extensive coverage of this background while Heilbroner undertakes a direct analysis of machine culture in the context of history. Perez developed a model of technological revolutions which elaborates on Schumpeter's model of creative destruction. Ihde is one of the most influential and most analytical philosophers of technology in recent decades and I have included his 'phenomenology of technics' which adds a useful insight to our relationship with technology as does the work of Dreyfus whom I have also quoted. Heidegger's *The Question Concerning Technology* is a relatively short but very obscure text which, because of its significance, I have analysed is some detail.

Ellul's *The Technological Society* is an important work and he is the philosopher most associated with the term 'autonomous technology'. Kelly embraces the idea of autonomous technology although he could be a bit more discriminatory in his theory of the 'technium'. Feenberg makes a valuable contribution on technological determinism although he is somewhat ambiguous about it but he proposes what he calls 'subversive rationalisation' as a practical means of undermining it. Stephen Hill's views are fairly similar to Feenberg's but his dialectical approach to the culture and technology relationship

is more nuanced. Carr, Oz, and Dedrick provided analyses of the productivity gains from the application of ICT. Machlup's work on knowledge creation and distribution is a good reference book but it is very pedantic and not nearly as useful as Finnegan and Murphy's work on tacit knowledge. Floridi is particularly useful on the subject of identity.

I relied on Chomsky and McLuhan in particular for my analysis of the mass media while Price provided interesting examples of how political power is wielded in the mass media. Micklethwait and Woolridge provided useful information on the development of the welfare state but were sympathetic to authoritarianism. Two of the best overviews I encountered were Brown and Duguid on the nature and use of information and Dusek on the philosophy of technology. I relied on Castells for the major case study on mobile technology. VanVught provided an analysis of dedifferentiation across the university sector in a number of countries. Taken together, I found the work of Illich, Dewey, and Dreyfus extremely useful in understanding the potential for, and the limitations to, the application of ICT in education. Because I had almost completed the thesis when I encountered Hirsch's *Social Limits to Growth* which introduces the concept of 'the tyranny of small decisions', I was unable to incorporate this to the extent I would wish.

Among the theorists I had to omit due to space constraints were Borgman, Latour, Mumford, Sunstein, and Winner while the works of Negroponte and Schmidt & Cohen were, in my view, insubstantial.

I used four case studies to illustrate as comprehensively as possible the range of applications for ICT including applications in the home, in education, in business and government and in the mass media. I also availed of Castells major case study on mobile technology. This is a metastudy comprising over 700 individual studies on the effects of mobile communications on societies throughout the world and was an invaluable source of information particularly in relation to mobile technology in the underdeveloped and developing countries.

1.4   Thesis Structure

Chapter 2 provides a review of the literature from the leading theorists on democracy. From this the different features and interpretations of democracy are identified and discussed. Also, some of the more significant elements of democracy such as political power, participation, leadership, and bureaucracy are discussed.

Chapter 3 follows a similar pattern with a focus on technology generally and, based on a literature review sets out the criteria for distinguishing between neutral, deterministic, and autonomous technology and it also provides an overview of the history and the stages of development of technology.

Chapter 4 focuses specifically on Information & Communications Technology (ICT) and provides a number of case studies and an overview of the impact of ICT in terms of functional dedifferentiation and disintermediation as well as a discussion on virtual reality.

Chapter 5 provides an analysis of ICT and a separate analysis of democracy based on the material from the literature reviews and these are followed by a discussion on the mutual dependency between democracy and ICT.

Chapter 2   Democracy

Chapter Introduction

Democracy is an autological term in that one can choose from among many different and valid definitions. Also, groups and communities can decide how they wish to implement democracy in their own particular situation. Some put the primary emphasis on democracy's intrinsic values such as freedom and justice while others stress its instrumental value in providing a mechanism for arriving at consensus. Democracy is, therefore, a compromise between idealism and pragmatism just as it is a compromise between anarchy and autocracy and sometimes recourse to certain narratives and myths is required to support these compromises. The situations in which democracy is applied are varied and are inherently complex since they involve interactions between people for the purpose of resolving conflicting requirements or ideas.

Bureaucracy is an essential support for democracy when applied in the state or other large organisations. However, unless judiciously implemented, it can overburden and therefore undermine the democracy. The strongest manifestation of this can be found in the welfare state and the growth of the welfare state has become the most contentious point for many political theorists and political activists. Few functions are as well suited as bureaucracy is to the adoption of ICT. There is a mutual relationship between ICT and bureaucracy through which each boosts the development of the other.

In the current chapter, I outline the main features of democracy and the concepts associated with it as identified by some of the leading theorists in their different approaches to the subject. I include an overview of Luhmann's theory of social systems which provides a somewhat unique perspective from which to analyse systems such as politics, bureaucracy, management and decision-making. Central to his theory is the functional differentiation of social systems which, for him, implies that the political and economic systems should not encroach on one another. It is interesting, therefore, that some of the leading political theorists - e.g. Weber, Schumpeter, Galbraith, and Hayek - were also economists. Luhmann presents a disembodied model of society which comprises communications rather than people which is in stark contrast to Geuss for whom political theory has to take account of the talents and foibles of all active and passive citizens.

2.1   What is Democracy?

Democracy is widely regarded as the ideal form of government and is the one that nearly all administrations believe they must, at least pretend to, embrace. This is also a manifestation of how

broad the concept is and how difficult it is to define it comprehensively. Belief in democracy and "support for the central institutions of society" were greatly strengthened through the political consensus that developed in the aftermath of World War II. The consensus was reinforced by the recent memories of fascism and the ongoing tensions of the Cold War and it was marked by a political will to address the inequalities in society (Held, 2006, pp.285-286). The optimism and political openness that followed encouraged new thinking on social and political matters and saw the emergence of various movements in support of civil rights, feminism, the environment, peace, etc. These and some other groupings comprised the New Left and Held argues that the "New Right emerged partly in bitter opposition to the prominence" being given to these groups (p.187). In the early 1970s the consensus began to break down giving rise to a renaissance in "the political theory of democracy, albeit a renaissance marked by a fierce polarization of views (p.187)." The years since have not been very positive ones for the development of democracy with questions about legitimation and overload (pp.190-201) coming to the fore. Nevertheless, most states still wish to be identified under the democracy banner.

The principles underlying Athenian democracy were set out by Pericles in his 'Funeral Oration' in the fifth century BC. Among the most significant of these principles were: (pp. 13-14)

- Power is in the hands of the whole people.
- Everyone is equal before the law (Isonomia).
- Poverty is not a bar to political participation.
- In public affairs everyone has to obey the laws particularly those for the protection of the oppressed and avoid doing anything that would invite shame.
- In their private affairs, everyone is free and tolerant.
- All citizens are expected to participate in the affairs of state, in the debates and decision-making on policy.

Weber's approach to democracy centres on rationality. He begins by identifying three categories of legitimate domination. They are based on (i) charismatic grounds which rest "on devotion to the exceptional sanctity, heroism or exemplary character of an individual person," or (ii) on traditional grounds based on "an established belief in the sanctity of immemorial traditions," or (iii) on rational grounds "resting on a belief in the legality of enacted rules and the right of those elevated to authority under such rules to issue commands." (Weber,1978, p.215) These, he emphasises, are conceptual formulations for the purpose of analysis which are unlikely to be found in their 'pure' form in historical cases. The charisma model, in which recognition of a "charismatically qualified, and hence legitimate, person is treated as a duty,"(p. 266) can gradually evolve towards a democratic model through a process of rationalisation where "instead of recognition being treated as a consequence of legitimacy, it is

treated as the basis of legitimacy; *democratic legitimacy.*" (pp. 266-267)   This legitimacy is acquired through a plebiscite which Weber says - as though anticipating Schumpeter's reservations about 'the will of the people' - that "irrespective of how its real value as an expression of the popular will may be regarded, the plebiscite has been the specific means of deriving the legitimacy of authority from the confidence of the ruled" (p.267). This authority can be enforced ultimately through "legal coercion by violence [which] is the monopoly of the state." (p. 314)

In concluding, somewhat paradoxically, his assessment of the future of democracy, Luhmann says that "one should not begin with the critique of its states and circumstances but should marvel that it functions at all and then ask how long it will continue" because democracy he says "is evolutionarily improbable, full of presuppositions but politically realizable." (Luhmann, 1990, p. 238)

Overall, Luhmann is not very positive about democracy. Most of his efforts to define it are statements about what it is not, rather than what it is, and he is not very optimistic about the future of democracy as it is commonly understood. He says that "[a]round 1800 the concept of democracy began to be valued precisely because of its internal impossibility: as the illusionary component of all future constitutions, as the concept of the future."(p. 231)   For him democracy is not rule of the people by the people - i.e. "domination of the people over the people" or the "annulling of power by power" (p.232) although this is to ignore what has been accepted as a fundamental element of democracy ever since Aristotle - "Ruling and being ruled in turn." (Aristotle, 1992, p. 362)   Neither, according to Luhmann, is democracy a "principle that states that all decisions have to be made in such a way that they are capable of being participated in." (Luhmann, 1990, p. 232)   In other words, he does not see participatory democracy as a practical proposition and he sees inclusion, which manifests itself in its most extreme form in the welfare state, as detrimental to democracy. He considers the outlook for democracy to be "pretty bad" if it is concerned about "reason and freedom….hunger and need, about political, racist, sexist and religious suppression, about peace and about worldly happiness of any kind." (p. 231)

The political system can be characterised as a means of producing collective binding decisions - binding on both the decision makers themselves and those to whom the decisions are addressed (Luhmann, 1990, pp. 73-74)

The functional differentiation of society means that the political system is operating as just one of many functional systems in a very complex and chaotic environment which is constantly changing with developments in the economy, science, education etc. Luhmann concludes from this that politics "can continue to operate only as a closed […] autopoietic system that has to code and program itself for contingency.   The structural innovation emerging from this as a result of mere historical chance has

received the name of democracy." (p.234)   A democratic mode of government "is a 'specific structural arrangement' of the political system" (Czerwick, 2008, p.134 cited in Moeller, 2012, p.88) - a view which is shared by most empirical theorists of democracy.   This is an instrumental definition which tells us nothing about the value system which democracy tries to reflect or the outcomes it tries to achieve.

Schumpeter takes a somewhat similar line to Luhmann when he defines democracy as "a political *method*, that is to say, a certain type of institutional arrangement for arriving at political - legislative and administrative - decisions." (Schumpeter, 1987, p. 242)   But Schumpeter emphasises that democracy, since it is only a method, cannot be an ideal or an end in itself.   In contrast to Luhmann's view, he says there are "ideals and interests such as freedom of conscience and speech, justice, freedom of government and so on" which are above democracy and which democrats themselves are convinced a democracy will guarantee.   The will of the people cannot prevail unconditionally particularly if it endangers ideals such as these.   In implementing democracy or democratic procedures, time, place and situation must be taken into account.   Where the will of the people as represented by the majority is insistent upon restricting the rights of the minority, it "seems more natural in such cases to speak of the rabble instead of the people." (p. 242)

Taking account of the difficulties in achieving the 'common good' or the 'will of the people' or even establishing what they mean in practice, Schumpeter develops a new theory of democracy and while it coincides substantially with Weber's views (Weber, 1978, pp. 1128-1130), he brings it together very succinctly.   The basis of his theory is "to drop government by the people and to substitute for it government approved by the people" (p. 246) so that the people, rather than deciding directly on issues of concern, elect those who are to make the decisions.   He refines his original definition of democracy thus: "the democratic method is that institutional arrangement for arriving at political decisions in which individuals acquire the power to decide by means of a competitive struggle for the people's vote." (p. 269)

As a liberal, Hayek believes in the free market with minimum interference from government and his constrained description of democracy reflects this although it belies the vehemence with which he defends democracy elsewhere. He is very critical of Schumpeter's perspective on democracy, particularly his view that "it presupposes a belief in things higher than democracy." (Hayek, 2013, p. 348)   He says democracy "refers to a method or procedure for determining governmental decisions and neither refers to some substantial good aim of government […] nor is it a method that can be meaningfully applied to non-governmental organizations." He considers democracy "an ideal worth fighting for to the utmost", and "our only protection against tyranny" and says it is "the only method of peaceful change of government yet discovered." (p.349)

Democracy, for Hayek, is based on the principle that the will of the majority is "authoritative and binding upon the rest only if the former prove their intention of acting justly by committing themselves to a general rule." In other words, the response of the majority to any situation is determined by just rules based on abstract principles which can be applied generally and not just to the particular situation in question. In this way, the majority gets its legitimate power not through bare might but through "the proven conviction that it regards as right what it decrees." (p.381)

2.2 Features of a Successful Democracy

Luhmann's description of democracy is purely instrumental and value-free and is in marked contrast to Amartya Sen's description where democracy is shown to have intrinsic, instrumental and constructive values. Democracy allows people to participate in the political life of the community and such participation "has intrinsic value for human life and well-being." Democracy also "has an important instrumental value in enhancing the hearing that people get in expressing and supporting their claims to political attention (including claims of economic needs)." In addition "the practice of democracy gives citizens an opportunity to learn from one another, and helps society to form its values and priorities." (Sen, 1999, p.10)

There is, according to Geuss, a difference of opinion among political philosophers regarding the significance of the distinction between the "instrumentally useful" and the "inherently valuable" nature of democracy (Geuss, 2001, pp.125-126). For some, this distinction "is sharp, and designates a basic and ineluctable feature of human thought and experience" while for others it "is relative and contextual, and […] is a sure sign of a deficiency in a society if […it] is taken too seriously."(p.126) For Dewey, who regards it as irrelevant, the distinction originated in the era when "slaves did the instrumentally necessary work, and parasitic aristocrats pursued the good for its own sake."(p.126)

While Hayek would be very critical of attaching intrinsic values to democracy as Sen has done, he is quite clear on the values his 'Great Society' should cultivate. Two of the cornerstones of the Great Society are a democratic political system and an open market economic system and it follows that these must facilitate, or at least not obstruct, the cultivation of the values of the Great Society. His overriding concern as a liberal is to protect the freedom of the individual and minimise interference particularly from government. This freedom is made available in the open society through a set of negative values which allow the individual to define their own space in which they can pursue their aims by applying their own knowledge. The "indispensable foundations of civilisation" are the "three great negatives of

Peace, Freedom and Justice" and these must be provided by the government. It is the role of the government with its monopoly of coercion to enforce a framework of 'rules of just conduct' which, rather than directing the individual to pursue particular positive ends, protects them "against unpredictable disturbance caused by other men." (Hayek, 2013, p.465)

Hayek's view of democracy is very much in line with that of Aristotle who placed great emphasis on the fact that democracy was based on the principle of liberty which, he said, has two defining principles. The first of these is "'[r]uling and being ruled in turn'" and the second is "to live as you like….since its opposite, living not as you like, is the function of one enslaved." From this is derived the "ideal of 'not being ruled', not by anyone at all if possible, or at least only in alternation."(Aristotle, 1992, pp. 362-363)

Based on the above principles Aristotle identified a number of features of democracy which, though they reflect the concerns of the city state, are still relevant to today's large nation states. The features are: "[e]lections to office by all from among all"; "[r]ule of all over each and of each by turns over all"; rotation of offices with terms of office as short as possible and no official to have perpetual tenure; the Assembly to be the key sovereign body with officials having sovereign power over as few matters as possible. He also identifies the requirement that payment for services be controlled and that members of the Council (i.e. the executive committee of the Assembly) "do not receive lavish pay" to prevent the Council getting too powerful (pp.363-364).
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According to Dahl the "ideal criteria [for democracy] are so demanding that no actual regime has ever fully met them" and in surveying past and existing examples of democracy, he lists seven attributes which, taken as a whole, "distinguish the political regimes of modern democratic countries from all other regimes" and can serve as criteria in assessing the level of democracy in nation states or countries today. These attributes are: elected officials having control over government decisions; frequent and fair elections; practically all adults have the right to vote; practically all adults have the right to run for elective office; freedom of expression for all citizens on political matters; the right for all citizens to alternative sources of information and these are protected by law; the right of all citizens to form relatively independent associations, political parties and interest groups (Dahl,1982,pp.7-11).

In reviewing the different perspectives on democracy, it is worth noting Davies comment that "there is little consensus about the essence of democracy. In theory, it promotes all the virtues from freedom, justice, and equality to the rule of law, the respect for human rights, and the promotion of political pluralism and of civil society. In practice, 'rule by the people' is impossible." He concludes that what "does exist, as always, is almost universal abhorrence of tyranny. And this is what propels all newly liberated nations in the direction of democracy."(Davies, 1997, p.131)

Schumpeter lists four conditions for democracy to be successful. By successful he means "no more than that the democratic process reproduce itself steadily without creating situations that enforce resort to non-democratic methods" (Schumpeter, 1987, p.290 n.) which, of course, has echoes of Luhmann. The conditions are as follows:

- There should be a sufficient number of competent people of high moral character prepared to enter the political profession. He argues for a political social stratum, "neither too exclusive nor too easily accessible for the outsider" that takes to politics as a matter of course (p.291).

- "The effective range of political decision should not be extended too far." It would be impractical for politicians or for parliament to get involved in every issue that comes before them. For many of the issues politicians must rely on the advice of specialists while formal approval will ultimately rest with themselves. He also recommends, as do Luhmann and Drucker, the establishment of what are essentially quangos which "extend the sphere of public authority without extending the sphere of political decision."(p.293) There would be no political involvement other than at a supervisory/regulatory level.

- A democratic government must be able to command "the services of a well-trained bureaucracy." (p.293)

- What Schumpeter terms 'democratic self-control' is essential. By this he means in effect that everyone should be reasonable and should refrain from instantly taking advantage of every political situation without consideration for the wishes of others.

Geuss highlights those features of democracy which best support the values we hold such as "human survival, peace, efficiency [and] continuity." The main advantage is that democracy provides a mechanism which facilitates the smooth transfer of power from one political group to another since, among other things, those yielding power know that they are likely to have the opportunity to return to government at some future date under similar circumstances. Another significant advantage is that "many forms of democracy" allow for "widespread social discussion" before making decisions and this would increase the likelihood "that as much relevant information as possible [is] brought to bear on the decision" Geuss adds that Mill, among others, "thought that such extensive public discussion" would make people more tolerant (Geuss, 2001, p.120).

Geuss mentions some of the criticisms of democracy. These include "the difficulty in pursuing long-term consistency in policy-making"; (p.120) the lack of participation arising from representative

democracy; and the devaluation of human knowledge since democracy puts "the opinion of the fool and the expert on an equal level" and thereby making it difficult to bring "relevant expertise optimally to bear on outstanding issues." (p.121) Geuss also quotes de Tocqueville's reservations about tolerance and compromise being enabled through free public discussion. Rather, de Tocqueville believes that "public discussion can have the effect of polarising and radicalising opinion, rendering positions more inflexible" (p.121). Geuss says that, based on experience, the more one understands the reasoning behind views of others, "the more one sees that they are a tissue of culpably self-serving illusions, self-deceptions, and deeply rooted prejudices – just as one's own are, if seen with sufficient dispassion." (p.121) He adds that by delving deeper, one often finds that they are "immovably trapped by history and circumstance" and this may lead to greater empathy (p.121). Lastly, Geuss notes the conflict between bureaucracy which operates on the basis of fixed, known rules and is organised hierarchically and according to clearly defined areas of responsibility, and democracy which is "anti-hierarchical and egalitarian." (p.122)

2.3   Democracy and the Economy

Based on Luhmann's theory, the political and economic systems are separate, enclosed and functionally differentiated systems which communicate with one another only through perturbations. This hardly stands up in practice, however, where so much political activity is concerned with and influenced by the economy and many would argue that this is reciprocated. The fact that many of the most influential theorists on democracy since the Second World War, including many that I have cited here, are economists would bear this out. Politics and economics are not closed off from one another but are intertwined. To continue Luhmann's analogy with biological systems, it could be said that the economy is a parasite on the political system or that the systems infect one another.

It is not just the content of the economic system, i.e. the flows of money, that impacts on the political system, but many would advocate that the business practices of the 'open market' economy should be adopted in politics and hence also in our democratic processes. Schumpeter was one of the greatest exponents of this. Being very much a pragmatist, he saw the business of democratic politics in somewhat the same terms as the business of commerce and this is summed up in his quote from a politician "What businessmen do not understand is that exactly as they are dealing in oil so I am dealing in votes."(Schumpeter, 1987, p.285)[1]   Politics is to be seen as a competition for votes (markets), for political programmes (products) which are in fact very similar, although every means of persuasion is

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[1]Schumpeter attributes this quote to "one of the most successful politicians that ever lived" but doesn't identify him/her.

used by the professional career politicians to show how unique their particular party's (producer's) programme (product) is.

Sen examines the relationship between democracy and economic development. While admitting that sufficient data are not available to establish a strong correlation between democracy and economic growth, he disagrees with the often claimed 'Lee Hypothesis' that authoritarian regimes are better than democracies at promoting economic development. More significantly, he says that "in the terrible history of famines in the world, no substantial famine has ever occurred in any independent and democratic country with a relatively free press. We cannot find exceptions to this rule, no matter where we look." He argues for "the protective power of democracy" with the appropriate balance of political incentives with economic incentives."(Sen, 1999, pp.6-9)

Lee Kuan Yew, the eponym for the hypothesis, was prime minister of Singapore from 1959 to 1990 when his son, Lee Hsien Loong, succeeded him. It is claimed that he transformed Singapore from "an impoverished swamp […] to a whirring hub of the global economy" with state spending consuming only 17% of its GDP in 2012 and his achievement is held up as an exemplar for government in the 21st Century (Micklethwait & Wooldridge, 2014, p.135). He prioritised discipline over democracy. Some of his opponents were locked up and elections were rigged with his party winning all the seats in every election from 1968 to 1984 while in 2011 it won 93% of the seats with 60% of the vote. He has, according to Micklethwait & Wooldridge, achieved "the perfect compromise between accountability and efficiency" with its politicians being tested regularly in elections "but since the government knows it is going to win, it can take a long view [and is] able to think strategically and look ahead."(pp. 137-138).

While Luhmann is opposed to any interference between the political and economic systems, he concludes reluctantly that "it does, however, seem that positive economic development is the single decisive factor in keeping a government in power, while, on the other hand, recessions are politically dangerous."(Luhmann, 1990, p.13) This is the flip side of Sen's argument and the two conclusions together imply that the health of the economy is dependent on the political situation and vice versa.

The free or open market is a key component of Hayek's 'Great Society' since it acts as a communications system (in the Luhmannian sense) which facilitates the maintenance of order in society. He says, for example, that while people tend to regard earnings in the market as rewards, their real purpose, in fact, is "to indicate to people what they ought to do if the order is to be maintained on which they all rely."(Hayek, 2013, p.243) The information provided by the market is impersonal and abstract and this matches the requirement to treat "every other person as a human being rather than as

either a friend or an enemy"(p.252) as we move from the small group, community or 'tribe' to the Great Society where personal relations with many or all the members can no longer be maintained.

Hayek contrasts the spontaneous order of the market "where the individual is free because bound only by general rules of just conduct" with the type of order that prevails in the 'organisation' where the individuals are directed towards a particular purpose or end and "all are subject to specific directions by authority."(p.247) Likewise Habermas, describing the development of commerce in the sixteenth century, contrasts the "far-reaching network of horizontal economic dependencies" in the market that replaced "the vertical relationships of dependence" in the estate system (Habermas, 1989a, p.15). Hayek asserts that there is a lack of understanding of the operation of the free market and this is due to the emphasis on organisational thinking arising from the fact that so many individuals now work in large organisations and therefore "find their horizon of comprehension limited to what is required by the internal structure of such organisations."(Hayek, 2013, p.293) Government is an organisation, society is not.

Merit and fortune/misfortune are often associated with justice but this is to misunderstand the working of the open market. A person may think it unjust that they get very low pay for doing work which, though valuable, they find extremely unpleasant while someone else is very well paid for work they enjoy. But in a free society "remuneration is based on the values the services have to the user and not on an assessment of merit earned" and the individual "is free to choose whatever occupation he can find and is not assigned to one by authority." (p.254) Similarly, Hayek says, when undeserved material misfortune such as unemployment hits some individual or group, this is merely a signal from the "steering mechanism of the market: it is the manner in which the cybernetic principle of negative feedback operates to maintain the order of the market" indicating that some activities should be reduced (p.255).

In considering the development of the "bourgeois constitutional state", Habermas hints at what might be one of the reasons for the significant role of the market in the political sphere. He outlines the similarities between the laws of the state and the laws of the market. These included the fact that "neither allowed exceptions for citizens, both were objective […] they were not directed at individuals (the free market prevented collusion)." But, most significantly, "the laws of the market […] prevailed because they were intrinsic; […] The laws of the state, in contrast, needed to be explicitly enacted." (Habermas, 1989a, p.80)

2.4   Political Power in a Democracy

The structural arrangement which Luhmann associates with democracy is one "in which all social systems countervail the direct vertical application of power by the political system." (King & Thornhill, 2005, p.110) The political system is just one of many functionally differentiated social systems which together constitute society. (Luhmann, 1982, pp.131-138) Other systems include the legal, economic, education and scientific systems and political power is dispersed through these rather than being focused directly on particular individuals and groups. This is, of course, reciprocated in relation to any power these systems may exercise so that "[p]olitical power simultaneously regulates and is regulated by, limits and is limited by, legal power, economic power, media power, and so on." (Moeller, 2012, p.90) The phenomenon of power in this context is best summarised by Geuss in his reference to the "Foucaldian programme of construing modern society as the locus of a dense network of 'omnipresent, but not omnipotent power.'" (Geuss, 2001, p.27)

Geuss, in the quote above, is responding to Weber's view of power "as a property of the intentional action of a human individual" whereas, in contrast, he refers to Foucault's analysis of Bentham's 'panopticon' which made prisoners feel under constant surveillance "even if they were not" but this coercive power was more an attribute of the prison space itself than an "intentional action of any human individual or group of individuals." (pp.25-26) In his opinion, Weber makes a sharp distinction between power and influence while he (Geuss) favours "a significantly more flexible and realistic way of approaching the phenomenon of power" (p.27) - a "way that would include the effective employment of influence as an instance of the exercise of power." (p.24) He illustrates this by distinguishing between actual power, perceived power, reinforcing of perceived power, coercive power, persuasive power and charismatic power. (pp.26-27)

Power is kept in check by that condition of democracy "in which the political system develops a variety of resources and points of reference for its communications, and in which political power is not located exclusively in one centre of execution." (King & Thornhill, 2005, p.111) This separation of powers addresses de Montesquieu's requirement that "power should be a check to power." (de Montesquieu, p.150) "Democracy emerges, firstly, with the constitutional formalization of the separation of the executive, legislature and judiciary in the modern legal state, and then, secondly, with the 'separation of politics and administration' into two distinct subsystems of the political system." (King & Thornhill, 2005, p.111)

The executive is separated from the legislature lest, in Montesquieu's words, "the same monarch or senate should enact tyrannical laws, to execute them in a tyrannical manner" The judiciary is separated from the legislature to prevent "the life and liberty of the subject [being] exposed to arbitrary control; for the judge would be then the legislator" while the judiciary must be separated from the executive since otherwise "the judge might behave with violence and oppression." (de Montesquieu, p.152)

While the law, in a democracy, provides a check on the political system, it also provides "a positive medium for transmitting legal decisions through society" so "democracy is not really a 'form of rule': it is a 'technique of systemic steering'." (King & Thornhill, 2005, p.110) Political decisions with regard to policy are made by government and these are submitted to the legislature and to the 'administration' generally to be refined, debated and passed into law. This process, in which political decisions are second-coded in the form of law, makes the decisions more acceptable to the public while reinforcing the legitimacy of the political system itself.

Whether power is seen by politicians as a means to an end or as an end in itself, for Schumpeter it is the key driver in politics. Although political parties are generally seen to be centred on particular sets of principles and policies which differentiate them, Schumpeter defines a party as "a group whose members propose to act in concert in the competitive struggle for political power." (Schumpeter,1987, p.283) Politics is, ultimately, about the "competitive struggle for power and office" and the essentials such as government, legislation, administration etc. are incidental to this in the same way as the production of the essentials for life such as food, clothing etc. are incidental to the making of profits. (p.282)

The formation of political parties facilitates the differentiation of government and opposition which, for Luhmann, provides the key to democracy and this became possible only when society was "arranged non-hierarchically into function systems."(Luhmann, 1990, p.233) Prior to that, when society was a stratified hierarchy, it was not possible to have the bifurcation - represented in democracy by government/opposition - at the top. If such a bifurcation did appear, it manifested itself in "schisms and civil wars, i.e. disorder and calamity."

The government/opposition relationship and coding solves a paradox for Luhmann. In a system where "there is superior and inferior power, then one also finds in it a true powerlessness of those who hold power and, conversely, a power of those who do not.[…] The opposition does not have the power of the government. Therefore it can assert the power of those who are out of power." (p.232) Similarly, in his only reference to democracy in his *Theory of Society* he says "[a]ll power comes about by submitting to power, and supreme power comes through submission to the lowest power. We call this democracy." (Luhmann, 2012, p.224)

Ultimately, politics is, in Bismarck's reported words, "the art of the possible."[2] (Crankshaw, 1982, p.75) When the ideals prove unattainable or the theory becomes impractical, the essence of politics - i.e. finding a workable solution - gets underway. To quote Geuss, "politics is about action, and is a matter of tacit skills, practical insight, and the mobilisation of the imagination in pursuit of collective ends." (Geuss, 2001, p.156) This usually involves compromise and consensus. However, the government/opposition arrangement does not easily accommodate consensus so consensus is not forced. But over time the outcome could be close to that which would be achieved through consensus because of "the possibility that governing and opposition parties will switch places at the next election" (Luhmann, 1990, p.233) and this possibility sustains the arrangement.

Again, Schumpeter's insistence on 'democratic self-control' is relevant here. Politicians should allow the government the space to govern without trying to embarrass it at every opportunity and voters "must understand that, once they have elected an individual, political action is his business and not theirs." (Schumpeter, 1987, p.294)

There is a third element, public opinion, which favours the opposition and favours the government at different times and the resultant instability strengthens the arrangement through "the sensibility of the system that is created by it." (Luhmann, 1990, p.234) This is one of the factors that provides a continuous stimulus "for pursuing themes and innovations" but eventually even these begin to form patterns which generate structures which tend to restrict them. Luhmann talks of 'self-despontaneification' and gives the example of Green Parties which "find themselves exposed not only to an imposed order, not only to pressures to adapt but also to this process of self-despontaneification. In the course of time they begin to lose steam." (pp.235-236)

2.5   Citizen Participation

The emphasis on active participation in politics by citizens is such that many, particularly in the mass media, would regard it as a measure of the successful implementation of democracy with the example of Athens (which I deal with below) being held up in support. But political theorists reject the idea of maximising participation in politics and would even consider it to be dangerous. (Pateman,1970,p.1) If we go back just a few decades, participation was identified with totalitarianism rather than with democracy. There were high rates of participation in the Weimar Republic which collapsed "into fascism" as there were in many of the other fascist or totalitarian regimes that followed during the War

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[2] The original according to Crankshaw is "Because they have yet scarcely outgrown the political nursery, the Germans cannot accustom themselves to see politics as a study of the possible."

and after, "albeit participation backed by intimidation and coercion." (p.2) Such fears have eased with the rise in the popularity of democracy. Nevertheless, "extensive participation can readily lead to increased social conflict, undue disruption and fanaticism" (Held, 2006, p.162) and there is always the danger of what Mill referred to as "the tyranny of the majority." (Mill, 1998, p.8) On the other hand "[l]ack of political involvement can […] be interpreted quite positively: it can be based upon trust on those who govern."(Held, 2006, p.162) Or, "political apathy may reflect the health of a democracy."(p.162)

Pateman reflects the view of a number of theorists when she says that for democracy to be effective "it is the participation of the minority élite that is crucial and the non-participation of the apathetic, ordinary man […] that is regarded as the main bulwark against instability."(Pateman, 1970, p.104) Claiming that "non-democratic attitudes are relatively more common" among the apathetic, she says that any increase in their participation "would weaken the consensus on the norms of the democratic method." (p.14) Quoting Berelson, she says that the democratic system requires both stability and flexibility and that "political traditions in families and ethnic groups and the long-lasting nature of political loyalties contribute to stability" while the "least interested voters" who may also be the most flexible and "the least partisan […] perform a valuable function for the entire system." (p.7) Pateman sums it up saying that "the apathy and disinterest of the majority play a valuable role in maintaining the stability of the system as a whole."(Pateman, 1970, p.7)

"Whenever one has to produce results within a specified period of time, discernible ineffectiveness, overburdening and stupidity unquestionably obstruct the full realization of the principle of participation."(Luhmann, 1990, p.224) Taking this quote from Luhmann, it would seem that he is fully in favour of the idea of participation in political life but would regard it as very impractical. He is very critical of the idea that the political system can be legitimated through participation – an idea which arose from the expectation "that more participation would lead to more agreement." He says this is a carry-over from the past when one's identity was only as part of the group - the family, the household, society. Today society comprises various functional systems and the individual is a member of, or has access to, several of these systems. Now it is the individual rather than the group that "is a subject or even *the subject as such* that underlies everything."(pp. 220-221)

Luhmann describes the unmanageable bureaucratic process that can develop around participation in organisations, and it has to be assumed that participation can take place only in an organisation, however informal. Participation results in an increase in decisions. Decisions have to be taken about decisions - one must decide whether one will decide and how one will decide, or not decide. Procedures have to be agreed and implemented to manage the group decisions. If committees are to be set up, they must be prepared, "both regarding the subject matter as well as tactically." Luhmann says "the reflexivity

of deciding is shifted to a third level. One has to decide about how a representative ought to decide about decisions."(p.223) "The result can be condemned as bureaucracy and praised as participation."(p.224)

Luhmann mentions the "new corporatism" where institutionalised fora are used to gain consensus from those affected before political decisions for radical shifts in direction are taken. While "the organized representation of interests" in this way is a form of participation, it "has nothing to do with the original intention of the concern for more participation, with an improvement of the chances of individual self-realization."(p.229)

Over the last few decades, the focus has shifted from efforts at merely widening participation to efforts at achieving greater depth and more active participation through the process of 'deliberative democracy'. Widening citizen participation, especially if it is based just on turnout at elections, amounts to nothing more than the aggregation of individual choices. The "aggregation of private preferences […] embraces a concept of rationality more appropriate to consumer choice, i.e. market relations, than to politics."(Held, 2006, p.235) In consumerism, the individual takes only their own preferences into consideration whereas in politics they are expected to consider also the preferences of others although this would not apply in the Hayek's liberal model or Schumpeter's instrumental model.

The development of deliberative democracy has been influenced by Habermas' analysis of the public sphere as represented by the discourses on matters of public interest that took place in the salons and coffee houses of France and Britain towards the latter end of the seventeenth and the beginning of the eighteenth century (Habermas, 1989a, p.32) and involved the aristocracy and the intellectuals meeting to critically discuss art and literature in addition to political and economic issues (p.33). He describes the modern public sphere as that which "comes into being in every conversation in which private individuals assemble to form a public body.[…] Citizens behave as a public body when they confer in an unrestricted fashion - that is, with the guarantee of freedom of assembly and association and the freedom to express and publish their opinions - about matters of general interest."(Habermas, 1974, p.509) He expresses some scepticism, however, about publicising the deliberations in the age of PR since much of the publicity is merely for the purpose of winning "public prestige for people or affairs, thus making them worthy of acclamation in a climate of non-public opinion."(p.514)

Deliberative democracy is intended to provide citizens with the opportunity to meet and express their views and preferences on matters of public interest and concern in an environment which is free "from the distorting influences of unequal power, wealth, education and other resources."(Held, 2006, p.238) The process of deliberation enables the "transformation of private preferences […] into positions that can withstand public scrutiny and test."(p.237) The process should be such that it exposes any biases

and special or vested interests and reveals any "preferences shaped by reducing one's expectations to accommodate oneself to circumstances which seem fixed or unchangeable."(p.237) Key to the success of the deliberative process is that the participants have a say in developing the process for their own deliberations. They can also call on experts to advise them on specialist topics. It is a learning process whereby they share information and exchange views but, most importantly, they develop their ability to engage in a heuristic process of rigorous rational argument as they present, support or criticise proposals while at all times maintaining an atmosphere of mutual respect among all participants. The outcome of any deliberations can be distributed through "the communicative structures of the public sphere [which] constitute a far-flung network of sensors that react to the pressure of society-wide problems and stimulate influential opinions."(Habermas, 1996, p.300)

The Convention on the Constitution which was established by the Irish parliament, the Oireachtas, in 2012 is a good example of deliberative democracy in action. This was a forum of 100 people, representative of Irish society and parliamentarians from the island of Ireland, with an independent Chairman which met throughout 2013 – 2014 "to consider and make recommendations on certain topics as possible future amendments to the Constitution."[3] The Convention was supported by a team of academics and legal experts.

Barber makes a significant and practical contribution to the deliberative model in his proposals for 'strong democracy' which he contrasts with the 'thin democracy' of the liberal democrats who have "little sympathy for the civic ideal that treats human beings as inherently political."(Barber, 1984, p.8) In a strong democracy, politics is the means by which people "with competing but overlapping interests can contrive to live together communally."(p.118) Barber's model requires active participation by the citizens within the community but he emphasises that while politics in a strong democracy is "a way of life", the idea is "explicitly hostile to the […] claim that politics is *the* way of life" as envisaged by Arendt.(p.118)

The key feature of strong democracy is that it "acknowledges (and indeed uses) the centrality of conflict in the political process." It does not attempt to ignore, minimise or accommodate conflict but transforms it "into cooperation through citizen participation, public deliberation, and civic education."(p.135) This process involves making free choices "under the worst possible circumstances, when the grounds of choice are not given a priori" since to be truly free is to be "without guiding standards or determining norms."(p.121) It is not, however, a matter of bargaining and choosing a winner between the different options which individuals have brought to the table. It is essentially a

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[3] www.constitution.ie/Convention.aspx [Accessed: 17th September, 2016]

dialectical process of never-ending "deliberation, decision, and action"(p.151) in the course of which participants "modify and enlarge options as a consequence of seeing them in new public ways"(p.136) and which should result in identifying a common purpose or common good.   The objective is to agree on a reasonable choice which provides a practical solution. The reasonable choice may not be rational "but it will be seen as deliberate, non-random, uncoercive, and in a practical sense fair."(p.127)

Barber's assertion about conflict being central to the political process echoes Machiavelli's claim that it was the tension or "discord between the Plebs and the Senate" in Rome that made possible the three hundred years of peace with "such striking examples of virtue" in education, laws and liberty (Machiavelli, 1970, pp.113-114). The tension ensured that they kept the peace by keeping a very close watch on one another.

Barber's proposal for developing strong democracy is to start with local neighbourhood assemblies which would meet regularly and relatively frequently.   They would confine themselves initially to discussion and deliberation on local, regional, and national issues. This would provide a civic education process which would "eventually engender civic competence"(Barber, 1984, p.270) and facilitate the assembly in taking on more responsibilities over time. These could include a watching brief over the accountability of public officials, a role which is undertaken mainly by the media (and accountability of the media could also be considered), examining legislation to assess the likely local impact, addressing local disputes and at a later stage again, developing local statutes(pp. 270-271).

Hind's proposal for the public commissioning of journalism in order to transform the means for developing and interpreting public opinion provides another useful addition to the deliberative model. It is based on the view that we, as citizens, "do not have adequate means to form our own opinions"(Hind, 2010, p.156) since the formation of public opinion is in the hands of private interests and the state. The mass media is being taken over increasingly by big corporations, often headed by plutocrats, and the commissioning editors working for these "hold a near monopoly on both the investigative agenda and the publicity given to information."(p.157) Even the relatively independent media are still beholden in most cases to their advertisers.

The public commissioning system proposed by Hind would be an addition to, rather than a replacement for, the existing media.   Public funding would be provided and citizens would meet and "collectively and equally, make decisions about the allocation of resources to journalists and researchers."(p.158) They would agree on the projects or stories to be investigated and journalists would be freed from the influence of corporate bosses and editors in their reporting. News media "could be mandated to publish the results of publicly funded research."(p.165) This activity "would provide a venue, and a reason for common deliberation"(p.158) among the citizens.   Like Barber, Hind insists that the "act of

deliberation" is as important as the "eventual product of deliberation."(p.163) Both the process and outcome should provide for a more informed, active and participating citizenry.

Dahl contrasts the ideal of participatory democracy, which he says is effective only when implemented on a small local scale, with the urgent global problems confronting us regarding the environment, military conflicts, economic disparities etc. which can be addressed only within "large-scale political systems."(Dahl, 1982, p.14)

Any discussion on participatory democracy must take account of the contrary view as articulated by Constant almost two centuries ago.[4] It is even more relevant today and would resonate well with Luhmann. Examining the reasons why representative government "was totally unknown to the free nations of antiquity", he explains how a very high level of political participation was facilitated. In general today, the individual is at liberty to partake in any private activities he wishes provided they don't interfere with the liberties of others. With regard to public affairs, he can exercise some influence by taking part in elections, signing petitions etc. This is the reverse of the situation in the ancient world where "the individual, almost always sovereign in public affairs, was a slave in all his private relations."

Comparing the ancient republics with the modern age, Constant identifies four major differences in the circumstances of the citizen. Firstly, modern states are much bigger with far higher populations. The ancient states were small enough to let a citizen feel that he could make an impact in public life whereas today the individual "lost in the multitude, […] can almost never perceive the influence he exercises. Never does his will impress itself upon the whole."

Secondly, citizens today don't enjoy the same leisure time due to the abolition of slavery. The slaves (and the women) did all the work which allowed the men to spend "every day at the public square in discussions."

Thirdly, commerce has replaced war. They are both "means of achieving the same end, that of getting what one wants […] War is all impulse, commerce, calculation." Therefore commerce is ongoing whereas there are intervals between wars. If it weren't for the opportunity, indeed the requirement, to participate in the affairs of state during these "intervals of inactivity, the citizens of antiquity "would have languished under the weight of painful inaction.""

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[4] Constant, Benjamin; The Liberty of Ancients Compared with hat of Moderns; (1816) http://www.indiana.edu/~b356/texts/Constant.htm [Accessed: 17th September 2016]

Finally, commerce supplies our needs and helps us to satisfy our desires "without the intervention of the authorities." This "inspires in men a vivid love of individual independence." We value our individual liberty whereas the citizens of antiquity sacrificed this for their political liberty. We also value our political liberty but primarily because it guarantees our individual liberty which allows us to enjoy the benefits of commerce - money, property, credit etc.

While "political liberty is indispensable" we need to organise it differently for our convenience and the representative system provides the solution. Just as "Poor men look after their own business; rich men hire stewards", the "representative system is a proxy given to a certain number of men by the mass of the people who wish their interests to be defended and who nevertheless do not have the time to defend them themselves."

In conclusion, Constant urges his audience not to allow "the enjoyment of our private independence [.. to cause us..] to surrender our right to share in political power too easily." He is concerned that we protect our political liberty to ensure that the state doesn't interfere in our private lives or in our commerce.

2.6   The Will of the People

It is easy to have clarity regarding concepts such as the 'will of the people', the 'common good' or indeed democracy itself when these are applied in a relatively small community such as Athens where these concepts originally developed and where it was possible to bring most of the citizens together to discuss and decide issues.   The clarity is significantly diminished when these concepts are applied in the much larger nation states without due attention being given to the practicalities that arise due to the change of scale (Dahl, 1982, p.141).

The difficulty in determining the will of the people is due to the impracticality of ascertaining every citizen's views on all issues or on any particular issue.   Sometimes a government will put proposals to the electorate in a referendum.   No matter how complex a proposal or how many elements in it, both explicit and implicit, the voter is usually allowed to vote just 'yes' or 'no' and this doesn't necessarily give a result that fully reflects the will of the people on the particular proposal. Furthermore, it is likely that many people use these occasions to express their dissatisfaction with the government.   Opinion polls can provide more information but the outcome of these can be skewed by the formulation of the questions, the timing etc.   Timing can also be critical since the publication of the results of an opinion poll can affect how people will vote. In other words, when dealing with a large electorate, the feedback from the people will be mediated and can therefore be distorted.

Schumpeter feels it necessary to emphasise repeatedly and at some length the principle that "the will of the majority is the will of the majority and not the will of "the people"."(Schumpeter, 1987, p.272) Sometimes 'the will of the people' can be in conflict with democratic ideals and to illustrate this he cites what he classifies as the most famous of all trials where Pilot was "certainly the representative of autocracy. Yet he tried to protect freedom. And he yielded to a democracy."(p.243n.)

Schumpeter also considers the question of the 'common good' which, he implies, was a key element of the eighteenth century philosophy of democracy and he outlines the difficulties faced by 'the people' in determining the common good - it will mean different things to different people. And even if the people agree on the overall principles encapsulated in the common good, there may be significant disagreements on the details or on the means of achieving them. A clear example of this today are the gun laws in the US. There is a major security problem arising from several mass killings by students or former students in a number of schools and colleges across the US. There is general agreement that the common good requires steps to be taken to make the schools and colleges safer. A large proportion of the population believes this can only be achieved by severely restricting the access to guns while another significant section believe it can only be achieved by arming the teachers.

Schumpeter insists that even if it were possible to provide the democratic process with clear and accurate data on the opinions of individual citizens, the political decisions based on this data are not likely to "conform to 'what people really want'," nor can it be assured that the decisions will be a "fair compromise."(p.255) He refers to Napoleon's achievement in reaching a settlement with the Catholic Church in France, resolving difficulties with the clergy, allowing somewhat limited freedom of worship and signing a concordat with the Pope "while strongly upholding the authority of the state." Through these actions, as a military dictator, he solved one of the most pressing political problems at the time and for this he received almost universal acclaim. Schumpeter claims that, since the people were so divided in the chaotic aftermath of the Revolution - particularly in relation to the Church, it would have been very difficult to achieve this result through the democratic system.

Schumpeter considers the ability of the individual voters to interpret facts, draw rational conclusions and to make up their own minds clearly and independently and mentions two factors that militate against rationality - crowd psychology and advertising. Regarding crowd psychology, he says it applies not just to the mob on the street but to almost any group including committees, parliaments, etc. which display to varying extents features such as "a reduced sense of responsibility, a lower level of energy of thought and greater sensitiveness to non-logical influences." And of particular relevance in the era of social media is his assertion that crowd psychology is not confined to physical gatherings of people. "Newspaper readers, radio audiences, members of a party even if not physically gathered together are

terribly easy to work up into a psychological crowd and into a state of frenzy in which attempt at rational argument only spurs the animal spirits."(p.257)

In relation to the motivation of voters, Schumpeter says that the issues that engage them (evoke volitions) most strongly are those "involving immediate and personal pecuniary profit to individual voters and groups of voters" and that experience shows "that by and large voters react promptly and rationally to any such chance."(p.260) He notes that this is in conflict with the classic doctrine of democracy as espoused by Bentham and the Utilitarians but they "philosophized in terms of bourgeois interests which had more to gain from a parsimonious state than from any direct bribes."(p.260n.)

It is much more difficult for the voter to engage with, or feel a responsibility in relation to the 'bigger' political issues which are not as directly linked to the private concerns of the individual, their family or their business. While one may have an interest in the wider national and international issues and may have views on them, one does not feel the same level of responsibility as in the case where there is money on the table. In relation to these issues the voter lacks "a pungent sense of reality" - there is an "absence of effective volition." Despite the availability of plenty relevant information, the citizens, including the educated citizens, are ignorant and lack judgement "in matters of domestic and foreign policy." The private citizen sees himself as "a member of an unworkable committee, the committee of the whole nation, and in this way he expends less disciplined effort on mastering a political problem than he expends on a game of bridge."(p.261) In bridge, the task and the rules are clearly defined as are success and failure and one is made aware immediately of any mistakes. Schumpeter sums up saying "this goes to show that without the initiative that comes from immediate responsibility, ignorance will persist in the face of masses of information however complete and correct."(p.262)

In failing to engage in the wider political issues and bring "the rationalizing influence of personal experience and responsibility" to bear on them, the citizens are leaving open "opportunities for groups with an ax to grind." These groups will have vested interests of various kinds and may be groups of politicians, business people, idealists etc. and the way is left open to them to fashion and "even to create the will of the people. What we are confronted with in the analysis of political processes is largely not a genuine but a manufactured will" in which case "the will of the people is the product and not the motive power of the political process."(p.263)

Hayek is concerned about the fact, as he sees it, that it is very difficult to establish the will of the majority through democracy. The "majority government does not produce what the majority wants but what each of the groups making up the majority must concede to the others to get their support for what it wants itself."(Hayek, 2013, pp.354, 358) But this is just politics in operation - bringing together the different viewpoints and arriving at a compromise. If one does not go down the road of compromise,

then one takes the road towards authoritarianism. Through the deals and compromises, politicians are doing no more than acting on Hayek's own theory of 'civilisation' - they are bringing together the knowledge which is dispersed among many individuals.

Once the will of the majority is established, this does not give the majority free rein to do anything it wishes - it must always act in accordance with the abstract rules of just conduct. Otherwise it becomes mob law or, to quote John Stuart Mill, "the tyranny of the majority."(Mill, 1998, p.8)[5] For this reason Hayek says that 'demarchy' would be a more appropriate term than 'democracy' since the latter, if one goes back to the Greek roots, "seems to stress brute force rather than government by rule."(Hayek, 2013, p.381)[6] Democracy had replaced an earlier term 'isonomia' which meant 'everyone is equal before the law.'

There can also be a "tyranny of the minority" where a relatively small group of citizens use the processes and procedures of the democratic institutions to leverage their power successively through those institutions to such an extent that they control them. A recent example of this is the shutdown of the federal government services in the US because, in the words of President Obama "one faction of one party in one house of Congress in one branch of government shut down major parts of the government all because they didn't like one law."[7] Most commentators agree that this was engineered by a small though significant faction of the Republican Party.

Aristotle's antipathy towards democracy was primarily because "the democratic idea of justice is in fact numerical equality, not equality based on merit" and this means that "there must be equality for each of the citizens [so] the poor have more sovereign power than the rich; for they are more numerous" (Aristotle, 1992, p.362) He says that the best environment for democracy is "where the population subsists on agriculture or pasturing stock. For having no great abundance of possessions, they are kept busy and rarely attend the assembly […] They find more satisfaction in working on the land than in ruling and in engaging in public affairs."(p.368)   There are faint echoes of Schumpeter and Mill in these sentiments.

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[5]Mill also refers to "the slavery of the majority to the least estimable portion of their number" (p.313) which illustrates his elitist view on the electorate.

[6] The word 'democracy' is derived from the Greek words 'demos' (the people) and 'kratos' (power). 'Archein' is another word for power with less stress on force - hence Hayek's term 'Demarchy'.

[7] President Obama is referring to a vote in the House of Representatives on 1st October 2013 which blocked the passage of a budget in protest against the passage of the Affordable Care Act in 2010.
Obama, 2013 [online] available at http://www.i24news.tv/en/news/international/americas/131001-us-in-a-government-shutdown-first-time-since-95 [Accessed 1st September 2016]

Lincoln's pronouncement that "you cannot fool all of the people all of the time" would appear to be a safeguard against the long-term negative effects of individual sectional interests but Schumpeter adds a cautionary note to this. Having already argued that "it is only the short-run promise that tells politically and only short-run rationality that asserts itself effectively" (Schumpeter, 1987, p.261), he says that history "consists of a succession of short-run situations that may alter the course of events for good. If all the people can in the short run be "fooled" step by step into something they do not really want [then] in reality they neither raise nor decide issues but […] the issues that shape their fate are normally raised and decided for them."(p.264)

A related phenomenon is what Hirsch refers to as "the tyranny of small decisions" where "[i]ndividual choices, each made separately and thereby necessarily without taking account of the interaction between them, combine to have destructive social consequences […] in the sense that they produce a worse result for the individuals concerned than could have been obtained by coordination of individual choices."(Hirsch, 1987, pp.37,40,79,106) Take the choice between having excellent public transport and few cars or plenty cars and poor public transport. It is likely that a majority today would opt for the former but while the social planners are making the 'big' decision on this, the individuals buy cars since they have to make the "'small' choices to which they are confined in market transactions." This increases congestion and reduces the custom for public transport, both of which increase the cost for public transport so the "car ownership feeds on itself."(p.168, n.13)

Schumpeter's model also defines unambiguously the level of control the electorate has over the government. The electorate has the power to elect the government and to evict it and this is the limit of its power other than on the very rare occasions when "spontaneous revulsion" at an action of the government or one of its members causes them to change course (Schumpeter, p.272). This brings greater clarity to the question of what democracy is and what it is not and, in particular, deals with the question of interpreting the will of the people. Napoleon's actions regarding relations with the Church in the earlier example are clearly not democratic since, according to the definition, he was not elected by the people although his solution almost certainly reflected the will of the people and it is unlikely that an elected government could have arrived at such an acceptable and effective solution.

If, however, we want the 'majority' to represent more closely the 'will of the people', it can be done through proportional representation but this, according to Schumpeter, offers "opportunities for all sorts of idiosyncrasies to assert themselves [and also] may prevent democracy from producing efficient governments and thus prove a danger in times of stress." (Schumpeter, 1987, p.272) Evidence throughout Europe today, and perhaps throughout the world would seem to support this. He suggests that proportional representation and leadership are mutually exclusive (p.273).

2.7   Politicians and Political Leadership

As mentioned already, Schumpeter argued for a social stratum of competent people that takes to politics as a matter of course.   Because of the nature of the politician's work, politics has to be regarded as a profession.   There can be little time for any other pursuits in life if one wants to engage seriously in politics, most certainly at national level, (p.286) because of "the incessant battle in parliament", the unrelenting competitive duels between politicians and between parties and the constant pressure from the electorate and the media. As a result, Schumpeter implies that the politician pays more attention to 'his' fellow politicians and the needs of his party than to his constituents and this further emphasises the independent non-delegate nature of the role.   Because of the constant pressure, the attention of the politician, and particularly the senior politicians such as ministers, is kept focused mainly on the short-term goals.   On the more positive side, the system excels in developing the politician's skill for understanding and managing people.   The system is also very good at ensuring that the most competent get to the leadership positions since "[t]here are many rocks in the stream that carries politicians to national office which are not entirely ineffective in barring the progress of the moron or the windbag." (p.289)

The strength of democracy lies in its clarity and openness and this is brought out in Schumpeter's discussion of leadership.   Where there is strong leadership, the people have the opportunity of seeing how the 'will of the people' or public opinion is represented, faked or substituted by a 'manufactured will' (p.270). Also, the democratic system will accommodate the various sectional interests including those associated with social issues, in a way that will filter and prioritise them according to the general political climate (and the will of the people). Rather than being asserted directly, these will in general evolve over time until some political leader takes them on board, develops them and includes them "in his competitive offering" at election time (p.270) and "on principle at least, everyone is free to compete for political leadership."(p.272)

The fact that every member of the electorate can compete for political leadership, also clarifies the relationship "between democracy and individual freedom."   No system provides for total freedom for the individual - such a situation is impossible anyway since respect for one individual's freedom always restricts the freedom of other individuals. The amount of freedom allowed is a matter of degree and democracy doesn't necessarily provide a higher degree of individual freedom than all other systems. But if everyone is free to go before the electorate and compete for political leadership, "this will in most cases though not in all mean a considerable amount of freedom of discussion *for all*.   In particular it will normally mean a considerable amount of freedom of the press." (p.272)

Where politics differs from business is within the party, especially in relation to leadership. Despite the moves towards democracy in the workplace, it seldom has any role in the selection of business leaders. Democracy is carried through, however, into the political party and it is perhaps here that it is seen at it's most intense. Party leadership is, in theory, open to all members and since the business of politics is the competition for power, there will always be politicians with ambitions to replace or even displace their leader. In pursuing this, they must carefully weigh up the risks of failure against the chances of success and "steer a middle course between an unconditional allegiance to the leader's standard and an unconditional raising of a standard of [their] own." But the leader in turn must also steer "a middle course between insisting on discipline and allowing himself to be thwarted." (p.281) This can in fact be very productive since everyone is forced, or at least motivated, to listen to what everyone else is saying, discussion and debate is intensified, compromises have to be made and this is the essence of politics.

The US President is, according to Schumpeter, in the fortunate position of not having to sit in Congress unlike his counterparts (i.e. prime ministers) in other democracies who have to face the parliamentary battles on a daily basis. This allows the President to concentrate more on longer-term issues. However, the President is constrained somewhat by the four-year presidential and congressional elections and also the mid-term congressional elections. The President must ensure a supportive Congress in order to get his long-terms policies approved but paradoxically this regularly compels him to concentrate on short-term vote-winning strategies.

2.8   Morality in Politics

Luhmann says that the election of a particular party to office should, under democracy, represent a decision in favour of "a political program that differs from that of other parties."(Luhmann, 1990, p.236) Not only should the programmes differ, but they should be "of a contrary nature" and fit the binary coding of his functional differentiation model e.g. conservative/progressive, restrictive/expansive welfare state, ecological/economic etc. However, he says that parties shy away from campaigning in this manner and, instead, make election promises they know they cannot deliver because the leadership that is required to speak about necessary austerities or about what *cannot* be done, does not exist. So, instead of competing on the basis of their programs, parties compete on personalities and on their moral stance against the moral stance of their opponents.

Luhmann argues that historically rulers could rule without moral considerations because of "an unavoidable arbitrariness at the top of every hierarchy" which put a distance between the sovereign and

morality "for reason of state."(p.237) (L'etat cest moi!) But this cannot work in a system with a bifurcated top such as democracy. "Instead, democracy needs a different style of higher amorality - the renunciation of the moralizing of political antagonism."   Parties should not take a moral stand against their opponents.   Put another way, all parties, while competing on the basis of their respective policies, must respect one another and respect their commitment to the democratic system since, to do otherwise would be to endanger the government/opposition model.

Luhmann appears to miss the point that when one takes the moral high ground, one steps outside politics. President Bush's declaration of war on the 'axis of evil' is one of the more extreme examples. By setting himself in opposition to 'evil', he took on the role of 'God' and since he had absolute right on his side, there was no question of arguing with him or trying to reach a compromise. He had gone beyond politics and it was irrelevant.   In domestic politics, particularly though not exclusively here in Ireland, we see how reluctant the mainstream parties are to get involved in debates on issues which have a significant moral element such as abortion despite pressure quite often from the electorate.

The political system can in many cases, however, convey the impression of a strong commitment to moral values such as peace, justice, equality or practical values such as low unemployment, low inflation, absence of corruption etc. since the existence of these values "which are widely held in modern societies […] means that the political system can always filter information through the vocabulary given by these values [and so] rationalize and legitimize its choices insofar as it responds to problems in this vocabulary." (King & Thornhill, 2005, p.93 citing Luhmann, *Die Politik der Gesellschaft,* p.196)

In Hayek's model, everyone is a member of the Great Society but individuals are free to join the various smaller groups which make up the Great Society on a voluntary basis. The smaller groups are in most if not all cases focused on particular ends and may depend on human emotions and moral values such as solidarity, unselfishness etc.   These will lead ultimately to totalitarianism if applied to the Great Society as distinctions between loyalty and disloyalty or friend and enemy are identified and the need or the excuse for control becomes apparent.   In the case of the smaller group the individual can leave but this is not possible in the universal group.

Traditional morality and moral sentiments have no place in the Great Society. The society is governed by the abstract rules of just conduct to which everyone is subject and is guided by the open market to do what is of most benefit to oneself and therefore to everyone in the society.   Hayek says it "did become part of the ethos of the Open Society that it was better to invest one's fortune in instruments making it possible to produce more at smaller costs than to distribute it among the poor."(Hayek, 2013, p.302) He admits however that this ethos "leaves an emotional void by depriving men both of satisfying

tasks and the assurance of support in the case of need."(p.303)   His use of the past tense in these passages would seem to imply a departure from this ethos but he concludes by emphasising again the inevitability of totalitarianism if the Great Society is run on the same basis as the familiar small group or is focused on a particular end or purpose.

2.9   Abstract Rules

Reference has been made to the 'abstract rules of just conduct' in Hayek's Great Society.   Unlike Luhmann, Hayek is not a constructionist although they arrive at broadly similar conclusions in their analysis of the workings of democracy.   For Hayek, it is only through the use of abstraction that we can manage our affairs in the Great Society. It is "the basis of man's capacity to move successfully in a world very imperfectly known to him - an adaptation to his ignorance of most of the particular facts of his surroundings."(Hayek, 2013, p.29)   It would be impossible for any individual to have command of the complete set of facts relevant to any action they are about to take.   All the facts exist within the Great Society but not with any one individual.   However, it is civilisation that "helps us to overcome that limitation on the extent of individual knowledge […] by conquering ignorance, not by the acquisition of more knowledge, but by the utilization of knowledge which is and remains widely dispersed among individuals."(p.16) Civilisation lets us benefit from knowledge we do not possess. In this context Hayek notes that economics, while stressing the 'division of labour' has little to say about the fragmentation of knowledge. (p.14)

Hayek takes issue with the constructivists' view of abstraction which they conceive "as a property confined to conscious thought or concepts, while actually it is a characteristic possessed by all the processes which determine action long before they appear in conscious thought or are expressed in language."(p.29) He is scathing in his criticism of "Cartesian constructivism with its contempt for tradition, custom, and history in general" and according to which, he claims, "[m]an's reason alone should enable him to construct society anew."   He is opposed to this rationality because of its anthropomorphism and its intentionalist view of history which "found its fullest expression in the conception of the formation of society by a social contract" by Hobbes and Rousseau (p.11).   The "*hubris* of reason" he says "manifests itself in those who believe that they can dispense with abstraction and achieve a full mastery of the concrete and thus positively master the social process" and this concentration on the concrete led to philosophies "of 'life' and of 'existence' which extol emotion, the particular and the instinctive, and which are only too ready to support such emotions as those of race, nation and class." (p.32)

As opposed to constructive rationality and Cartesian dualism, Hayek sees mind and society evolving together - the mind being "an adaptation to the natural and social surroundings in which man lives and

[…] it has developed in constant interaction with the institutions which determine the structure of society." He says man was able to act before he could think or understand and that understanding is "simply his capacity to respond to his environment with a pattern of actions that help him to persist." (p.18)

Hayek fears the development of totalitarianism within democracy and points to the fact that dictators like Hitler, Mussolini or Stalin did not appeal just to the worst instincts in people but appealed as well "to some of the feelings which also dominate contemporary democracies." (p.292) These 'feelings' include the "desire for a visible common purpose" such as a welfare state which would cater for the needs of the poor and result from the rationalist intentionalist approach rather than the abstract approach.

The task of establishing and maintaining the rules of just conduct would lie with a Legislative Assembly. The most significant aspect for Hayek is that the rules would be abstract, that is, that they would be general rules not relating to any particular situation or event or to any individual person or group - a proposal made much earlier by Weber (Weber, 1978, p.217). Somewhat like 'blind justice', the Legislative Assembly would not be able to predict the situations in which the rules would need to be enforced. "Although the use of abstraction extends the scope of phenomena which we can master intellectually, it does so by limiting the degree to which we can foresee the effects of our actions, and therefore also by limiting to certain general features the degree to which we can shape the world to our liking." (Hayek, 2013, p.31)

2.10   Government and Administration

Peter Drucker, in developing his theory of organisations, anticipates Luhmann's approach to social systems. Taking a business or a university as examples, he says "the members of [these] organisations, whether employees or students, should be expected to take the largest possible responsibility for managing the community life of their institutions. A great deal of what managements are doing today is not related to performance and function. Why management should run the plant cafeteria, for instance – or student discipline – is not very clear. And there are many other areas where community self-government can and should take over. […] A wise management […] limits itself to the spheres of direct relevance to its central task. Everything else it tries to unload." (Drucker, 1969, p.194) Here Drucker is advocating the differentiation of functions in the organisation on the basis of performance.

Drucker says that each of the major services required by society such as healthcare, education, government, consumer products, defence etc., are provided by special-purpose institutions. Each of these institutions "has its own autonomous management, [i]ts own job to do, and therefore its own objectives, its own values, and its own rationale." Reflecting the shift from differentiation by status or

title to functional differentiation (to use Luhmann's terminology), Drucker says that while government might still be regarded as 'lord', "it can no longer be master." He adds that social theory "to be meaningful at all, must start out with the reality of a pluralism of institutions – a galaxy of suns rather than one big centre surrounded by moons that shine only reflected light." (p.163) There is no 'centre', no one institution is superior or inferior in status to any other. Government acts as a co-ordinator or leader and in words to be echoed later by Luhmann, Drucker says "yet, paradoxically, government suffers from doing too much and too many things. The purpose of government is "to make fundamental decisions […] to focus the political energies of society. It is to dramatize issues. It is to present fundamental choices. The purpose of government, in other words, is to govern." (p.217) For Drucker, the governing function must not be distracted or diluted in any way by the follow-up implementation or execution of the decision.

For government, to be effective and strong, may have to learn to 'decentralize' to the other institutions, to *do* less in order to *achieve* more."(p.163) The purpose of decentralisation "is to make it possible for top management to concentrate on decision-making and direction by sloughing off the 'doing' to operating managements, each with its own mission and goals, and with its own sphere of action and autonomy."

Luhmann, for his part, refuses to accept the idea that politics is "an instrumental contrivance that attempts to bring about increasingly better outputs - that is, increasingly better social situations." Instead, he uses Parsons' formulation that politics is "collectively binding decision-making." (Luhmann, 2013, p.20) This is essentially the same as Drucker's view of the role. It must be noted, however, that Drucker uses the term 'government' in the general sense while Luhmann is very specific, although not always unambiguous, in assigning the collective decision-making role to 'politics.' According to Luhmann, the political system comprises two distinct functional components - politics and administration. He modifies Parsons' definition above to say that politics is concerned with "the establishment of decision-premises for future decisions" (King & Thornhill, 2005, p.79) while the "administration […] is, by contrast, specialized on the elaboration and issuing of binding decisions, in accordance with politically prescribed criteria of correctness." According to King & Thornhill, administration here includes "parliaments, sub-executives, councils, regional committees, quangos, tribunals and so on" (King & Thornhill, 2005, p.79) although elsewhere they say "Luhmann identifies the administration as a complex legislative subsystem of politics" and includes parliaments and a "series of other possible legislative organs - ranging from […] cabinet-sittings to executive round-tables, to high-level discussion groups, to bureaucratic sub-executives, to neo-corporate bargaining fora, to delegations of organised labour, even to local administrative networks, such as councils, regulators and regional executives."(p.123)

Among the problems Drucker identifies with democracy is that the bureaucrats are "protected from the demands of performance." Another is the difficulty that government institutions have in managing, or even adapting to, change. Examples include government programmes surviving long after their work is accomplished. They are rarely 'killed off' - they continue or evolve into other programmes for which their structures may be partially or totally unsuited.

Drucker's proposed solution is to contract autonomous institutions to undertake the performance of 'major social tasks" on the basis of performance rather than authority. These institutions could be businesses, cooperatives or even existing government administrators once they are granted autonomy by the government. The institutions would be the 'doers' and the government would be "the decision-maker, the vision maker, the political organ" and it would "figure out how to structure a given political objective so as to make it attractive to one of the autonomous institutions." (Drucker, 1969, p.220)

The institutions would be run on a business basis since, according to Drucker, this has the following advantages:

- "Of all our institutions, business is the only one that society will permit to disappear." The examples he gives for this are not convincing - comparing the storms of protest following the closure of a public hospital run by the Catholic Church and a school run by the Jesuits to the simple 'regret' that would be felt at the possible closure of an aircraft manufacturing company, is simplistic (p.221). However, it is likely that if a public hospital were closed down by the government, the public would protest and get a political campaign underway in which local politicians would engage. The political system opens itself to this type of political participation and thereby sustains the protest. If a private business closes down, there is likely to be a protest about unemployment and the loss to the local economy but usually the business doesn't engage with the protesters to any extent, so the protests are seldom prolonged. Drucker's solution would mean less politics. The services should be much better but examples such as the privatisation of Eircom and of British Rail would raise significant doubts.

- In a similar way and with similar consequences, "business can abandon an activity". (p.221)

- "Alone among all institutions [business] has a test of performance." The test is profitability with the risk of loss and closure and these are dependent on the judgement of the customers (p.222). However, he argues elsewhere that business can learn much from successful non-profit organisations. The non-profits don't base their strategy on money or centre their planning around financial returns. Instead, they "devote a great deal of thought to defining their organisation's

mission [avoiding] sweeping statements full of good intentions and focus, instead, on objectives that have clear-cut implications for the work of their members."(Drucker, 2008, pp.170-171)

- Business "has to prove its right to survival again and again. This is what business is designed for, precisely because it is designed to make and manage change."(Drucker, 1969, p.222)

Schumpeter would have a similar approach to Drucker regarding the business of government. He is concerned that the "effective range of political decision should not be extended too far."   It would be impractical for politicians or for parliament to get involved in every issue that comes before them. Many of the issues on which decisions are required may be too broad, technical or complex to be considered in detail and in such circumstances politicians must rely on the advice of specialists while formal approval will ultimately rest with themselves.   He also recommends, as did Luhmann and Drucker, the establishment of what are essentially quangos which "extend the sphere of public authority without extending the sphere of political decision." (Schumpeter, 1987, pp.292-293)   There would be no political involvement other than at a supervisory/regulatory level.

Whereas the main concern of both Luhmann and Drucker is the separation of the legislative function from the executive function, Hayek's emphasis is on the division of the legislative function itself into two functions - one establishing the principles, or the 'abstract rules of just conduct' mentioned earlier and the other "representing the concrete wishes of the citizens for particular results."   The latter would be governed by interests and the former by opinion, that is, "by views about what *kind* of action is right or wrong." (Hayek, 2013, p.448) He is influenced in this, as was John S. Mill, by the idea of the Ecclesia and Nomothetae in Athenian democracy where the Ecclesia could pass "decrees on single matters of policy" whereas the Nomothetae's role was "to revise the whole of the laws, and keep them consistent with one another." (Mill, 1998, p.280) In practice, the boundary between the legislative and executive function or between the Ecclesia and the Nomothetae is often unclear so differences between various theorists tend to be more about emphasis or terminology.

Hayek sets out the five tiers of authority as follows: (Hayek, 2013, pp.457-458)
1. The Constitution which deals essentially with organisational matters ensuring that there is no confusion regarding the power and authority of the other tiers.
2. The Legislative Assembly with responsibility for devising the rules of just conduct.
3. The Governmental Assembly, similar to existing parliamentary bodies which would include an organised opposition.   It "could not issue any orders for private citizens which did not follow directly and necessarily from the rules laid down by the [Legislative Assembly]." (p.454) and it would oversee the government as its executive organ.

4. The Government together with the Governmental Assembly would, within the rules of just conduct, "be complete master in organizing the apparatus of government." (p.454)

5. The Administrative Bureaucratic Apparatus to support the above.

2.11   The Welfare State

For many of the theorists on democracy, including Luhmann, Drucker and Hayek, the welfare state upsets their models or theories and they are therefore opposed to the idea although they accept that the state cannot ignore the plight of the very poor and it is necessary therefore to give it some consideration.

T.H. Marshall saw the welfare state as part of a pattern where the citizens acquired "civil rights in the eighteenth century, political rights in the nineteenth century, and social rights [..] in the twentieth century." (Micklethwait & Wooldridge, 2014, p.74) Micklethwait & Wooldridge argue that the welfare state marked a change from a system providing benefits with associated obligations to one which responded to a demand for universal rights from the state (p.74).

Before proceeding to discuss the difficulties posed by the welfare state, it is worth noting Castells' comment that the welfare state "in its different manifestations, depending on the history of each society, was a critical source of political legitimacy in the reconstitution of government institutions after the Great Depression of the 1930s and World War II." (Castells, 2010, p.402)

Drucker's difficulty with the welfare state is confined to an organisational issue in that it is administered through a state bureaucracy rather than through a business. I discuss the implications of this under Bureaucracy below.

For Luhmann, the origins of the welfare state can be traced back to the time of the French Revolution when the democratic vote brought the "the legally inaccessible aspect of ultimate, sovereign arbitrariness" under control and "the general populace acquired relevance."   This was also around the time of the Industrial Revolution and the social consequences arising from this became driving forces in political life and "became the point of difference for political parties that have become organizationally entrenched since the end of the nineteenth century." (Luhmann, 1990, p.26)

The root of the problem lies in the principle of inclusion.   The stratified society of earlier times, when differentiation was by status, assigned each person "to one and only one stratum of society." (p.35) This defined their position, rights and responsibilities and "every member of the system, from the yeoman up to the most powerful king, understood exactly the positions of the other members of the

hierarchy, their concerns, and their problems." (Drucker, 1969, p.164)   But when differentiation by function replaced differentiation by status, the population could not be distributed across the different functions as they had been distributed across the different strata.   Instead, rules of access apply. "As an individual, a person lives outside the function systems.   But every individual has to have access to every function system if and insofar as his or her mode of living requires the use of the functions of society.[…]this requirement is formulated by the principle of inclusion […] The welfare state is the realization of political inclusion." (Luhmann, 1990, p.35)

The growth of the 'compensation culture' is another aspect of the welfare state which causes significant problems. Until the mid-20th century, governments provided help through relief programmes of various types to those who were adversely affected by economic or other developments. These programmes ranged from, for example, the Poor Law system in Ireland and Britain during the early years of industrialisation to the relief programs under the 'New Deal' in the U.S. after the 'Great Depression'. The welfare state began to evolve in Britain during the first decade of the twentieth century with the introduction of "free school meals for needy children (1906), old-age pensions (1908), a budget against poverty (1909) and national insurance for the sick and unemployed (1911)." (Micklethwait & Wooldridge, 2014, p.68)   It became firmly established in the 1940s with the implementation of the Education Act, the National Insurance Act and the National Health Service Act. The overall thrust was encapsulated by Aneurin Bevan in the words "[h]omes, health, education and social security, these are your birthright." (p.75)   Prior to this the relief provided was at the discretion of the government or donors. The shift from help to compensation (or from benefits to claims) marked a shift, in Luhmann's words, "from the social state to the welfare state." (Luhmann, 1990, p.23)   The essence of the welfare state "is compensation to the individual for the negative consequences of a particular organisation of life." (Luhmann, 1990, p.22)   But the real difficulty arises from the fact that "the concept of compensation tends towards universalization because, according to the way the problem is presented, all differences can be compensated and yet differences always remain or new deficits appear that require compensation themselves." (Luhmann, 1990, p.22)   Taking universalization and inclusion together means that government can, and does, become involved in addressing a wide range of very diverse specific problems and individual situations.

Luhmann mentions additional potential problems that the welfare state may have to confront. It is important to note that these "are closely connected with and burden one another reciprocally - in the sense that better solutions of the problems of one domain can increase the problems in another." One of these problem areas is the increasing change in the environment "produced by industrial society that cannot be brought under control without invoking political measures." (p.23)

A second problem area is motivation - the motivation of those receiving benefits from the welfare state which can perpetuate existing, or create further problems. Also, with greatly improved standards of living, education, mass media and leisure facilities etc., we cannot count on the same motivating factors in the future as we have now. People may not have the same welcome for the welfare state or be prepared to "work for the politics of well-being."(pp.23-24)

A third problem is the growing cost of the welfare state. This not only forms "a daily financial problem but also threatens the differentiation of the political and economic systems because of the increasing relative size of the state budget in relation to other means." (p.23) Any decrease in differentiation will result in a similar decrease in the effectiveness of the administrative systems and hence a diminution of the overall democratic system. To avoid such dedifferentiation "[p]olitical systems must always be able to reflect on economic or legal or medical or artistic issues, and so on, in terms distinct from those that these systems use to describe themselves." (King & Thornhill, 2005, p.86)

Habermas claims that the welfare state has failed in its efforts to achieve a significant improvement in the conditions of those on low incomes since "the redistribution of income is essentially limited to a horizontal reshuffling within the group of the dependently employed and does not touch the class-specific structure of wealth." (Habermas, 1989b, p.57) He also says that "the upwardly mobile groups of voters who received the greatest direct benefits from the welfare state", in order to protect their standard of living may "ally themselves with the strata concerned with "productivity", to form a defensive coalition opposing underprivileged or marginalised groups." Castells makes a similar point in relation to African Americans and the growing hostility among the poor against the "middle-class blacks [who] strive to get ahead not only from the reality of the ghetto, but from the stigma that the echoes from the dying ghetto project on them through their skin […] particularly by insulating their children from the poor black communities".(Castells, 2010, p.60)

In addition to the structural problems just mentioned, Castells points to the problems caused in globalised markets by the varying levels of welfare benefits available from different states resulting in widely varying labour costs. "Since firms, because of information technology can locate in many different sites and still link up to global production networks and markets […] there follows a downward spiral of social costs competition."(p. 313) However, Castells also notes that there is "a somewhat more complex relationship between productivity, competitiveness, and the welfare state, emerging in the knowledge-based economy" as shown by Finland which used the welfare state to increase productivity "by providing the human resource base for the advanced knowledge economy, in terms of education, health" etc. (pp.314-315)

Hayek's difficulty with the welfare state arises from a misconstrued understanding of justice on which the welfare state is founded. Justice is a quality that can be attributed to the actions of individuals or groups of individuals acting in concert as in organisations. According to Hayek "[to] apply the term 'just' to circumstances other than human actions or the rules governing them is a category mistake" (Hayek, 2013, p.198) because the nature of justice is such that someone or some group of people must be held responsible for any instances of justice or injustice. Society, therefore, cannot be held responsible and, for Hayek, it follows from this that the term 'social justice' is an anomaly.

There are other reasons also for his strident opposition to the idea of social justice. Social justice involves directing certain efforts towards a particular group of people for the purpose of achieving specific results. This is organisation-type thinking which undermines the spontaneous order of society and the abstractness of the rules that govern it.

Hayek hints at the difficulty raised also by Luhmann, that once a problem of inequality, or perceived inequality, has been addressed in one area, it can create a problem in another area and this begins to destabilise the system overall (Luhmann, 1990, p.23). Also, the term 'social justice' is often used as a camouflage for the protection of vested interest groups which helps "to engage the sympathy of the public." While organised groups tend to represent themselves as 'social', he says that "the long run interests of the several individuals mostly agree with the general interest [but] the interests of the organized groups almost invariably are in conflict with it." (Hayek, 2013, p.257)

Hayek is in favour of having an 'even playing field' where everyone starts with equal opportunities, this being a key element of classical liberalism and he mentions in particular the provision "on an equal basis the means for the schooling of minors"(p.247) although he questions whether the government should provide them. He also sees "no reason why in a free society government should not assure to all […a] minimum income, or a floor below which nobody need to descend"(p.249) or should not provide "some security against severe deprivation." (p.294) He suggests that these provisions should be made outside the market but it is not altogether clear how this is to be achieved other than avoiding any attempt to impose "upon all a system of common concrete ends towards which their efforts are directed by authority, as socialism aims to do." (p.294)

The use of coercion in the Great Society is restricted to the agencies of government for enforcement of the rules of just conduct with a view to "reducing all coercion as much as possible and leaving as much as possible to voluntary efforts."(p.307) Hayek sees voluntary organisations as a very important element of the free society. While he does not say it explicitly, one can assume that he believes these organisations could be the agents for addressing the social deficiencies mentioned above. Also, the stronger the voluntary sector, the healthier the society since he says "nothing can have a more deadening

effect on real participation by the citizen than if government, instead of merely providing the essential framework for spontaneous growth, becomes monolithic and takes charge of the provision for all needs."(p.308) He adds that the citizen getting involved in public affairs should not confine him/herself to affairs of government and the "public spirit should not exhaust itself in an interest in government."

Despite its shortcomings, the accomplishments of the welfare state were significant until the economic downturn in the 1970s when there was an enormous increase in welfare demands and a corresponding drop in tax revenue and other means of funding. As happened then, such a situation is usually followed by instability in the economy which the government attempts to manage and there follows a spiral of falling investment, increasing unemployment, more demands on the welfare systems, increasing government debt and then a period of austerity. This should allow the situation to be brought under control so the economy starts to build again. In attempting to manage the crisis, however, the internal complexity of the political system increases substantially and this manifests itself in a larger administration, a higher level of bureaucracy and more regulation.

Held, in his analysis, identifies two strands of opinion on the crisis in governments today resulting from the increasing role of the welfare state. The 'New Left' view is that it's a legitimation crisis with confidence in the government falling due to austerity measures affecting working conditions, income levels, quality of state services, etc. The view of the 'New Right' is that it's an overload crisis with the government becoming "essentially *dysfunctional* for the efficient regulation of economic and social affairs." This resulted from the "growing affluence, 'free' welfare, health and education which undermined private initiative and responsibility," and a decline in deference which, in turn, led to increased expectations and aspirations (Held, 2006, pp.190-196).

2.12   The Mythical Element in Democracy

Overall there are inconsistencies in Luhmann when he is dealing with the role of the electorate and their relationship with the politicians. He is critical of the politicians making promises which they know they cannot keep. Yet these promises are just part of the myth which is upheld through the connivance of both politicians and electorate in order to maintain the democratic system. For Luhmann, according to Moeller, "the democratic narrative is a myth that serves the function of closing the political circle" in which the voters "merely constitute the periodically activated audience of the political system which, by this very activity, is integrated into a circle of political decision-making." (Moeller, 2012, p.96)

One of the occasions in which the 'audience' is activated is at election time when the citizens collectively decide who is to form the government and who is to form the opposition. Or, taking

Moeller's interpretation of Luhmann, once the votes are cast and the numbers calculated, then using the rules and procedures of the democratic 'structural arrangement', these numbers are transformed into political decisions regarding the formation of the government and opposition.(p.95)

Luhmann accepts the very significant symbolic and mythical element in democracy (pp. 97-98) but does not accept the implications of this in, for example, insisting that the economy and the political system must be kept totally separate or that inclusion in the political system must be minimised. These of course would undermine his model and this begs the question as to how relevant his model is to practical politics. And politics is about practicalities. Ideals indicate the direction but they are never fully attainable and politics has to take over to find a workable arrangement - "a structural arrangement" - to get the optimum solution. As Geuss summarises it, "[p]olitics is a craft or skill, and ought precisely *not* to be analysed, as Plato's Socrates assumes, as the mastery of a set of principles or theories."(Geuss, 2008, p.97)

Pragmatism, however, must be coupled with myth if democracy is to be successful. Pragmatism makes democracy operational while myth provides the explanation - the cover that allows everyone to support it. The grey area lying between the pragmatics and the myth provides the environment for politics to work.

While a rite is often regarded as being prescribed or determined by a myth, Cassirer holds the opposite view. "Man may act very unreasonably; but even in his most irrational acts he cannot refrain from asking for the motives of his acts. Myth alone can supply such a motive. It becomes the interpreter of the rite; it enables man to understand what he does."(Cassirer, 1979, pp.248-249)

As already mentioned, democracy, for Luhmann is "a specific structural arrangement of the political system." In a different reference he says that democracy is the structural innovation emerging from the autopoietic system of politics. He treats democracy almost as the incidental result rather than the primary outcome of some political activities. But his abstract descriptions of democracy - they can hardly be called rigorous definitions - do not provide an adequate explanation for the motivation behind the 'Arab Spring' of 2011, the 'Prague Spring' of 1968 or the quiet revolution that overtook all of communist Eastern Europe in 1989. As Geuss insists, the political realist must understand the motivational force of powerful illusions.(Geuss, 2008, p.11)

On the other hand one must take cognisance of Moeller's argument that change can come only through a radical approach like Luhmann's which goes beyond the values and vocabulary of today's allegedly failed protest movements such as the anti-globalisation movement. He says "society cannot be more democratic or free – because under the conditions of functional differentiation self-descriptions such as "democracy" (in the sense of "rule of the people") or "liberty" (the right to realize an individual

lifestyle) are meaningless."(Moeller, 2006, pp.116-117) If we want to change our world for the better, we have to think beyond the outdated semantics which social protest movements only conserve and perpetuate thereby providing credibility and legitimation for the semantics employed by those they are protesting against. The success of Marxism during the twentieth century is due, at least to some extent, to the new vocabulary Marx provided for the workers which allowed them to express a distinct identity for themselves and their cause.

The failure to think beyond the current semantics or 'outside the box' has parallels with Heidegger's idea of *enframing* with regard to technology which I cover in more detail below. Briefly, it means that when we undertake an analysis of technology, we do so with an often unrecognised technological bias. There are plenty examples of this in the various 'innovations' we are presented with today - technological innovations which solve problems but overlook the fact that the problems were caused by a related technology in the first place. (Schmitt & Cohen, 2013)[8]

2.13   Bureaucracy

Bureaucracy is an essential complement to democracy within the state because it allows the execution of government policies and regulations to be undertaken in an effective and fair manner. In addition, for Luhmann, it is one of the systems, referred to earlier, which countervail the application of power by the political system.

Luhmann distinguishes between the administration and the bureaucracy. The former derives from "the primary division of the political system […] between politics and administration." (King & Thornhill, 2005, p.79) The role of the bureaucratic administration is "the elaboration and issuing of binding decisions, in accordance with politically prescribed criteria of correctness."(p.79) It includes the bureaucracy but also includes parliament and various networks of committees etc. Bureaucracy itself is "the result of requirements placed upon the political system to offer *performances* outside those areas organized by collectively binding decisions." (p.85) Bureaucracy is the instrument through which services are delivered to the citizens and to the state.

Bureaucracy regularly overextends itself as it responds to the performances demanded by the welfare state and by increased inclusion encouraged by, among other things, "the competition of parties [which] stimulates one-upmanship vis-á-vis the other side." (Luhmann, 1990, p.76) King & Thornhill give an example of bureaucracy over-extending itself and compensating itself by self-reproducing when "the

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[8] There are numerous examples in this book of the phenomenon in question.

political system nationalizes a branch of industrial production […] The state will be forced to deploy new resources for channelling investment, for overseeing production, for overseeing those who oversee production, and ultimately for overseeing its own mechanisms for overseeing those who oversee those who oversee production." (King & Thornhill, 2005, p.84)

While Drucker's reservation about the welfare state is that it is administered through a bureaucracy rather than a business he doesn't deny the need for bureaucracy in the administration, in fact he makes a very clear case for it:

> "A 'little dishonesty' in government is a corrosive disease. It rapidly spreads to infect the whole body politic. Yet the temptation to dishonesty is always great. People of modest means and dependent on a salary, handle very large public sums. People of modest position dispose of power and award contracts and privileges of tremendous importance to other people.[…] To fear corruption in government is not irrational. […] Any government that is not a 'government of forms' degenerates rapidly into a mutual looting society." (Drucker, 1969, p.214)

There is a need for control but control "of the last 10 per cent of phenomena always costs more than the first 90 per cent." (p.214)

For Schumpeter, a democratic government must be able to command "the services of a well-trained bureaucracy of good standing and tradition, endowed with a strong sense of duty and a no less strong *esprit de corps*."(Schumpeter, 1987, p.293) A bureaucracy is required to ensure that the range of political decisions are confined to high level issues. The bureaucracy "must be in a position to evolve principles of its own and sufficiently independent to assert them. It must be a power in its own right." It must be competent at administration and capable of providing independent advice when required.

Schumpeter argues for a social stratum for bureaucrats which would provide candidates with sufficient ability and prestige for positions within the bureaucracy. Such a class would have been cultivated in France since the post-war Fourth Republic particularly through the establishment of ENA (École Nationale d'Administration) and they now have very significant influence (some would argue far too great an influence) throughout the EU. (Siedentop, 2000, p.135) While emphasising that bureaucracy, rather than being an obstacle, is an essential element of democracy, Schumpeter does not overlook its deficiencies. He says it can have "a depressing influence on the most active minds […] due to the difficulty inherent in the bureaucratic machine, of reconciling individual initiative with the mechanics of its working. Often the machine gives little scope for initiative and much scope for vicious attempts at smothering it."(Schumpeter, 1987, p.207)

According to Weber, "[bureaucratization] offers above all the optimum possibility for carrying through the principle of specializing administrative functions according to purely objective considerations […i.e.] according to *calculable rules* and "without regard for persons"." He adds that "[b]ureaucracy develops the more perfectly, the more it is "dehumanized," the more completely it succeeds in eliminating from business […] all purely personal, irrational and emotional elements which escape calculation." (Weber, 1978, p.975) Bureaucracy, therefore, is a system of rationalisation - it is based on rules, processes and procedures. Roszak, putting it another way, says that the bureaucratisation of life is "the conversion of experience into numerical abstractions."(Roszak,1994, p.4)

Bureaucracy can function effectively in the absence of democracy and it can be traced in much earlier records than the latter. The Pharaoh Userkaf employed a team of bureaucrats over four thousand years ago to allow him "and his family to rise above the nitty-gritty of government." (Wilkinson, 2010, p.94) Today, bureaucracy is an intrinsic part of any formal organisation of people. It "is a precision instrument which can put itself at the disposal of quite varied interests, purely political as well as purely economic ones, or any other sort." (Weber, 1978, p.990)

Weber outlines six characteristics of bureaucracy which are: clearly defined areas of jurisdiction; a formal office hierarchy with clear lines of reporting and channels of appeal; the management and preservation of the 'written' documents (the "files"); fulltime salaried officials with the required technical expertise; specialist training and functional division of labour; and office management based on "*general rules,* which are more or less stable, more or less exhaustive, and which can be learned." (pp.956-958,1393) These give bureaucracy "its purely *technical* superiority over any other form of organisation"(p.973) which is the reason it is so ubiquitous.

The bureaucracy, for Weber, is the "actual ruler" in the modern state "since power is exercised neither through parliamentary speeches nor monarchical enunciations but through the routines of administration."(p.1393) It gains its power through its tendency for centralisation, its expertise and its control of information.

While bureaucracy has existed since ancient times, it is only with the development of machinery and modern technology that it has become widespread. In the military, for example, most armies comprised conscripted men of the poorer classes or men of wealth and they generally had to provide their own gear and provisions. With the introduction of technology such as guns and especially heavy artillery, warfare began to require much greater coordination and planning since equipment costs were higher, mobility was hindered to some extent and new technical skills were required. The army became

bureaucratised with fulltime paid soldiers, more detailed planning, more rigid procedures and all equipment and provisions supplied by the 'lord or master'.

Similar developments took place in manufacturing during the Industrial Revolution. Whether for the army or for the cotton mill or other enterprise, the cost of the machinery and other equipment was now far beyond the reach of the individual soldier or craftsman. These were provided by the wealthy ruler or landowner. While the craftsman couldn't afford the machinery, the provider of the machinery and other means of production couldn't work them and capitalism came into being. Weber summarises the situation saying "the [separation] of the worker from the material means of production, destruction, administration, academic research, and finance in general is the common basis of the modern state, in its political, cultural and military sphere, and of the private capitalist economy." (p.1394)

The material means of administration would have applied mainly to office space and furniture rather than machinery or modern type technology in Weber's time. However, the administrator - i.e. the bureaucrat, in the narrower sense of Luhmann's terminology - has two major advantages which allows him or her to garner and consolidate power. The first is technical expertise, technical in the sense of *tekhnē* - technique or art. The bureaucrat, particularly in the past, would have had little exposure to complex technology but, being fulltime salaried officials they would have developed very strong technical expertise in the processes, procedures and tactics of administration. In the public sphere, "the political "master" always finds himself, vis-à-vis the trained official, in the position of a dilettante facing the expert."(p.991)

The second advantage which the bureaucrat holds is the possession of official information and the capacity, in many cases, to transform it into classified material.(p.1418) The power of the bureaucrat in this regard has been undermined somewhat with the introduction of freedom of information legislation in many countries. But here again the resourcefulness of the bureaucracy has developed various techniques to minimise the effect of this legislation. What is more, the legislation has provided more scope to further expand the bureaucracy as is demonstrated, for instance, by the imposition of additional 'rules' which an interviewer has to follow when interviewing someone for a position in the public service in order to protect the bureaucracy itself from any allegations of bias or discrimination since the interviewee now has the right to feedback.

Taking the expertise of the bureaucrats together with the nature of the information they possess, Weber says that "[b]ureaucratic administration means fundamentally domination through knowledge"(p.225) and "as a means of exercising authority over human beings [it] is superior to any other form in precision, in stability, in the stringency of its discipline and in its reliability."(p.223) He also emphasises the

critical role of technical knowledge as 'modern'[9] technology develops and thereby anticipates the later development of the technocracy within the bureaucracy which I deal with later.

Habermas makes an interesting observation regarding political participation and bureaucracy. He says that citizens who are entitled to services - which would include practically all citizens in the welfare state – "relate to the state not primarily through political participation but by adopting a general attitude of demand – expecting to be provided for without actually wanting to fight for the necessary decisions. Their contact with the state occurs essentially in the rooms and anterooms of bureaucracies." (Habermas, 1989a, p.211)

Another difficulty raised by Drucker is that the "elaborate safeguards to protect the administrative structure within government against the political process" also "protects the incumbents in the [administrative] agencies from the demands of performance." (Drucker, 1969, p.215) The press can provide an antidote to this. To quote King Frederick William III of Prussia in 1804, "a decent publicity is for both government and subjects the surest guaranty against the negligence and spite of subaltern officials and deserves to be promoted and protected by all means." (Habermas, 1989a, p.84)

Castells is concerned about the development of global bureaucracy arising from the "irreversible sharing of sovereignty [by nation states] in the management of major economic, environmental, and security issues." Individually, the states sacrifice power for durability. Collectively, they display a paralysis in addressing these issues. Partly because of this paralysis and "partly because of the inherent logic of any large bureaucracy" to take on a life of its own, international institutions such as the International Monetary Fund "define their mandate in ways that tend to supersede the power of their constituent states, instituting a *de facto* global bureaucracy."(Castells, 2010, pp.330-331)[10]

2.14   Technocracy

The spread of bureaucracy following the Industrial Revolution was one of the features marking the separation of the worker from the means of production. This process was intensified during the early 20th century with the development of scientific management and the increasing complexity and scale of technology. According to the 'father' of scientific management, F.W. Taylor, one of its main principles is that "[all] possible brain work should be removed from the shop and centred in the planning or laying-out department."(Braverman, 1974, p.113) These developments led to greater specialisation

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[9] Weber was writing this between 1914 and 1920.

[10] Also, an article in *The Economist* entitled *Good Fences* (17 December 1998) states that "politicians are giving up some of their sovereignty—and some of their control over the limits of their territory—to the bureaucracies of supranational organisations."

and huge growth in production levels.   Detailed planning became critical because of the level of investment involved and the complexity of the production process -   nothing could be left to chance.

It was now the turn of the owner to become separated from the means of production.   Up to this point the owner in the large industries was an entrepreneur, one whose function was drive innovation through, for example, exploiting inventions and other opportunities for producing goods or opening new outlets or new sources of supply. Difficulties had to be overcome in such cases because of obstruction from those opposed to, or concerned about, change or due to the difficulty in understanding the innovation. The entrepreneur was someone who was able to get things done against this background. But then innovation itself became routine and "the romance of earlier commercial adventure [was] rapidly wearing away, because so many more things [could] be strictly calculated that had of old to be visualized in a flash of genius." (Schumpeter, 1987, p.132) The entrepreneur came back into vogue for a while during the 'dotcom era' in the 1990s - an example of the potential of ICT to revive some lost practices and ways of life.

Genius is unpredictable and one of the achievements of today's industry is to be able to manage without it by getting a more predictable though less inspiring performance through "taking ordinary men, informing them narrowly and deeply and then, through appropriate organization, arranging to have their knowledge combined with that of other specialized but equally ordinary men." (Galbraith, 1974, pp.76-77) This marks a shift of power "from capital to organized intelligence"(pp.72-73) as is evident from the dilution of the stockholders power generally.(p.65)   This organised intelligence resides in the technostructure.

The goal of the technostructure is stability rather than profit maximisation.   This stability is achieved through planning - planning for continuity of supply, for production, pricing strategies and containment of possible market uncertainty. To quote Galbraith "the technostructure is compelled to put prevention of loss ahead of maximum return.   Loss can destroy the technostructure; high revenues accrue to others."(p.176) We have here the distinction between property and possession - while the stockholders may own the organisation, the technocrats have possession and control of it.

Where decisions are not made by the technocrats, they are almost certainly initiated or proposed by them for ratification by higher management so most of the decision making is effectively done by the technostructure.   Even the technocrat who is 'merely' briefing the non-technical manager can significantly influence the decision-making of the latter by the information he or she chooses to provide or emphasise.

The technostructure is part of, or at least overlaps with, the bureaucracy but the boundaries become blurred because of the difficulty in categorising some of the specialists such as technicians, scientists, analysts etc. As Galbraith puts it "a continuum [..] exists between the centre of the technostructure and the more routine white-collar workers on the fringe. At some point power, or the chance for moving towards the centre becomes negligible. But it is no longer possible to recognize that point." (p.269)

Feenberg provides an illustration of the bureaucracy/technocracy complex through the example of medical services in which "vast bureaucracies […] mobilise the labor of physicians […]; these bureaucracies draw their power not from their role in healing, but from control of buildings, instruments, and financial tools such as accounting systems and computers."(Feenberg, 1995, p.88)

In this environment, planning for investment and production is not enough; the market and the supplies are other large variables that must be stabilised through planning. Large organisations assist one another in this stabilising process through long-term contractual arrangements for supplies etc. Some of the best examples of controlling markets are to be found in the ICT business where we're led to believe we're purchasing consumer items but we are in fact locking ourselves into proprietary systems. Ultimately the objective is to locate all effective decision-making, relating not just to the organisation itself but also to its external environment, deep within the technostructure thereby removing it from the influence of outsiders. (Galbraith, 1974, p.95) Technology contributes to this in many ways including the replacement of blue-collar with white-collar workers and "opening the way for a massive shift from workers who are within the reach of unions to those who are not." (p.267)

From this it follows that planning is critical to the success of an organisation because it assists in stabilising the environment. Luhmann, however, asserts that planning increases rather than decreases dependence on chance because "[more] information means more internal disorder, more problems in producing order out of order and disorder."(Luhmann, 1990, p.150) Almost inevitably, this leads merely to an expansion of the technocracy to help in re-establishing the order. Galbraith outlines the consequences of technology. (Galbraith, 1974, pp.32-35) These illustrate the increased inflexibility and therefore an element of determinacy that is introduced into the organisation. They include

- an increased timespan for the completion of any task;
- increased production capital needed in addition to that prompted by increased output;
- money and time are committed "ever more inflexibly to the performance of a particular task."
- specialised and highly organised manpower, including specialists on organisation;

- "From the time and capital that must be committed, the inflexibility of this commitment, the needs of large organization and the problems of market performance under conditions of advanced technology, comes the necessity for planning."

Galbraith was writing at a time when consumer electronics were just coming on the market and before the PC or the Internet became available. It could be argued, therefore, that his stated consequences are no longer valid since ICT has removed some of the barriers of time, place and organisation and this has allowed very successful businesses to be launched without the need for significant capital or supplies. The ICT industry itself provides the best examples of this with some of the software firms rapidly growing into very large multinational corporations by their extraordinary means of locking-in customers. As a result, thay have become a significant part of the globalisation process which, many would claim, is exerting a much greater influence or control than governments over the lives of the citizens. The consequences outlined by Galbraith above, however, are still valid for many industries, particularly manufacturing industries.

The recession following the debt crisis in 2008 in Ireland and elsewhere is evidence of the damage that can be caused by large corporations in search of capital and the powerlessness of governments to prevent it or even get adequate explanations from the technocrats. When things go wrong, the technical explanations usually go unchallenged by the public who don't understand the technicalities. Feenberg's definition of technocracy as a political order "based on expertise rather than citizenship" (Feenberg, 1995, p.23) is relevant here. I will return later to the question of whether ICT is a democratic, a neutral or a controlling technology.

The technocracy is not confined to the private sector. It is located also in the public sector. ICT has helped bureaucracy enormously by providing much greater facilities and opportunities for record keeping and processing, analysis, planning, modelling etc. As various systems and networks are developed through these activities the technocracy/bureaucracy consolidates its own power.

2.15 Luhmann Overview

According to Luhmann, society consists of a number of functionally differentiated sub-systems such as politics, the economy, law, education, science, etc. The functional differentiation of society evolved around the eighteenth century from the stratified society that was differentiated by class. Prior to this society was differentiated on a centre/periphery - usually city/country - basis which had evolved from the original tribal-type differentiation known as segmentary differentiation. When a particular tribe or segment began to dominate, in trade for example, then a power imbalance tended to develop between the centre and periphery.

The significant advantage of functional differentiation is that, in theory at least, each individual has the opportunity to participate in, or avail of the services or benefits provided by the different functional systems. In previous societies, people generally found themselves confined to one of the separate hierarchical groups based on family, location, class, etc. and the benefits of wealth, opportunities, or services provided by society were not made available equally to all groups. However, Luhmann notes that while function systems allow society to "claim equality and freedom for everybody" these systems have ways of "organizing their own boundaries, their own modes of inclusion and exclusion of persons [and can] transform equality into inequality and freedom into restraint." (Luhmann, 2002, p.111)

For Luhmann, society is not composed of people but of communications. 'Social' implies communication. People can use the social systems such as the economy or the law, but the systems themselves cannot be observed or analysed effectively as systems if they are taken to be composed of individual human beings. Social systems are just one of three categories of autopoietic systems identified by Luhmann, the other two being biological and psychic systems. Biological systems comprise bodies, cells and the various other living organisms. Psychic systems are systems of consciousness, minds, thoughts, ideas etc. while social systems comprise communications. So 'persons' are not systems in themselves but "are a construct of the social system with which it refers to the conglomerate of organic and psychic systems."(Seidl, 2014, p.10) The psychic system triggers communications in the social system and the social system triggers thoughts in the psychic system.

Much of Luhmann's theory of society was built on borrowings from the theories of others, in particular the theory of autopoiesis from the biologists Humberto Maturana and Francisco Varela. Biology is essentially a study of systems - life systems and the environment - and hence the frequency of use of biological terms in other disciplines. It should be noted, however, that Nisbet, challenges the idea of there being any affinity between evolutionary biology and the social sciences and he quotes Ernst Mayr saying that there is "no theoretical or substantive relation whatever" between the work of the geneticist or molecular biologist and that of the sociologist. Nisbet refers in particular, in this context, to the work of Talcott Parsons "and his followers." (Nisbet, 1980, p.307)

Maturana and Varela defined a living system as a system that reproduces itself recursively. In the autopoiesis of a cell, for example, "a network of reactions" produce molecules which then interact and "generate and participate recursively in the same network of reaction which produced them, and […] realize the cell as a material unity."(p.2) A significant aspect of autopoietic systems is that they are self-referential which implies that they are operationally closed and can, as a result, maintain their integrity. The functionally differentiated social systems are, therefore, operationally closed such that each system has full control over its own operations. No system is in a dominant position over any other system or systems so there is no central control of them. There can, however, be structural coupling between systems which allows a system to detect developments in other systems through

'perturbations' or 'irritations' in the environment and to respond if necessary. If, in the economic system, for example, there are ongoing warnings about a shortage of science and business graduates, then the education system is likely to become irritated by these and may decide to take action to address the problem. The political system regularly responds to irritations from the economic system and this is reciprocated to the extent that more direct explicit connections develop between the two systems and dedifferentiation sets in which makes management within each much more complex.

The move from hierarchy to functional differentiation has resulted in a more complex society. Luhmann even refers to the *hypercomplex* society since "there are many competing descriptions of this complexity."(p.109)   One reason for the increased complexity is the fact that different systems have different time frames or cycles. Market cycles, corporate planning horizons, technology development cycles, government terms of office etc. will differ from one another. Each system will be affected by decisions taken in some of the other systems but, being operationally closed, they operate independently and are not synchronised. This makes decisions all the more complex.

The question of complexity is very important to Luhmann but, although he is critical of the coverage it is given in the literature, (Luhmann, 2013, p.124) his own extensive coverage of it is no more satisfactory in terms of clarity. This reflects a problem generally with Luhmann in that he is not always precise or consistent. (King & Thornhill, 2006, p.188)[11] He provides a very large jigsaw with a lot of missing and badly cut pieces.

The world provides an outer limit or boundary for Luhmann's systems theory. One has to deduce from this that the world is not a system because it cannot have an environment outside itself, nor can it be an environment since the related system would then be part of its environment.   The complexity of the world is a function of all the circumstances and all that happens in the world and it is too complex to "be understood (ie given meaning), described or handled anymore."(p. 193)   This arises because "[t]he more elements you have, the more each individual element is overstrained by connectivity requirements. […] The consequence of this is that, from a certain size upwards, each element can no longer be connected with every other, and that relations can now be created only selectively." (Luhmann, 2013, p.124)

The solution to the problem of complexity is to find ways of reducing the complexity.   But reducing complexity in the environment results in an increase in complexity in the system.   For example, in a small business with just a few staff, it is likely that each of them would have some familiarity with most of the business transactions and could handle queries from any customer.   As the business grows and

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[11] Hornung states that "Luhmann's definitions or concepts do not seem to be precise, unequivocal, or, most especially, stable. That is to say, they seem to be formulated for the moment and the present context, already changing a few pages later."

the number of customers increases, it is necessary to formalise the channels of internal and external communications and establish distinct and more specialist departments within the organisation - the organisation becomes more ramified.   The more ramified it is, the better equipped it is to reflect and respond to the complexity of its environment.   Similarly, when the government introduces new regulations to streamline, say, some aspect of trade, this more than likely involves the formation of an additional section or office in a department to implement and monitor the regulations. The environment (i.e. the trade) is simplified but complexity within the system (i.e. the department) is increased with the extra office. From this it can be seen that the growth of bureaucracy and the accumulation of power in bureaucracy is driven by a need to manage complexity in the environment.

The transition to functional differentiation would have coincided more or less with a change in semantics from *prudence* and *hazard* to the management of *risk*. But, for Luhmann, risk is not a clear concept since it is normally "defined by its antonym 'safety' and by its relation to practical affairs" but this is ambiguous since "in practical affairs there is no absolute safety." (Luhmann, 1996, p.4) So, with a future that by definition will always contain "elements of uncertainty", why, he asks, do we invest so much effort in research on risk analysis, risk perception, and risk management etc. when an approach which would fit the traditional understanding of prudence in the face of hazard would be much more reasonable and simpler?   In fact there is so much analysis and research on risk that it contributes to "the increasing complexity of perspectives and information [which] may render our knowledge of the future even more uncertain." (p.4) In a competitive environment there is the additional factor that a decision aimed at reducing risk for one party is very likely to increase the danger for a competitor or competitors so there is a strong possibility that, of itself, risk management will not provide benefits to society overall.

The "cleavage of decision making" due to the isolation of the risk management decisions from the dangers that these decisions cause for others, is now resulting in serious social problems (pp.16-17). Luhmann is concerned that greater participation "by all those who are concerned about and affected by decisions, including even future generations" is regularly advocated as a solution with Habermas being one of the most prominent advocates (p.17).   But such participation would overburden the democratic system since "participation, like rationalization, can only mean multiplication of decisions [..and…] the growth of bureaucracy." (p.17)

Another aspect of the risk management problem manifests itself in the increased risk associated with lawsuits due to the complexity of the law nowadays and "the acceleration of changes by legislation [which] make outcomes even more unpredictable." (p.15) Yet among the main purposes of the law are increased safety and the reduction of risk. But the problem with laws and regulations is that as one level of detail is covered, it exposes the next level of finer but more numerous details which the fastidious regulator cannot leave uncovered.

Luhmann's view is that if risk is such a key aspect of decision making, what is needed is a "theory of modern society that explains why we have to make so many decisions and why modern society differs in this respect from traditional societies." (p.5)

While one would regard decisions as being a product, perhaps, of psychic systems, Luhmann says decisions are communications so they belong within the social systems. They are produced by organisations which, being autopoietic, are a particular type of social system which reproduces itself on the basis of decisions. (Seidl, 2004, p.15) Decision making is paradoxical because if the options proposed are equal in terms of the decision criteria, then it is not possible to make a decision other than one based on random choice but to do this requires a prior decision. On the other hand, if the options proposed are not of equal value, then no decision is required. "Only *those* questions that are in principle undecidable, *we* can decide – everything else would be mere calculation." (p.20) Strictly speaking, it is not possible to resolve the paradox because, as mentioned, deciding on how decisions are to be made defers the decision and takes one into an infinite regress "unless the paradox ends up in a place where it is not 'noticed'" and thus prevents a state of paralysis (p.21). The decision paradox is central to Luhmann's theory of organisations because "most organisational phenomena can […] be traced back to this undecidability of decisions." (p.21)

Decision making is simplified by uncertainty absorption which enables one to make decisions without having to go right back to the start every time. "[U]ncertainty absorption takes place when a decision is used by subsequent decisions as [a] decision premise" (p.18) – it allows one to move on. Luhmann links authority to uncertainty absorption since it "makes it possible to continue with communication on the basis of the assumption that someone can actually give reasons why he selects a certain topic rather than another." (Luhmann, 2013, pp.224-225) He also quotes Carl Joachim Friedrich's definition of authority as the "capacity for reason elaboration." (pp. 224)

Luhmann's objective is to provide us with the tools not just to observe society, but to observe the observers of society which would include observing ourselves. He wants us to be aware of the context within which we observe society and we can attain this awareness through second-order observation. The first-order observer observes *what* is there while the second-order observer observes *how* the first-order observer sees it.[12] Second-order observation is about understanding the context within which society is observed and in this there are some similarities with deconstruction.

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[12] Hollander, Jaap den; *Historicism, Hermeneutics, Second Order Observation: Luhmann Observed by a Historian*; (n.d.) www.intechopen.com/books/social-sciences-and-cultural-studies-issues-of-language-public-opinion-education-and-welfare [Accessed: 17 September 2016]

In the past, second-order observation was undertaken on our behalf by privileged observers such as the clergy, the literati, the "transcendental subject," (Luhmann, 2002, p.108) or the "Great Observer [with] the all-seeing eye."(Hollander, n.d., p.54)   Luhmann is now encouraging us to become "observers of all those theories, concepts and beliefs which people use to understand events, attribute causes, make predictions and so on." And he exhorts us to "free ourselves from our own moral, religious, ethical, ideological and political beliefs and attitudes, and become neutral observers of the social world." (King & Thornhill, 2005, p.2)

In most cases with function systems, we are second-order observers.   Hollander mentions how historians work mostly with texts and other relics from the past so they are "second order observers, who observe how people from the past observed their own world." (Hollander, n.d., p.40) He adds that "Thomas Kuhn's *The Structure of Scientific Revolution* […] shows that even scientific observations are historical relative" and scientists are still struggling with "Kuhn's concept of paradigms."(p.55) Stichweh notes that "[m]odern science […] in all its cognitive operations always refers to observations by other scientists already published before."[13]

When reading Luhmann, it is not always clear as to what is being observed and who the observers are. (Luhmann, 2002, pp.94-96)[14]   Also, it can be difficult to ascertain where the philosophers or sociologists fit among the observed and the various levels of observer. However, he is very clear when answering his own question as to "how the world society can observe and describe itself and its environmental conditions given the enormous variety of living conditions, of cultural traditions, of political regimes" etc. The answer is that the observing and describing is done by the mass media (Luhmann, 2002, p.107). Indeed, the opening sentence in his book *The Reality of the Mass Media* is: "Whatever we know about our society, or indeed about the world in which we live, we know through the mass media." (Luhmann, 2000, p.1) The mass media are the first order observers and we do the second order observing via the newspapers, radio, television etc.

Luhmann provides us with a very rational, comprehensive, although often obscure, model of society. But he often steps outside this model to offer very incisive insights from a more pragmatic perspective as though taken from a higher level of observation.

Chapter Conclusion

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[13] Stichweh, Rudolph; *Niklas Luhmann*; http://www.fiw.uni-bonn.de/demokratieforschung/personen/stichweh/pdfs/81_stw_niklas-luhmann-blackwell-companion-to-major-social-theorists.pdf   [Accessed: 17th September 2016]

[14] This provides an example of the difficulty encountered in trying to identify the first order observer.

In this chapter I have given an overview of the main features of democracy as proposed by some of the leading theorists. They range from the theoretical to the very practical and it's this variety that gives democracy the flexibility to be successful and durable in many different environments. I have highlighted a number of aspects including the significance of active citizen participation in democracy about which there is wide disagreement; the important role of myth in politics which I believe is extremely important but is often overlooked or not accepted at all; the centrality of conflict in the political process which tends to be misunderstood; and bureaucracy, abstraction, the "tyranny of small decisions", and functional differentiation which I will be returning to throughout the thesis since these play a key role also in the discussions on ICT and in my overall thesis.

Chapter 3   Technology

Chapter Introduction

Opinion among the theorists is divided with some claiming that technology itself is neutral while others claim it is deterministic or autonomous. Another group take a 'middle way' approach based on an analysis of the historical and cultural contexts within which technology has developed since the Industrial Revolution and conclude that the development takes the form of a dialectical or synthesising process between humans and the technology.

In this chapter I outline some of the main theories on the development of technology generally together with some historical and cultural background that influenced the development. This includes a summary of Heidegger's essay "The Question Concerning Technology" which is a seminal work in the philosophy of technology.

3.1   Technology

Any philosophical analysis of ICT must start with technology itself. It is only in the last three decades or so that technology has become a significant issue for philosophy despite the impact it has on human existence, on nature and on the environment generally. The argument that this is because there wasn't an awareness of the full impact on living and social conditions until the mid-twentieth century doesn't stand up since the upheavals that accompanied the Industrial Revolution one and a half centuries earlier had, in many ways, a much greater impact. Another argument is that technology always followed science and was therefore regarded as 'applied science', an argument which was first challenged by Heidegger (Heidegger, 1977, p.23).

For Ihde, this argument about technology being applied science arises from the Platonist or idealist "classical mind-body arguments" in which science and technology are analogous to the mind and body respectively (Ihde, 1979, p.xxi). Smithurst gives some examples of the practice following the theory and also of cases where the two are intertwined and develop in parallel. In addition, some "devices are invented, but for the laboratory, for the purposes of theory, and to feed the inquisitiveness of discovery." (Smithurst, 1995, p.22) Then there is the clear case of the atom bomb which "sprang fully armed from the head of theory." (p.23) Generally, until the advent of modern science, the theory was derived from the practice but in the twentieth century the picture is more complex. As Smithurst concludes, the sciences themselves are interwoven - "[y]ou cannot have chemistry and mechanics and leave behind astronomy and geology" - and technology is interwoven with these (p.27).

In "The Question Concerning Technology", Heidegger seeks the essence of technology which, he emphasises, has to be distinguished from technology itself in the same way that the essence of *tree* "which pervades every tree, as tree, is not itself a tree." (Heidegger, 1977, p.4) So "the essence of technology is by no means anything technological." (p.4) He warns us against the danger of treating technology as something neutral since, in doing so, "we are delivered over to it in the worst possible way" and it "makes us utterly blind to the essence of technology." (p.4) He gives both an instrumental definition of modern technology, i.e. technology is a means to an end; and an anthropological definition, i.e. technology is a human activity, and notes that the instrumental definition is correct - which is not to imply that the anthropological definition is not correct - but it does not inform us as to the essence of technology. This leads to an analysis of the instrumental definition which concerns means and ends, in other words an analysis of causality and this leads Heidegger back to the Aristotelian doctrine of the four causes (p.6). But in reaching back to the these, he focuses on the term *aition* used by the Greeks, in place of the term *cause* which we use, and translates this as "that to which something else is indebted." (p.7) As a result, a silver chalice is indebted to the silver from which it's made and it is indebted to the aspect or form of chaliceness for its shape.   If the chalice is to be used for sacrificial rites, then this is its *telos,* the final cause, which Heidegger says is often misinterpreted as purpose or aim (p.8).

There is one other 'cause', the efficient cause which, in the case of the chalice, is the silversmith who "considers carefully and gathers together the three aforementioned ways of being responsible and indebted." (p.8)

Heidegger takes the analysis of German and classical Greek words further to avoid the danger of misinterpreting "being responsible and being indebted moralistically as a lapse, or […] in terms of effecting."   Instead, the four ways "are responsible for the silver chalice's lying ready before us as a sacrificial vessel."(p.9) They bring it into our presence. "They let it come forth into presencing." (p.9) He then introduces the term *occasioning* saying that "[i]t is in the sense of […] starting something on its way into arrival that being responsible is an occasioning or an inducing to go forward."   He concludes from this that "to occasion" is "the essence of causality thought as the Greeks thought it."

In a quote from Plato's Symposium, Heidegger links occasioning to poiēsis - "Every occasion for whatever passes over and goes forward into presencing from that which is not presencing is *poiēsis, is* bringing-forth." (p.10) This, however, does not agree with other translations in so far as those translations do not provide a direct link between occasioning or presencing and poiēsis which is critical to Heidegger's etymological chain.[15] Nevertheless, the chain of meaning is maintained. Poiēsis is explained in the relevant passage from Nehemas and Woodruff's translation as follows:

> "[E]verything that is responsible for creating something out of nothing is a kind of poetry; and so all creations of every craft and profession are themselves a kind of poetry, and everyone who practices a craft is a poet."

Heidegger distinguishes two types of poiēsis. One, 'physis' refers to an entity reproducing or "bringing-forth […] in itself" which occurs in nature and is similar to 'autopoiesis' mentioned earlier in the context of Luhmann's theory. In contrast, 'poiēsis en allōi' as in the 'bringing-forth' of the silver chalice, requires the intervention of the craftsman (Heidegger, 1977, pp.10-11).

Poiesis or bringing-forth into presencing can be also be regarded as the unconcealment or revealing of that which was previously concealed. This revealing is what the Romans called 'veritas' and we now call 'truth'(p.12). "Instrumentality is considered to be the fundamental characteristic of technology" (p.12) and therefore technology provides a means for the craftsman to reveal the truth.

Heidegger considers the origin of the word 'technology' and its derivation from the Greek word *'technikon'* which "means that which belongs to *technē"*(p.12) and the word *technē* was linked to the word *episteme,* both of which mean to be expert in a subject. Technē refers to the work and skills of the artisan in the case of the crafts and the poet or artist in the case of the fine arts. It relates directly to *poiēsis en allōi* which is the revealing or bringing forth of "whatever does not bring itself forth and does not yet lie here before us." He adds that what is revealed "can look and turn out now one way and now another" which can mean that the intermediary has choices as to the outcome (p.13). As an example, one who builds a house "reveals what is to be brought forth [and this] revealing gathers together in advance the aspect and matter of the house." Heidegger concludes that "what is decisive in *technē* does not lie at all in making or manipulating nor in the using of means, but rather in […] revealing. […] Technology is a mode of revealing."(p.13) He then considers whether this definition of technology, which is derived from Greek thought and certainly applies to the work of the craftsman, can also be applied to "modern machine-powered technology" which is very different since "it is based on modern physics as an exact science."(p.14) Noting that

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[15]The content of this translation does not agree with the content of the translation by Nehemas and Woodruff in Plato 1997, p.488 or of the translation by Fowler in Plato (1925) available at
http://www.perseus.tufts.edu/hopper/text?doc=Perseus%3Atext%3A1999.01.0174%3Atext%3DSym.%3Asecti
on%3D205c

the reverse applies also since physics is dependent on technology for laboratory and other experimental equipment, he states that modern technology is also a revealing "but not in the sense of *poiēsis."*

Modern technology is not a 'bringing-forth' but a 'challenging-forth'.   "The revealing that rules in modern technology is a challenging […] which puts to nature the unreasonable demand that it supply energy that can be extracted and stored as such." (p.14)   Heiddeger elaborates further on the revealing or challenging of modern technology saying that the energy in nature is unlocked, "what is unlocked is transformed, what is transformed is stored up, what is stored up is, in turn, distributed and what is distributed is switched about ever anew." (p.16)   What is stored is designated the "standing reserve" (p.17) which cannot be regarded simply as stock; it is something more since it reveals itself on being challenged.

Heidegger contrasts a windmill, where the wind turns the sails and uses the energy directly without storing it, (p.14) with a hydroelectric plant on the River Rhine.   Whereas the windmill is passive in allowing, with minimum interference, the wind to work the sails, the Rhine no longer flows freely as it is damned up, challenged, to control the flow and maximise the power to produce electricity. He compares the Rhine of the poet's artwork and the Rhine of the power works.   He goes further to assert that while "the Rhine is still a river in the landscape," it is so merely "as an object on call for inspection by a tour group ordered there by the vacation industry." (p.16)

The challenging is accomplished by man, but only at the beckoning of 'unconcealment' itself.   He can only respond to what addresses itself to him (p.18).   "[M]an drives technology forward [and] takes part in ordering as a way of revealing." People have a role, and perhaps some influence, in the ordering of the standing reserve but, as a human resource "commanded by profit-making", Heidegger asks, do they not also belong to the standing reserve? (p.18)   The challenging that provokes people to exploit nature, including the Earth, air, Sun etc., is called Enframing or, in German, *Gestell*, which Heidegger says is "the name for the essence of modern technology."(p.20) Enframing is not technology.   A machine and its parts such as wheels, rods, electronic components etc. can be classified as technology and they come into action in response "to the challenge of Enframing" (p.21) but Enframing "is itself nothing technological." (p.20)

Gestell is usually translated as 'frame' or 'bookrack' or some similar object in which things are stored in an orderly fashion for easy retrieval.   In this case it implies that whatever is revealed is to be ordered, sorted, configured, secured, regulated etc. as standing reserve.   "[M]an's ordering attitude and behaviour display themselves first in the rise of modern physics as an exact science." (p.21)   Heidegger labels modern physics the "herald of Enframing." (p.22)   Modern physics is concerned with forces and subatomic particles and therefore "its realm of representation remains inscrutable and incapable of being visualized." (p23)   In this realm it is difficult to see how the

doctrine of the four causes can be applied when "nature reports itself in some way or other that is identifiable through calculation and […] remains orderable as a system of information." (p.23) (Through modern science, nature becomes an abstraction and modern science also enables the technology to manage the abstraction.) We are "continually approaching the brink of the possibility of pursuing and pushing forward nothing but what is revealed in ordering, and of deriving all [our] standards on this basis." (p.26) In other words, we do not consider what cannot be measured. Failing to realise that we become part of the standing reserve, we become arrogant. Because of the predominant influence of science in defining and explaining our world, we miss the truth of what the world is. The danger is "that all revealing will be consumed in ordering and that everything will present itself only in the unconcealedness of standing-reserve."(p.33) Enframing conceals even itself.

Enframing presents a serious danger for humanity. This prompts Heidegger to quote the lines from Hölderlin:

> *"But where danger is, grows*
> *The saving power also."*

He takes from this the reassurance that "the essence of technology must harbour in itself the growth of the saving power." (p.28) This leads to a further investigation of what is meant by 'essence' in the context of enframing. Essence designates what something is. It distinguishes its main characteristic, its 'whatness'. Heidegger uses the example of different types of trees such as oak, ash, beech etc. They all share a common 'treeness'. "Under this inclusive genus - the "universal" - fall all real and possible trees." (p.29) If enframing were the essence of technology in the sense of genus as with trees, then every machine, tool or artefact of technology would be 'an enframing' just as any oak or ash is a tree. But enframing is not a genus, it is a way of revealing, of challenging, "which allots itself to man." (p.29) Heidegger is not explicit as to how its allots itself to man but according to Lovitt, his translator, "such a way of revealing is seen when *man* becomes subject, when from out of his consciousness he assumes dominion over everything outside himself, when he represents and objectifies and, in objectifying, begins to take control over everything." (p.xxix)

According to Heidegger, essence endures in the same manner as Plato's concept of *idea* endures. Enduring is therefore one of the characteristics of enframing. He then associates the term 'granting' with 'enduring' based on Goethe's use of the words interchangeably due to their phonetic similarity in German and adds that "*That which endures primally out of the earliest beginning is what grants.*" (p.31) What happens therefore is that while the 'challenging forth' element of enframing throws us into "the frenziedness of ordering" which prevents us from seeing the full truth revealed to us, the more primal granting allows us to endure so that at some time in the future we will enable and witness the coming to presence of truth (p.33). We will experience the full richness of technē where,

to borrow some of Cassirer's terms, the abstractions of language and science will be balanced by the intensifications of art (Cassirer, 1992, p.143).

Heidegger's essay has to be seen in the context of his philosophy of Being. It is summed up in Lovitt's interpretation that technology is "that phenomenon, ruled from out of Being itself, that is centrally determining all of Western history." (Heidegger, 1977, p.xxix) Some of his arguments appear weak. For example his argument swings from the pessimism arising from the danger of Enframing to the optimism of the 'saving power' based solely on the two lines from Hölderlin without providing any of Hölderlin's context. To identify the saving power, Heidegger relies on the association of different German and Greek words based on their meaning or phonetic formation and thus making parts of the essay as much a study in etymology as a study of technology. But the apparent weakness arises from his effort to avoid the trap he identifies in another essay, where a "countermovement […] necessarily remains, as does everything "anti," held fast in the essence of that over against which it moves." (p.61) He avoids the trap by writing in the expansive and imaginative style of the poet rather than following the strictly rational and calculative discipline of the logician or scientist.

Heim takes the implications of enframing a step further saying that "[t]he way technology enframes us affects our analysis of it, as it affects all reality apprehensions. At the same time, reciprocally, the way technology enframes, also depends on the way we construe our interface with it." (Heim, 1987, p.98)

As regards the primacy of technology over science, Heidegger says that although "mathematical physics arose almost two centuries before [modern] technology,[the latter] got under way only when it could be supported by exact physical science" and then quotes the Greek thinkers saying "[t]hat which is primally early shows itself only ultimately to men." (Heidegger, 1977, pp.21-22) Ihde notes that Heidegger "reveals a strongly romantic trait" in his preference for "traditional technologies over high-tech and complex technologies" and this may weaken his case but it "does not mitigate the early insights involving technology as a way of seeing." (Ihde, 1991, p.57)

Ihde supports Heidegger's position about technology preceding science but also claims that the belief in technology being merely applied science, although false, has had a profound effect on our assessment of, and probably therefore our relationship with, technology. Until recent decades, philosophy paid little attention to technology compared to the attention paid to science and when it did consider technology, the interpretation tended to be the idealist one, i.e. technology as applied science. By the time philosophy was taking technology seriously, concerns about the social and ethical impacts of technology were emerging and philosophy began to focus on these (Ihde, 1979, p.xxii). According to Ihde, these questions, "as urgent and as important as they are, deal with *effects* of technology rather than

examine the phenomenon itself." (p.xxiii)   We are therefore left with a lesser insight into technology itself than we have into science.

Idhe says that if we take technology to be applied science, then a "series of relations may be formalized thusly:

<div align="center">Science → Technology → Social Effect</div>

Here the original cause is science as concept; technology is its effect or application; and the ethical or social effect is the tertiary phenomenon." Therefore, in focusing on the social effects, we are merely focusing on a tertiary phenomenon.   "[T]he only radical way of treating any problems which arise at the end of the series as other than symptoms, would call for revision or change in the cause, in this case the *conceptual foundations of science* itself."(p.xxiii)

Ihde provides an analysis of how we relate to technology or, as he describes it, "a phenomenology of human-technology relations to discover the various structural features of those ambiguous relations" (Ihde, 2009, p.76) and he identifies four different types of relations - Embodied, Hermeneutic, Alterity and Background.

Embodied Relations: Ihde uses the wearing of glasses (spectacles) or the use of a telescope as examples of an embodiment relation. Here the technology comes between the "seer and the seen."(p.77)   One has to learn or take time to become familiar with the technology and the better the design, the easier this will be. As one becomes competent in its use, the technology becomes more transparent until one is almost oblivious to it - the technology 'withdraws' and the person is hardly aware that they are using it to experience the world. The technology almost becomes part of oneself, it's an extension of oneself.

The better the design, the greater the transparency and this can lead to "a wish for *total transparency*, total embodiment, for technology to truly "become me." Were this possible, it would be equivalent to there being no technology, for total transparency would *be* my body and senses." (p.78)

Hermeneutic Relations: Hermeneutic relations involve interpretation which usually requires the reading of an instrument, a text, an image or some other representation of an object, event or process.   Ihde uses the example of the Three Mile Island incident where a nuclear meltdown almost occurred due to a misreading of an instrument panel while it was impossible to observe directly the pile or the equipment where the problem was occurring.   In cases such as this the "immediate *perceptual* focus of the [observer's] experience *is* the control panel" but the reading on the panel "is now dependent upon the semi-opaque connection between the instruments and the referent object (the pile)." (p.84-85) Another

example would be the temperature gauge in a car. The gauge gives the exact temperature of the engine without the observer being able to experience it directly.

Map reading is another example. In this case the reader is focused on the map but the map "retains a representational isomorphism with the natural features of the landscape […] there is a kind of representational 'transparency' [which] 'refers' beyond itself to what it represents." (p.83)

Ihde provides a range of examples where perception is increasingly mediated by gradually more sophisticated technologies. In the case of spectrographic astronomy, for example, it doesn't provide any spatial representation of a star but "merely a band of differently colored rainbow stripes." The star is "mediated not only instrumentally but in a transformation such that we must now thematically *read* the result. And only the informed reader can do the reading." A further transformation is possible by converting the output of the spectrograph to digital (pp.88-89).

In discussing hermeneutics, Ihde considers shamanism and the interpretation of bones, entrails etc. and notes that this is "close to a familiar association between magic and the origins of technology suggested by many writers." He suggests that while the hermeneutic relations in this primitive practice have many shortcomings especially in detecting specific bodily ailments, the emphasis is on diagnosing underlying communal or social problems. "The sometimes socially contextless emphasis of Western medicine upon a presumably 'mechanical' body may overlook precisely the context which the shaman so clearly recognises."(p.87) There is a contextual similarity between this and Heidegger's thinking in relation to technology as "a revealing."

Alterity Relations: Ihde borrows the term 'alterity' from Levinas who spoke of "the radical difference posed to any human by another human, an *other"* (p.90) in a face-to-face encounter. We can have an embodiment relation with technology when the equipment we are using seems so much part of us that we do not even notice it explicitly. However, if the equipment is unusable because it is missing or damaged, then we become very much aware of it, of its *othernesss* (Heidegger, 1962, p.105). We see it in opposition to us, or as a competitor. An example would be a computer or a piece of software with which someone is very familiar and which they 'love' using, but when it breaks down, "this quasi-love relationship reveals it quasi-hate underside." He adds that hacking "becomes the game-like competition in which an entire system is the alterity correlate." (Ihde, 2009, p.92) This sense of the technological competitor can also be found in various types of computer games.

Backround Relations: This applies to technologies that are in the background and "texture the immediate environment."(p.95) Lighting and heating systems are examples of background technology. Cookers, washing machines and other automatic appliances which although they have to be turned on

and off or readjusted regularly, work most of the time without interference and one often becomes aware of the sound of them only when they stop and go silent.

3.2   Technological Neutrality

In its traditional or Aristotelian conception, technology is seen not as "an end in itself but simply as a means to some further end. [It] is as it were extrinsic to man's nature." (Hood, 1983, p.347) This is a definition of 'neutral' technology. Traditional tools such as the hammer and the handsaw are neutral - they cannot work independently of an operator, they must be moved and guided at all times. They are "subservient to human choices" and are "neutral with respect to values and purposes" and because of this they tend to be very versatile and practical (Kaplan, 2009, p.xvi). To quote Heim, "the tool may alter the conditions under which we live, it does not itself become a condition under which we live, as does, for instance, the network of highways we traverse with automobiles." (Heim, 1987, p.33) Kaplan equates neutrality with instrumentality since he uses both terms to designate value-free technology (Kaplan, 2009, p.xvi).

Most, if not all, hand tools fall into the neutral category. Machines are not as easy to categorise. According to Mumford "the essential distinction between a machine and a tool lies in the degree of independence in the operation from the skill and motive power of the operator; the tool lends itself to manipulation, the machine to automatic action." (Ingold, 2000, p.300) However, as he indicates, the distinction - and perhaps also the neutrality - is a matter of degree. The traditional pedal-operated lathe is totally dependent on the direct input of the operator for both motive power and guidance. The electric lathe is dependent on the operator for guidance only whereas the stencil lathe which copies patterns has no direct input from the operator for either motive power or guidance.

For Heidegger, the significant distinction is that between traditional and modern technology. As mentioned above, he defines all technology as a way of revealing where, in the case of traditional art and craft technologies, the resulting output or artefact reveals itself (poiēsis). In the case of modern technology, the revealing is brought about through a challenging or demanding of nature. As an example he contrasts the windmill with the damn on the river. The windmill could be considered a machine under Mumford's definition but in harnessing the wind to provide energy, it does so in a passive manner. It allows the wind to turn its sails but "they are left entirely to the wind's blowing." (Heidegger, 1977, p.14) The windmill doesn't really interfere with nature. The damn, on the other hand, as a modern technology challenges the river to produce energy by blocking it up and controlling its flow (p.16).

Both the windmill and the damn could be considered non-neutral since they are not versatile in that they serve only one purpose or end.   Alternatively, the windmill could be considered neutral since it interferes only very minimally with nature or with its environment.

Some will still argue today that all technology is neutral, that it is ultimately under the control of humans who determine its output and is therefore but a means.

3.3   Technological Determinism

Kaplan defines technological determinism as "the idea that technology drives the course of history" and this is reflected, he says, in the references to various periods as the Iron Age, the Industrial Revolution and the Information Age.   "Technology *imposes* on a society specific social-political consequences. […S]ociety responds more to technology than technology responds to society." (Kaplan, 2009, pp. xvi-xvii) This, he classifies as strong determinism whereas a technology such as email that merely *influences* social relations would be an example of weak determinism since it did not cause social change but "had a profound influence on the way we communicate."   The terms hard and soft determinism are sometimes used instead.

As an illustration of how technology can shape society, Dusek quotes the example of the feudal system in Europe which developed from the need to provide support for the mounted armoured knight and his emergence, in turn, was made possible by the introduction of the stirrup (although he adds that historians might argue about the details of this). He expresses the view, however, that "in most cases there is an inextricable feedback from technology to culture and from culture to technology." (Dusek, 2006, p.85)

For Sclove, technology is influential but not determining since "there is always a margin of flexibility in how existing technological artifacts may be used or operated." (Sclove, 1995, p.17)   The margin, however, is finite and varies with the technology and the timing.   He quotes, as an example, the installation of running water in the houses in the small Spanish village of Ibieca in the 1970s which brought to an end the social interactions that took place and strong bonds that existed between the women, children and men as they gathered throughout each day at the village fountain and washbasin. The introduction of running water and washing machines did not prevent them from gathering but the technology did alter "the system of inducements and interdependencies that formerly made such gathering occur naturally." (pp.3,17)   Some would take a stronger deterministic line and identify technological processes as "the equivalent of a form of law […] as a binding expression of social norms and values" which everyone is obliged to accept.(p.11) What is particularly significant is that many of

the modern technologies exert a structural social influence even on non-users of those same technologies (pp.14-15).

Sclove mentions a number of factors that would support the deterministic view of modern technology. Many of these relate not to the focal, or intended, effects of technology but to the non-focal or secondary effects and these are likely to include negative environmental effects such as pollution and the depletion of natural resources or social effects such as unemployment (p.10). Also, modern technologies such as the worldwide web tend to be dependent on other technologies and systems such as the electricity supply system. Other systems such as communications and travel systems which would have been dependent on the electricity supply system now become dependent on the web also. As a result, these systems and technologies become integrated and interdependent and their development is therefore irreversible (p.19). The interdependencies extend to more and more systems and the individual technologies "are designed so that they deliver their focal results in experiential abstraction from the countless other sociotechnical structures and processes required to bring them about." (p.103)

Because the interdependencies are not always obvious and the different systems or technologies cannot be clearly delineated, then the relationships are probably better described as entanglement rather than interdependence. Entanglement also sums up the situation outlined by Sclove where "adverse externalities can […] perversely inhibit adoption […] of alternative technologies that would reduce production of the initial harm." He mentions, as an example, that "the pollution, noise and danger of cars" inhibits one from the alternative of using the non-polluting bicycle (p.166). In the broader context he says that "the entire ensemble of modern technological systems - including the background conditions required to keep them operating - tends to promote centrally coordinated, technocratic social administration." (p.16) It is not just the complexity and the spread of these systems that causes the drive towards centralisation. When, for example, tensions or conflicts reflecting an element of NIMBYISM[16] arise between local communities over proposals to locate some infrastructure such as high-tension power lines, gas pipelines or sewage plants, in one of their areas, these conflicts "will tend to elicit the involvement of high-level political institutions" thereby denying the local communities the hands-on experience of democratic politics.

The most significant developments in society and culture arose from the technology of writing and, later on, the printing press. Writing, according to Ong, "was and is the most momentous of all human technological inventions." (Ong, 1982, p.85)[17] The phonetic alphabet, as perfected by the Greeks, "was

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[16] Not In My BackYard

[17] In relation to philosophy itself, Ong raises the question that if it "is reflective about its own nature, what is it to make of the fact that philosophical thinking cannot be carried on by the unaided human mind but only by

democratizing in the sense that it was easy for everyone to learn. It was also internationalizing in that it provided a way of processing even foreign tongues." (p.90) McLuhan highlights the fact that the alphabet, "when combined with papyrus, […] spelled the end of the stationary temple bureaucracies and the priestly monopolies of knowledge and power." (McLuhan, 1967, p.92)

During the Homeric period prior to the invention of writing, the poets and druids were the guardians of civilisation and culture. Their encyclopaedic knowledge and formulas for memorisation and recitation, were developed for the "preservation of a magisterial tradition" and they enjoyed a command over education and government, which was lost as soon as alphabetic literacy was placed at the disposal of political power." (Havelock, 1963, p.94) This was, of course, the basis of Plato's antagonism against the poets.

Over two millennia after the invention of writing and when knowledge and power were again monopolised by the Church and other autocracies, the introduction of Gutenbergh's printing press with movable type helped to break the power of these institutions and was instrumental in the development of the Renaissance, the Reformation, the Enlightenment and all that followed.   While the invention of the phonetic alphabet and the printing press resulted in a redistribution of power, they also resulted in a diminution of sensibility since "the eye has none of the delicacy of the ear" (McLuhan, 1962, p.27) and in greater specialisation although Steiner questions whether these were the effects or the causes (Steiner, 1985, p.285).

If technological determinism is a fact - if changes can be effected in society through the medium of technology, then technology can become a powerful political, economic and cultural weapon as some of the examples above demonstrate.

3.4   Autonomous Technology

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the human mind that has familiarized itself with and deeply interiorized the technology of writing." (Ong, 1982, p.173)[17]

To say that technology is autonomous is to say that it is independent of human control in both its operation and development. Technology is invented, developed and operated by humans but they do not control it. Autonomous technology "generally presupposes technological determinism." (Dusek, 2006, p.84)[18] Jacques Ellul, who published his paper *The Technological Order* (Mitcham & Mackey, 1983, pp.86-105) in 1963 is the person most closely associated with the term 'autonomous technology'.

Ellul claims that humans, although they exploit technology,[19] are "to an ever greater degree the object[s] of certain techniques and their procedures" and he lists as examples, pedagogical techniques, psychotechniques, intelligence testing and others (p.88). While these techniques are administered by other humans, these people are, in turn, exploited by still other techniques.

Ellul counters the argument that ultimately technology contributes to the happiness of the individual, by emphasising the distinction between happiness and freedom. To be free is to be the subject rather than object and consequently to have the freedom to decide the direction of technological development and to master the technology. But people cannot be masters of technology; they cannot impose values on it and any values that exist in the technological society "are simply there to justify what is; *or* they are generalities without consequence; *or* technical progress realizes them automatically as a matter of course."(p.89)

Those who would be seen as the likely people to put humans in command of technology - to make them subjects rather than objects - are not, according to Ellul, capable of doing so. They include the philosophers who have but a small influence on society; the technicians who "cannot make the slightest claim to have mastered any technique but [their] own"; the scientists who are too specialised and naive when it comes to considering the more general issues and the politicians who are subject to the electorate who, in turn, "are primarily concerned with the happiness and wellbeing which they think [technology] assures them."

Ellul examines the possibility of a new civilisation which is inclusive of technology and concludes it is not possible because:

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[18] Dusek also says that "technological determinism does not, on the face of it, presuppose autonomous technology" but adds that this is undermined if one accepts the argument that "science has a logic of its own," as Heilbroner claims and that "technology is applied science" which is at variance with Heidegger.

[19] Ellul uses the French term 'Technique' rather than 'technology'. There is confusion over the translation of 'La Technique' but it is taken here as 'technology' i.e. any form of rationalised methodology. (See Stephen J. Kline - What is Technology - Scharff & Dusek 2003)

- "When [technology] displays any interest in man, it does so by converting him into a material object." The technically quantitative takes over from the humanly qualitative (p.90).

- Technical growth has brought us to a point where "we are confronted for the first time with the possibility of the annihilation of all life on earth, since we have the means to accomplish it. In every sphere of action we are faced with just such absolute possibilities." Governments have absolute power in amalgamating "organizational, psychological, and police techniques [….and] when power becomes absolute, values disappear."

- Technology brings with it "a necessary order and a determinate process […] which freedom, unorthodoxy, and the sphere of the gratuitous and the spontaneous cannot penetrate." (p.91)

In examining the problems posed by technology, Ellul highlights some of the impediments to addressing them. These include the tendency "to consider technology something possessing sacred character" and technical progress as one of humanity's supreme achievements rather than as "a commonplace fabrication of certain objects". People must not become too attached to technical objects or take even their "most imposing technical conquests" too seriously. They must overcome their natural inertia that "is leading [them] to accept a condition of slavery and to pay for [their] technological happiness with [their] freedom." (p.96)

Among the other specific problems identified by Ellul is that of unemployment. While assurances are given that in the long run technical progress will provide greater opportunities for employment, he expresses concern that the interim unemployment is not taken more seriously. Even if it's only short-lived, interim unemployment can have far-reaching consequences for individual workers due to displacement. For example, while Ireland has been very successful in building up a large hi-tech production sector since the late 1960s, interim unemployment at various times has resulted in large numbers of people emigrating for work, many of them never to return. Whatever the outcome, the technology takes precedence over the human.

Ellul refers to Nef's work on the effect of industrial development on war (Nef, 1950) particularly in relation to the level of abstraction or detachment which technology allows us. Technology removes "the anguish implied in the act of killing people [..and..] all the tiresome difficulties of conscience about the evil of murder." This is analogous to defamation posted anonymously on the web.

Although he was writing over fifty years ago, Ellul focuses on aspects of technology which have become particularly relevant in the 'information age'. He describes technology as a milieu in which we have

to exist, one which supplants the old milieu of nature. This milieu, he says, is artificial; is "autonomous with respect to values, ideas and the state"; is a self-determining, closed organisation which "is formed by an accumulation of means which have established primacy over ends [and which] grows according to a process which is causal and not directed to ends."   All parts of the technical milieu are "mutually implicated to such a degree that it is impossible to separate them or to settle any technical problem in isolation." (Mitcham & Mackey, 1983, p.86)

The technical milieu is somewhat similar to, if not identical with, Luhmann's idea of the environment since Ellul says that "all social systems are situated in it […] a novel situation modifying all traditional social concepts."   The political system, for example, "is not modified by [technology] as one factor among others which operate upon it; the political world is today *defined* through its relation to the technological society." (p.86)

Dusek says that autonomous technology is "independent of human control or decision [and] is claimed to have a logic of its own or, more metaphorically, technology has a life of its own." (Dusek, 2006, p.105) For Kelly, however, there is no metaphor - technology has a life of its own. Because the term *technology* tends to refer to specific categories such as information technology, biotechnology etc., he coined the term *technium* to refer to a broader field and include hardware and "culture, art, social institutions and intellectual creations of all types.   It includes intangibles like software, law, and philosophical concepts.   And most important, it includes the generative impulses of our inventions to encourage more tool making, more technology invention, and more self-enhancing connections." (Kelly, 2010, pp.11-12) Kelly relates the term *technium* to the German word *technik* and the French term *la technique* which, significantly, is the term Ellul used.

Kelly defines autonomous entities as ones which display "any of these traits; self-repair, self-defense, self-maintenance […] self-control of goals, self-improvement." (p.13)   The technium is one of these entities and can "be understood as a type of evolutionary life."(p.45) He claims "[we] are coevolving with our technology" ever since the mind "liberated by language […] transcended the constraints of nature" (p.37) although he emphasises that "technology predated humans, appearing in primates and even earlier."(p.43) He outlines the "three evolutionary vectors in life." These are the structural aspect which is inevitable and is based on the laws of physics; the historical aspect which is contingent and includes those accidents and "circumstantial opportunities that bend the course of evolution; and the adaptive aspect which focuses on survival and is represented by natural selection. (p.182) The structural and historical vectors also apply to technological evolution.   However, while in biological life the adaptive function is unconscious, that is "there is no designer, but in the technium there is an intelligent designer – Sapiens." It is therefore "open to free will and choice" (p.183) but Kelly also says that "technology begins with the Sapien mind but soon transcends it" with "additional forces" (p.57)

influencing it such as "exotropy" or negative entropy which he relates to information and increasing order (pp.57-69). He says the technium is driven by what "we try to direct it to do" but it is also driven by its own requirements "to sort itself out, to self-assemble into hierarchical levels,[…] to perpetuate itself" and as it develops these requirements "are gaining in complexity and force."(p.15) In this he is reflecting on, or projecting from, von Neumann's statement that "technology will […] increasingly turn from problems of intensity, substance, and energy, to problems of structure, organization, information, and control." (p.41)

While some of his arguments for this coevolution are weak, if not indeed ambiguous and lacking clarity, Kelly's most compelling argument is based on the notion that most developments or new ideas in technology "are disjointed ideas merged." Ideas do not come alone but "come woven in a web of auxiliary ideas, consequential notions, supporting concepts, foundational assumptions, side effects, and logical consequences and a cascade of subsequent possibilities." (pp.44-45) In other words, scientists and inventors are working from a pool of common knowledge and experience. As a result, it often happens that a number of people independently arrive at the same conclusions or come up with similar theories. Examples include Darwin and Wallace independently arriving at the theory of evolution through natural selection, or Einstein and Lorentz arriving at similar conclusions regarding relativity. The parallels between Kelly's technium and Teilhard de Chardin's Omega Point (Teilhard de Chardin, 1974, pp. 23-56) in terms of increasing complexity, organisation and consciousness, are probably another example of similar thought patterns working independently in different fields but arriving at comparable conclusions.

The concept of new ideas developing from the merging of existing ideas is termed *combinatorial evolution* (Arthur, 2009, p.18) by Arthur and he refers back to the influence of Schumpeter writing in 1910 that "to produce, means to combine materials and forces within reach […] To produce other things, or the same things by a different method, means to combine these materials and forces differently."(p.19) This seems very obvious and should not require further explanation but for the fact that scientists, in many cases, tend to prefer the image of the 'lone scientist' rather than acknowledging that even when working independently of one another they are still drawing on a common set of ideas and therefore a number of them are likely to arrive at similar conclusions or make similar discoveries. The risk that one of their discoveries happens to be only a rediscovery of something that was found previously, is an occupational hazard and an occasion "for acute stress." (Merton, 1973, p.377)

Merton rejects the idea of the lone scientist and distinguishes between the local milieux of the scientist and the larger "community of scientists [which] is a dispersed rather than a geographically compact collectivity" He says that while scientists may be remote from one another, "they are responding to much the same social and intellectual forces that impinge upon them all [including] environing

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structures of values, social relations, and socially as well as intellectually induced foci of attention." (pp.373-376) Merton notes that this was highlighted by Bacon in his *Novum Organum* published in 1620. He also says that Bacon "wholly rejected the notion that in the new science, discoveries would typically appear at random [but] once the right path is followed, discoveries in limitless number will arise from the growing stock of knowledge: it is a process of once fitful and now steady increments in knowledge." (p.346)

The fact that multiple instances of the same or similar discoveries occur in science or technology arising from a common pool of knowledge supports the deterministic and autonomous theories of technology since they highlight a particular trend or direction. Merton's primary concern, however, is to show that there is value in having multiple discoveries or at least in maintaining an environment where this is likely to happen. Others may believe that all but one of the 'discoverers' are redundant and might restrict the granting of funds to eliminate this wasteful duplication. This would seem the rational and efficient thing to do but while 'redundant' can mean abundant or plentiful, it can also mean "superfluous, that which can be *safely* done away with." Merton advocates using the "more differentiated concept of redundancy [which] is relative and statistical [and] recognizes that efficiency increases the prospect of error [while] redundancy (or reduced efficiency) makes for safety from error. [Therefore] a functionally optimum amount of redundancy under specified conditions [is] that amount which will approximate a maximum probability of achieving the wanted outcome but no so great an amount that the last increment will fail appreciably to enlarge that probability."(pp.378-380) Multiple discoveries validate one another and reflect an environment that provides a greater probability for the advance of science and technology. One has to deduce from this that the more economically efficient the management of the research effort, the less likely the discoveries that will advance science and technology.

In discussing the "role of scientific genius in the development of science", Merton says that "men of scientific genius are precisely those whose discoveries, had they remained contemporaneously unknown, would eventually be rediscovered. *But* these rediscoveries would be made not by a single scientist but by an aggregate of scientists." (p.381) He is saying, in effect, that the development of science and technology is deterministic and autonomous unless it is constrained by funding mechanisms.

Science and technology build on what has gone before. This provides the conditions to allow the amount of scientific and technological discoveries, the range of technological devices, and the pace of development to increase exponentially. But while this can happen based on quantity alone, the quality of the devices is also changing to allow the process of development to accelerate even more. As development moves from heavy machinery towards light miniature devices, more and more of these

devices can become components of other devices - electronic clocks and GPSs being typical examples. The clock and the GPS themselves are a combination of other components so there is a great deal of recursion in the assembly of modern devices and this contributes further to the rate of development of technology. Arthur hints that "all technologies stand by for use as potential components within other new technologies",(Arthur, 2009, p.42) a sentiment that would resonate with Heidegger.

Since any new technology is "the culmination of a progression of previous devices, inventions and understandings", it is supported by "a pyramid of causality that leads to it."(p.124) Arthur says that despite this, the emergence of any new technology is not predetermined. Nevertheless, he claims that since "all inventions are supported by a pyramid of causality […] an invention tends to show up when the pieces necessary for it, and the need for it, fall into place."(p.125) Kelley, thinking along similar lines suggests that the emergence of the new technology is inevitable; "[if] inventor X does not produce it, inventor Y will. But the step will come in the right sequence."(Kelly, 2010, p.138)

Heilbroner, in addressing the question "do machines make history?" (Heilbroner, 1967, in Scharff & Dusek, 2003 pp.398-404) says that "technical evolution follows a sequential and determinate rather than random course." This is borne out by the fact that it is possible" to make *general* predictions of technological capability twenty-five or even fifty years ahead." Like nature, technology evolves incrementally, not in sudden leaps (p.399). The development of technology is controlled by both the "stock of available knowledge of an age" and the "material competence of the age" – the latter being the general competence and available technology to manufacture or fabricate the components needed to assemble the new technology (p.400).

One has to take into account here the conclusion of William Ogburn who was one of the first to consider this issue in depth:

> "[T]he more one studies the relationship between mechanical and social inventions, the more interrelated they seem. Civilization is a complex of interconnections between social institutions and customs, on the one hand, and technology and science, on the other. The whole interconnected mass is in motion. When each part is in motion and banging up against some other part, the question of origins seems artificial and unrealistic. If one pushes the question to the extreme, origins are lost in a maze of causative factors." (Ogburn, 1964, pp. 132-133)[20]

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[20] This extract is from Chapter 11 'Technology and Governmental Change' which was originally published in The Journal of Business of the University of Chicago, IX, No.1, January 1936.

There is no disputing that the pace of development of technology accelerated significantly in the late eighteenth and into the nineteenth century. This would have marked the beginning of *modern* technology. For Heilbroner, it was the emergence of the market economy based on private property, i.e. capitalism, which provided society with the focus for the first time around by which to develop technology and the focus in this case was production. Hence the replacement of the craft system by industrial technology and the factory system. This development was helped and reinforced by the rapid and parallel development of science. As a result, the continuous and rapid advances in technology and their diffusion throughout "assume the attributes of autonomous process, "mysteriously" generated by society and thrust upon its members in a manner indifferent as it is imperious." This, Heilbroner says, is the reason why it is so difficult to contest the idea of technological determinism (Heilbroner, 1967, pp.402-403 in Scharff & Dusek, 2003).

As mentioned earlier, Heilbroner is concerned with the relationship between history and machines. With regard to technological determinism, he says it is "peculiarly a problem of a certain historic epoch - specifically that of high capitalism and low socialism - in which the forces of technical change have been unleased *(sic),* but when the agencies for the control or guidance of technology are still rudimentary." He believes this will remain a problem until the controls over technology are greatly strengthened. One has to bear in mind that he was writing in 1963 but his contention that "[The] surrender of society to the free play of market forces is now on the wane, but its subservience to the impetus of the scientific ethos is on the rise", is now even more valid.

A significant feature of the technology development cycles is that in many cases the newer enhanced model of a particular technology will not continue some of the facilities on the earlier models so obsolescence is introduced. Take music audio technology, for example. The cassette tape was introduced while vinyl records were dominating the market. Some years later the music CD was introduced. At this stage vinyl was withdrawn gradually from the market. Then with the introduction of the iPod and iTunes, downloads came into widespread use. At this point, the cassette tape was withdrawn. Technology for home recording which had been easy to use and very convenient became scarce and in most cases unavailable and downloads (MP3 or Apple) came near to monopolising the market.

Behind the above developments was a major shift in the technology from HiFi equipment with significant high-precision mechanical elements to completely electronic equipment which is smaller, usually portable, probably cheaper but also provides much stronger copyright protection. At another level, these developments led to the closure of many local music shops; redundancy for many highly specialised technicians and in some cases, less control for users over their music libraries as the 'technology' updates or amends the software on a regular basis.

In this example of music audio, we can identify a development cycle, but is it a technological or an economic cycle, or both, or how do they relate to one another or, in this context, are they the same thing? This is what Schumpeter calls a "process of industrial mutation [that] revolutionizes the economic structure *from within*." It is an example of a process of "Creative Destruction" which he says is an essential element of capitalism and is put in train by competition from a new commodity or new technology or a new source of supply etc. "which strikes not at the margins of the profits and the outputs of the existing firms but at their foundations." (Schumpeter, 1987, pp.83-84) This is a revolution which, Schumpeter says, marks the beginning of the business cycle and once this has taken place, the effects of the new technology or other phenomenon are absorbed over a period until the next revolution begins. There are strong similarities between this and the pattern of Kuhn's "scientific revolutions" where a new discovery - e.g. X-rays - undermines the existing paradigm, thus "violating deeply entrenched expectations" and then requires a long period of assimilation or "mopping-up" before the next revolution (Kuhn, 1970, pp.24,59,64).

3.5   Technological Development from a Historical and Cultural Perspective

Perez elaborates on Schumpeter's model of creative destruction. She identifies five technological revolutions that have occurred since the latter half of the eighteenth century (Perez, 2003, p.11). These were:

1. The Industrial Revolution beginning with the first mechanised textile mill in 1771.
2. The Age of Steam marked by the first run of the 'Rocket' steam engine in 1829.
3. The Age of Steel, Electricity and Heavy Engineering following the opening of the Carnegie Bessemer Steel Plant in 1875.
4. The Age of Oil, the Car and Mass Production signalled by the first Ford Model-T in 1908.
5. The Age of ICT following the development of the Intel microprocessor in 1971.

Each of these revolutions led to what was largely the replacement of an existing technology or economic model over the subsequent half century or so. For example, the mechanised mill gradually replaced the craft system of textile production; the steam engine replaced the horse and carriage and steel replaced wrought iron. But these technological developments brought with them economic, social and organisational restructuring.

Each revolution goes through four stages after the initial 'gestation period' for the new technology. The first phase, the 'irruption phase', is marked by the appearance of new products and industries, (p.30) a lot of innovations and explosive growth. But there is also the displacement of old industries

accompanied by rising unemployment.   This is followed by the 'frenzy phase' in which there is "a flourishing of the new industries" and the development of infrastructure to such an extent that production runs well ahead of demand and the market is saturated. There is also an intensive investment of financial capital which causes a financial bubble and crash as the "paper economy decouples from the real economy, finance decouples from production while there is a growing rift between the forces in the economy and the regulatory framework, turned impotent." (p.50)

The crash and the resulting political and social unrest lead to a reassessment of "the excesses as well as the unsustainability of recent practices and trends, however wonderful they may have seemed until then." (p.52)   Perez sums up the installation period as "a huge trial and error process" in which "the engineers, the entrepreneurs, the consumers and the financiers test the various directions of development of the technological revolution." (p.103)   Following the completion of the installation period there is a potential turning point into the deployment period which, Perez says, "has to do with the balance between individual and social interests within capitalism."   Choices have to be made regarding the implementation of new regulatory frameworks "to put order in financial markets and to move towards full market expansion and greater social cohesion." (pp.51-52) If these are implemented, a "synergy phase" gets underway which is characterised by economic expansion, business confidence, near-full employment,   greater social cohesion, and "the reign of the 'middle class.'" (p.54)

In the final phase - the maturity phase - markets show signs of saturation, profits are tightening, and mergers and acquisitions become more frequent. The technologies have matured and their product life-cycles have shortened. Sources of innovation are becoming scarce. Evidence of increasing social unrest begins to appear due to capitalism "showing too much capacity for wealth creation and not distributing enough." (p.55) As a result, the door is opening for new technologies to come on the scene and the next revolution to begin, a process which is encouraged by the large pools of idle financial capital which have accumulated during the existing revolution and are now searching for new opportunities.   The entrepreneurs behind this capital are willing to take significant risks in the hope of high returns through investments in a new class of innovative technologies.   This represents a paradigm shift from the existing to the new technologies.   It is possible that the development of these new technologies may have been blocked because they were "incompatible or not well geared" to the existing paradigm (p.28).

According to Arthur, as technology accumulates "it creates the structure of the economy and the economy mediates the creation of novel technology (and therefore its own creation)" by deciding which technologies will enter the economy. The economy "emerges from its technologies". He says that it is only in the longer term of decades that one can detect this pattern of "continual creation and re-creation of the economy." (Arthur, 2009, p.194)

Because new technology is built from pre-existing technology, Arthur asserts that it is self-producing although with some human agency through inventors and developers.   He says technology is alive but "only in the sense that a coral reef is living [,….] it still requires human agency for its buildout and reproduction." (p.189)   He also tells us that technology can be described as autopoietic and concludes from this that "every novel technology is created from existing ones […] in a succession that goes back to the earliest phenomena that humans captured" and that "all future technologies will derive from those that now exist."   Also, "if technologies had appeared by chance in a different order, the technologies built from them would have been different." (p.170)

Kelly provides an example of how our modern technologies are determined by ideas and criteria passed down through a succession of previous technologies over two millenia in a story which, he says "is basically true."   The rocket engines on the US space shuttle had to be within a diameter of 4' 8.5" since they had to be transported by train. The width allowed by the train was determined by the rail gauge and back from this there is a succession of causality through the width of horse carriages, to the road width in Britain, the Roman road width, the width of a chariot, to the width of two war horses (Kelly, 2010, p.180).

Feenberg rejects the idea of technological determinism, at least by implication since it is difficult to find an explicit statement to this effect. He claims that current theories relating to technology in society "presuppose a form of technological determinism which is refuted by historical and sociological arguments." (Feenberg, in Feenberg & Hannay, 1995, p.4)   However, he advocates what he calls *subversive rationalization* but this is effectively an acceptance of technological determinism. By this he means that society can influence the development and impact of technology but this is to accept rather than reject technology in each instance; we should work within the technology sphere rather than from outside it.

One of the examples used by Feenberg is the introduction of legislation in the 1840s in England to control the use of child labour in factories, and the disputes surrounding this.   There was much opposition to the legislation particularly from the factory owners who claimed the move was inflationary.   The children were sent to school rather than to the factories and "[c]onsequently, they entered the labor market with higher levels of skill and discipline that were soon presupposed by technological design." (pp.7-8) This was obviously a very significant improvement in the social conditions for children. However, other issues are overlooked.   Women and children were employed because their labour was far cheaper than that of the craft workers they displaced during the previous half century and who, generally, remained unemployed.   This is an example of the interim unemployment about which Ellul was concerned. Also, if we were to consider the different aspects of

this development, we would see that the social agenda benefitted in some cases and not in others, whereas the technology agenda always benefitted in the long run.

Feenberg also quotes the example of regulations introduced in the US in the middle of the eighteenth century to set standards for the design of boilers in steamboats.   There had been thousands of casualties, many of them fatal, over the previous few decades due to "bursting boilers." (p.14) New standards and regulations were introduced and the number of casualties was reduced very significantly. This brings out an interesting phenomenon which is much more prevalent today with the huge increase in regulation.   The technical issue of the bursting boilers was identified as a social issue to be addressed by regulation which is essentially bureaucratic rationalisation so the social issue is sandwiched between two rational, i.e. technical, phenomena.

The problem with our approach to technology, as Feenberg sees it, is the emphasis on the function or 'goal' rather than the meaning of the technology.   He says that technology "is generally excluded from humanistic study [because we] are assured that its essence lies in a technically explainable function rather than a hermeneutically interpretable meaning [...but the...] concept of "goal" strips technology bare of social contexts, focusing engineers and managers on just what they need to know to do their job." (pp.8-9) He believes there are great opportunities to have the meaning better understood and the social element introduced into the technical design process or into later redesigns. He notes the particular case of the computer with regard to its goal: "progress of a generalized sort in speed, power, and memory goes on apace while corporate planners struggle with the question of what it is all for." (p.9)

Other examples quoted by Feenberg include the introduction of the Teletel service in France in the early 1980s.   The objective was to have a 'Minitel' terminal supplied to each home in the country through which information would be provided by different state services. However, due to the work of some hackers, it was discovered that users could send messages to one another and so what was intended as an information delivery system for government was turned into a very successful messaging system for citizens (Feenberg, 1995, pp.144-166). This is an example of subversive rationalisation, it marks a democratising of the technology.   He also mentions what in his view are effective protests or struggles in relations to nuclear power plants, toxic waste disposal and the "political demands for regulation of reproductive technologies." (Feenberg, in Feenberg & Hannay, 1995, p.19)   The success of these is not based so much on legal rights as on a mobilisation of opinion to resist "a specifically technological hegemony."(p.18)

The disputes and disagreements about options regarding technology are particularly acute when environmental issues are involved as in choices between "environmentally sound technology vs.

prosperity [or] workers' satisfaction and control vs. productivity."   We are faced with dilemmas but "what we need are syntheses."(p.13)   Feenberg believes that such syntheses can be facilitated by technology if enough effort goes into the design to accommodate all the relevant inputs.   However, he says that a capitalist society militates against this for reasons which are probably best articulated by Henderson who noted that, following the Exxon Valdez oil spill off Alaska in 1989, which is considered one of the worst 'man-made' environmental disasters, the "costs of the clean-up [were] added to GNP instead of being subtracted. […] GNP ignores the value of clean water, fish and pristine scenic environments." (Henderson, 1991, p.202) Luhmann expresses a similar view when, with regard to the environment, he questions whether "the language of the medium of money as such offers an adequate form of expressing and reacting to [the] problem of exhaustibility." (Luhmann, 1990, p.69)

Technology cannot be assessed on its own without context.   However the context can become very complex and confused when, for example, it has to include social factors, economics and accounting. In relation to environmental issues it can be manipulated to show that the cleanup or reconstruction after a disaster is more 'productive' than prevention as is illustrated above.

Although he doesn't describe it as such, Hill sees the development of technology as, to some extent, a dialectical process which would be broadly in line with Feenberg's advocacy of synthesis.   He contrasts how technology is experienced against what it promises - the experience being that "of apparent inevitability […] of being 'framed' by an immutable and 'tragic' power while the promise is "of continually new and enchanting means of mastering the problems humanity confronts." (Hill, Stephen; 1988, p.23) However, he says that to "attribute this intrusive power to technology *per se* is inherently wrong [since] social, political and economic negotiations are involved in bringing particular technological systems into existence."(p.6) What Feenberg says should be done, is already being done according to Hill, but not necessarily with the positive outcomes Feenberg anticipates.   Both Feenberg and Hill take the social constructionist approach which views technology as arising from the social interaction of humans (Dusek, 2006, pp.18-19,203-204).

Like Heidegger and Heim above, Hill also uses the term 'enframement' but is more specific in what he means by it. For example, enframement can be detected in the way our "[e]xperience of relating to and transforming nature is mediated by what technology makes possible. Experience of using a particular artefact is housed in what 'shadow systems' of other technological systems make possible" - in using an electrical appliance, one assumes the existence of an electric grid, generating stations and fuel or other energy sources. Hill adds that "for most people, the technical stock of knowledge that is required to understand fully the technologies of daily life is located elsewhere, within the specialised domains of scientists and technologists."   These examples "are all conditions of 'enframement', of acting and

perceiving *within* the structures of social life that are allowed by the technological parameters of existence." (Hill, Stephen; 1988, p.7)

While the experience of enframement would seem to support the deterministic view of technological development, this is undermined by the fact that the frames are the result of human action. "The frame aligns with human needs and only assumes power when humans actively engage with it." But the situation is more complicated since "the technological frame of social experience" is continually displaced "with a progression of encompassing frames, a progression in scale and international connectedness between technological systems of production, consumption, transportation, communication, urbanised living, and military destructiveness." (p.24)

Rather than accepting the deterministic view of technological development, Hill argues that there is an ongoing interaction between society and technology with the advance of technology being influenced by "social shaping forces" and the resultant technology influencing social development (p.26). He takes, for example, the situation in the domestic household at the beginning of the twentieth century. With wages rising due to industrialisation, servants were getting expensive. An apparent solution was provided by the manufacturers of electrical and other household appliances whose marketers encouraged "middle-class female spouses [to] adopt the latest consumer products and gadgetry" and take on the household tasks themselves. "Instead of being managers , middle-class housewives became workers, labouring on tasks that had no end, but which were required in service of […] their husbands patriarchal interests." (p.35) Here we had a social situation in relation to the cost of servants which influenced the development of a particular area of technology which, in turn, led to a change in the role and, it could be argued, in the social position of housewives.

Taking the above example, if we were to examine the use of each of the household appliances individually (i.e. take an instrumental view) or if we were to base our assessment on the immediate everyday or 'lifeworld' experience it would be difficult to get a full understanding of the social impact. Hill suggests that we must stand well back to get a more comprehensive view of the social/technological interaction and "the influence of its historic trajectory." (pp.26-27)

Tracing back to the beginning of the 'historic trajectory' brings us to the Industrial Revolution in Britain in the latter half of the eighteenth century but the "mechanical logic that was basic to later self-regulating and automated industrial production" predated this by many centuries. Hill notes that the mechanical clock which was developed in the thirteenth century was, as Lewis Mumford observed, "the model for all later automata." (p.46) The first printing presses were developed in China in the eleventh century and Gutenberg developed his in the fifteenth century and this, according to Hill, "was a paragon of mass production, using standardised, interchangeable components to produce a uniform product in large

quantities."(p.46) The fact that the sustained development of modern technology and technological systems did not follow on directly from these inventions undermines the theory that the development *was* deterministic or autonomous.

There were other significant developments before the Industrial Revolution. Hill notes that Crowley's Iron Works in County Durham had a relatively sophisticated "time-based organisational system" in place in 1700. He also refers to Josiah Wedgewood's ceramics manufacturing business where a similar system was in place (p.115) although this was much later in the century. Wedgewood's factory was probably more famous for introducing a production system based on the division of labour.

Although the "elements of modern technology"(p.46) and some of the management and organisational practices existed long before the Industrial Revolution, the wider social and cultural background did not provide the appropriate environment within which the technology could be cultivated. There was much turmoil and a multitude of developments were taking place within and across the different classes as the Industrial Revolution proceeded. These included the influence of the Enlightenment and in particular Baconian science (p.49); the influence - and the fear - of the upheaval of the French Revolution; further impoverishment of the labourers and the poor through the enclosures (Thompson, 1968, pp. 237-245; Hill, 1988, p.133; Reid, 1988, p.57) increased levels of literacy among many of the working class (Thompson, 1968, pp. 19-27, 110-203, 322, 538-539)[21] "the end to any notion of exclusiveness, of politics as the preserve of any hereditary élite or property group"; (p.24) the influence of John Wesley and Methodism (p.45).[22] What the Industrial Revolution achieved through this social maelstrom was to bring the technological culture and the wider culture of society into alignment.

The development of industrial technology required "the organisation of specialised knowledge" and "commercial and managerial acumen." Many of the inventors failed to benefit from the application of their inventions because they were unable to secure the capital to support these requirements (Hill, Stephen; 1988, p.152) and industrialisation had, therefore, to fall back on elements of the existing social structure, "in particular, the pre-existing powers of a commercial ruling class." (p.153) This ruling class

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[21] Thompson outlines in some detail the work of the Corresponding Societies which were springing up around Britain during the Industrial Revolution. These advocated political democracy and were influenced by the works of Tom Paine. They indicated a high level of literacy among, at least the leaders of, the working class.
 Also, During the Luddite revolt in 1812, a great fear of the authorities was that some of the Luddite leaders could read and write (See Reid p. 169).

[22] The influence of Methodism and John Wesley is a theme throughout Thompson's *The Making of the English Working Class.* Wesley welcomed everyone to his Church. There was no 'elect' for whom salvation was reserved. With a combination of strict discipline, democratic organisation and concern for the less privileged, the working class and the poor were particularly attracted to Methodism.

provided the "new breed of capitalists" that shattered the existing "social relations of production […] so that the people had no choice but to participate in the burgeoning industrial system." (p.133) This accomplishment was essential to the success of the Industrial Revolution.   However, Hill asserts that the driver was industrialism rather than capitalism.   If capitalism were the main driver, how could we explain the manner in which society in the Soviet Union and China bought into the "twin principles of technological superordinancy and expansion"? (p.245)

Industrialism required discipline, the discipline to work to the unremitting rhythm of the machine. This discipline was imposed initially in an oppressive manner by the bosses who relied where possible on the labour of women and children because they, particularly the children, were more submissive than men and cost less to employ.   This was a time of conflict and upheaval.   Towards the middle of the nineteenth century, however, with the introduction of the Factory Acts to protect child workers in particular and with the mass movement to the more structured environment of the towns and cities, the culture of the wider society was becoming aligned with the discipline and organisation of the technology culture. Many other factors helped. For example, while Wesley welcomed the working class and the poor to his church, he also inculcated a strict code of work and discipline or, as Thompson put it in relation to the younger leaders of Methodism at the time, "they fostered within the Methodist Church those elements most suited to make up the psychic component of the work discipline of which the manufacturers stood most in need." (Thompson, 1968, p.390)

The resistance to the new industrial regime gradually decreased but where it persisted, it provided "a direct inducement for accelerating technological change." (Hill, Stephen; 1988, p.126)   However, the culture of discipline not only helped the process of industrialisation, it also helped the workers to emerge "as a socially-cohesive cultural group" within the wider society and not just within the factory walls (p.31) and it was only then that the "discipline of union-based organisation was possible (as distinct from 'mob' protest)." (p.241) Between the ruling class and the working class stood the middle class "who most feared disorder" and "fostered the institutional means of balancing the interests of exploiters and exploited" particularly through education.(p.242) They "created the schools system for the poor that symbolically bridged the order of superordinate and subordinate interests in society."(p.159)

Science was not a significant driver of the Industrial Revolution but the scientific method was of great interest to the industrialists for application in the workplace (p.145) since it "provided an ethos for disciplined technical observation [and] a way of thought that encouraged the development of technical and social systems."(p.156) Also, because of the moral undertones associated with discipline and knowledge, science provided a legitimating ideology for industrialisation and it reassured everyone, especially the middle classes who feared instability, that industrialisation was progressing in an ordered, stable manner (p.146).

Hill's analysis centres on the alignment of the technological culture with the wider culture of society. This is brought into sharp focus in the US economy in the 1920s where, he says, a number of inventions were required "for the purchasing ability and desire of consumers to be brought into alignment with the technical systems that produced for them." (p.190) The first of these was consumer credit which allowed a significant proportion of the population to purchase the automobiles which were being mass-produced and were to become a powerful status symbol for Americans with image beginning to take priority over function.

The second invention was planned obsolescence which sustained the technological system. In 1956 the President of General Motors, Harlow Curtice, referred to it as 'dynamic obsolescence' to which he attributed many benefits including better job opportunities, higher living standards, the promotion "of science and the useful arts," and most important of all "the continuance […] of the democratic processes themselves." (p.192)

The success of the production methods on which these systems were based, was due to the standardisation of the products.   The apparent paradox between this standardisation and the culture of the time with its "emphasis on individuality, and privatised possession of unique status symbols, rather than on collective consumption" required a further invention - 'marginal differentiation'. (p.192)

Hill summarises the situation with the quote "[T]o keep America growing we must keep Americans working, and to keep Americans working, we must keep them wanting; wanting more than the basic necessities; wanting the luxuries and frills that make life so much more worthwhile." (p.192 quoting Walter Engard)

In a contrasting situation, Hill cites two examples where modern technology was introduced to primitive cultures and "[t]he people did not choose. Rather, they took advantage of what lay in a seemingly unproblematic way in front of them, and then *lived* the experience." (p.90)   Elsewhere, referring specifically to information systems, he says that "[w]hat is so easily lost in the information-inspired race […] is consciousness of what is not present in solutions to immediate problems […] and a consistent morality and wisdom that locates the immediate problems amongst all others."(p.238)   Do these specific examples not apply generally to all situations where people are presented with the options of modern technological solutions?   As he also says, we "participate in a technological code that remains a perpetual and unexamined context for lived experience, until crisis, such as system breakdown or strike, slams the significance of this background directly into our awareness." (p.40)

Hill implies that theories of technological determinism and technological autonomy are not adequate explanations of what drove the Industrial Revolution and the subsequent trajectory of technological development (p.36). He shows it to be far more complex, but in doing so, it is difficult to avoid the impression of inconsistencies, or at least lack of clarity in a few of the details but this may be unavoidable with our present state of knowledge if we regard capitalism, greed, or technological determinism as explanations which are too simplistic.

Culture "concerns the meaning system of society [..and] embodies shared ways of thinking and believing that grow out of group experience and are passed from one generation to the next." (p.91, incl. quote from Kroeber & Kuckhohn, 1963) Traditional culture evolved with new experiences being assimilated and sometimes aspects of the culture being reinterpreted to give meaning to changing contexts while maintaining the overall integrity and continuity of the culture. With technology, however, and the practice of planned obsolesence, we now speak of technology as being disruptive. Technology is subject to very frequent changes which are difficult to assimilate in the culture and therefore it does not evolve in the traditional sense. It is now a culture of newness, change and disruption with 'fashion' providing the necessary meaning for society at large.

While fashion provides the meaning at the consumer end, at the producer end it is found in the "technical stock of knowledge" that resides "within the specialised domains of scientists and technologists," (p.7) in other words, with the technocrats whom Hill compares to the scribes of ancient times that interpreted the culture for the illiterate masses (p.67). In contrast to others who trace the rise of the technocrat back to F.W. Taylor in the early twentieth century (see 2.14 above), Hill, although he does not use the term 'technocrat', traces it back to the early stages of the Industrial Revolution where the requirements of the factory system led to the "development of a new engineering and capital goods industry" which then determined the direction of technological development independently of the mill owners. The mill owners continued to maintain control over labour but control of technology was now firmly in the hands of the engineers and specialists. By definition, the specialist world is "collectively literate, but not individually literate, yielding power not to the specialist as such but to the corporate or state interests that control them."(p.67)

Considering the development of the technological society as arising from the alignment of cultures tends to imply that it happened naturally but, of course, it didn't. Rather, it was brought by coercion of the workers - men, women and children - and all of those who had been dispossessed of whatever holdings they had in the country and had to migrate to the cities (and in fairness to Hill, he doesn't overlook any of this.)

Hobsbawm's view, as a historian, would not be in conflict with Hill. He describes the Industrial Revolution as the release of "the productive power of human societies, which henceforth became capable of the constant, rapid and […] limitless multiplication of men, goods and services" or what "the economists [call] the 'take-off into self-sustained growth.'" (Hobsbawm, 1973, p.43) He regards it as "probably the most important event in world history, at any rate since the invention of agriculture and cities." (p.44)

The fact that the Industrial Revolution began in Britain was not, Hobsbawm says, due to any technological or scientific superiority since the French were much further ahead in this area. Education in Britain was also behind that in France although he makes exceptions of the "dour village schools and the austere, turbulent, democratic universities of Calvinist Scotland." Germany was well ahead of Britain in technical training.(p.45) But Britain had a long history of trade and its colonial activities throughout much of the world were determined by its trading requirements. As a result, it had a significant infrastructure in place in terms of capital investment especially in the ports, shipping, roads and canals to support the economic developments that lay ahead. Also, according to Hobsbawm, "[p]olitics were already geared for profit." (p.47)

The key to the take-off of the British economy was the development of the railways during the period 1830 to 1850 when 23,500 miles of railway was developed.(p.61) The merchants, traders and wealthy classes generally had accumulated huge wealth from trade, particularly during the preceding decades of the Industrial Revolution. They needed opportunities to invest their money (p.62). There were much more profitable enterprises for investment than the railways but these industries, such as, for example, the cotton industry, were unable "to absorb more than a fraction of the available surplus for investment." (p.63) The railways provided the only means to soak up the available investment capital. The railway infrastructure was a great enhancement for trade but, even more important, it resulted in more than a trebling of the already very substantial output of coal and iron during the two decades in question (p.61).

The timing, 1830 to 1850, above is significant for another reason. According to Lienhard, the rate of development, as measured by the improvement rate, of all technologies developed before 1840 doubled every thirty years, i.e. one generation. He gives the examples of the accuracy of clocks over the previous 600 years and the efficiency of steam engines since the early 1700s. From 1840, however, "we started doubling the exponent of improvement" except when they reached a limit within the laws of physics.[23] This has parallels with Moore's Law which says that the computing power, i.e. the number of transistors, available on a chip will double every eighteen months (Brown & Duguid, 2002, pp.14-15). There is general agreement that, as Kelly says, the Law "has been astoundingly correct" for the last fifty

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[23] www.uh.edu/engines/epi559.htm [Accessed 17th September, 2016]

years. Kelly asks whether Moore's Law is inevitable, the answer to this question being "pivotal for civilisation" since it will have implications for technology generally. He claims that "all technology follows computer technology [and] finding inevitability in one key area of technology suggests invariance and directionality may be found in the rest of the technium."(Kelly, 2010, p.159) This is, to some extent, supported by Gordon Moore on whose research the Law is based, and who commented that "once something like [Moore's Law] gets established, it becomes more or less a self-fulfilling prophecy." (p.162) Others believe that the Law has prompted the ICT industry to "take it on faith that more power will somehow solve the very problems that they have helped to create" and "[i]nstead of thinking hard, we are encouraged simply to embrace dumb power." (Brown & Duguid, 2002, pp.14-15)

3.6   The Idea of Progress

ICT, no less than other technologies, continues to develop along the path of progress as the conventional wisdom would have it. What is meant by progress is, however, the question that must now be asked. For Hayek, "[p]rogress is movement for movement's sake, for it is in the process of learning, and in the effects of having learned something new, that man enjoys the gifts of his intelligence." (Nisbet, 1980, p.300) He also says that we cannot determine the rate of progress although "we would be better able to digest it if it were slower," but unfortunately it "cannot be dosed." Neither can we predict what progress will bring us but we must embrace it and pave the way by means of the free market. (Hayek, 2013, pp.500-501) Spencer, almost a century before Hayek, gave a similar definition of progress which can be summarised as "motion from homogeneity to heterogeneity" as in the growth of a tree from a seed or an animal from an ovum This "law of organic progress is the law of all progress." It is the "evolution of the simple into the complex, through successive differentiations" and can be seen "in the evolution of all products of thought and action; whether concrete or abstract, real or ideal." (Van Doren, 1967, p.102)

The evolution of the simple to the complex gave rise to some disagreement regarding the evolution of scientific knowledge. Since the range of scientific knowledge had become so vast, any individual could hope only to master a very limited area or speciality and if they wanted to know anything outside of their area of expertise, they would have "accept the word of an authority or specialist in that field. Hence, […] we are condemned to accept authoritarianism by the very immensity of human knowledge." But, according to M. King Hubbert, science is not "a progression from the simple to the complex, but [rather] a progression from the complex to the simple." It is about reducing "chaotic phenomena" to a form which can be understood by the average human being (pp.327-328). In other words, it is abstraction but in abstraction one is losing some context and therefore some meaning and the expert can therefore always claim greater authority.

Is progress inevitable, is it necessary or contingent?   In the past, arguments for the necessity of progress tended to focus on the idea that it "is willed by and thus assured by Providence [or by] a natural cosmic principle" or "because it is inherent in human nature."   Arguments for the contingency of progress almost invariably centred around the principle of human freedom (pp.238-239).   For the past few decades progress has become increasingly identified with economic growth which is determined by the level of production although the services sector is becoming increasingly significant. This has to be contrasted with Van Doren's assertion in the 1960s that "growth is not progress."(p.258)   For Galbtraith, the emphasis on production is due to nothing more than its central role in economic science (Galbraith, 1970, p.139).   This can be seen today in the fear created generally by any news of a slowdown or decrease in economic production or growth. Van Doren also speaks of irreversible cumulative change (ICC) which he says is necessary but he quotes Maritain as saying that progress, that is "the introduction of something new, [...] is contingent [...] on man's free choice." (Van Doren, 1967, pp.258-259)

Nisbet is in no doubt about the link between the belief in progress and economic growth and development which, he says, can be traced back even to classical Athens (Nisbet, 1980, p.334) and he shows how this belief is shared in modern times by liberals, socialists, radicals and technocrats throughout the western world and also in the then communist countries such as the USSR and China (pp.303-306). The belief is sustained by optimistic predictions "seizing upon some seemingly dominant aspect of the present and then projecting it into the future." (p.309)

Chapter Conclusion

One of the big questions in this chapter, and indeed in the whole thesis, is whether technology is neutral, deterministic or autonomous.   Heidegger's concept of 'enframing' would rule out neutrality since he suggests that we are conditioned to think technologically.   Technological neutrality seems very plausible since, as individuals, we are generally free to accept or reject any technology. But if we accept this, and since many ICT appliances, as we will see later, are now low-cost consumer items, then we must take Hirsch's "tyranny of small decisions" on board also and taking these factors together with the clear evidence around us of the rapid spread of technology, I believe we have to accept the fact of technological determinism. Since autonomous technology presupposes technological determinism, we must consider it as a possibility also or at least accept that it will not *necessarily* remain permanently as

mere science fiction. Hill and Feenberg take a more nuanced view and advocate a greater synthesis of technology and culture with Hill saying that technological development is the outcome of economic, political and social negotiations while Feenberg advocates working within the technological milieu to mould it to our own individual and social requirements.

Chapter 4   Information and Communications Technology (ICT)

Chapter Introduction

ICT was largely confined to scientific, technical, and internal business applications until the appearance of the World Wide Web in the early 1990s.   The rapidity with which ICT then penetrated, or at least affected, the lives of almost everyone in the developed world was phenomenal.   While the proliferation of ICT in the developing and Third World countries has been much slower, it has nevertheless been very significant when seen in their particular contexts.   That such a complex technology could become so ubiquitous in such a short space of time raises a question of democracy as to whether or not we have control over the development and application of the technology.

I begin with a relatively detailed account of the case study conducted by Castells *et al.* on mobile communications.   This is a global study but, in my view, what is particularly significant is the insight it provides into the innovative use of ICT by communities in some of the less developed and underdeveloped areas of the world - an insight which is much more inspiring than that provided by many of the examples from the affluent developed world.   Following the case study, I provide an overview of current and some likely future applications of ICT in the home as well as in business government and the mass media.

4.1   Mobile Communications - Case Study

Castells *et al.* undertook a study of the effects of mobile communications on society.   Their study also examined how society helps to shape technology since "the more a technology is interactive, the more it is likely that the users become the producers in their actual practise" (Castells *et al.,* 2007, p.2) - something with which Hill would agree and Feenberg would advocate.   Mobile, i.e. wireless, communication networks have diffused throughout the world "faster than any other communication technology to date" and because "communication is at the heart of human activity in all spheres of life [..this..] raises a wide range of fundamental questions."(p.1) The aim of their study is "to construct an empirically grounded argument on the social logic embedded in wireless communication, and on the shaping of this logic by users and uses in various cultural and institutional contexts."(p.4) [24]   Their study is in fact a metastudy, "having consulted hundreds of studies on all regions of the world."[25]

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[24] Or, as they also state on p.3 "to answer the questions surrounding the transformation of human communication by the rise and diffusion of wireless digital communication technologies."

[25] Over 700 individual studies are referenced in the 'metastudy'. Many of my references from   this work are, therefore, secondary references.   It would not be practical to give details of each of the   original sources but they can be traced via the references below.

In terms of signal quality and security, fixed line communication is much superior to mobile communication but the infrastructure for the latter is much easier, cheaper and faster to install and therefore it overcomes the main barriers to a fixed line service such as inaccessibility and lack of capital. This is why mobile telephony has developed at such a significant rate across the world in the last two decades. While the main telephone companies continued to focus primarily on the fixed line service and confined their mobile offerings mainly to the business sector, the lower entry costs enabled entrepreneurs to exploit the mass market (p.14). In 1991 the ratio of mobile to fixed line telephones was 1:34, but by 2004 the ratio was 1: 0.66, mobiles having overtaken fixed line phones in the previous year (p.7).

The lower infrastructure costs allow the mobile suppliers to provide cheaper services to the consumers. In addition, the suppliers have provided more flexible payment options such as prepay resulting in a more affordable service and a "tendency for mobile-phone ownership to spread more evenly across income groups than has been the case with other consumable durables." (p.57) This applies across the globe since there is widespread diffusion of mobile technology not just in the developed world but also among many of those previously excluded due to poverty in the developing and under-developed countries.   There are some exceptions, particularly in Africa. A report published in 2003 showed that while 76% of Ugandans used a mobile phone regularly, the figure for Ghanaians was only 20% (p.58). However, the spread of mobile technology has run far ahead of expectations in developing countries where, it was generally assumed, it would not be commercially viable (p.19).

A number of factors besides low costs helped the diffusion of mobile technology although the fact that in the late 1990s, South Africans were spending 10% to 15% of their income on mobile phones, (p.57) begs the question whether costs mattered at all. Various payment plans such as the offer of "free and, later on, low-cost messaging" by private telecom operators in the Philippines was very attractive to those with limited money to spend (p.59). Perhaps the most significant factor in overcoming exclusion is the availability of prepaid services which allowed "those without a credit history, a permanent address, or a stable source of income to purchase cell phones." (pp.61-62) Prepaid services also benefit the provider through the cost-savings on billing and collection and passes to the customer the risks associated with "up-front investment in future calls." (p.220)

There was a very strong awareness of a digital divide in relation to the Internet. With the widespread diffusion of mobile technology, the telephone divide is much narrower (p.32) and since one can now surf the Internet on a mobile phone, the Internet divide itself is less significant. In terms of applications, the PC is a more versatile instrument but the mobile phone is handier. Relative to the PC, the mobile phone is a simple technology to use. The fact that voice is the primary medium for use on the phone means that it is available even to the illiterate. Mobile phone users have more control over their

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technology than PC users have over theirs since, to date at any rate, they are not as subject to the tyranny of regular unsolicited updates of their software of which the PC users are often unaware. Because the technology is simple and because a significant proportion of its users have very limited resources, the user community have played a very substantial role in its development and have, to a large extent, forced the technology to *align* itself with their social needs. However, one must note the qualifier which Castells *et al*. add: " [While] people shape communication technology, rather than the other way around […], the specificity of the technology reflects into the way in which people conduct their lives." (p.125)

The first text message was sent by a Nokia engineering student in 1993 but it was not considered a serious option by the telecomms companies (p.266 n.1). However, because texting (SMS) was much cheaper than voice telephony, there was a massive surge in its use particularly among those on low budgets including people in developing countries as well as teenagers and students throughout the world.

For the poor and the marginalised, the primary purpose of the mobile phone is connectivity rather than mobility and this is helped by the lower cost of wireless infrastructure allowing for greater coverage compared to fixed lines. But even among the wider user community, more and more of the 'mobile' communication is taking place from fixed locations such as home, office, etc. so that "mobile communication is better defined by its capacity for ubiquitous and permanent connectivity rather than by its potential mobility." (p.248)

In developing countries, even as a substitute for a fixed-line phone, there are still some constraints on mobile usage such as, for example, the availability of electricity for battery charging. But these constraints have produced even greater innovation and resourcefulness among the users. The charging problem has been addressed in some communities in Tanzania by a system "whereby all the phones in the community are taken to a nearby town once a week to be charged." (p.65) In other cases, car batteries are used for recharging (p.232). In South Africa, the telecomms company Vodacom identified a commercial opportunity in the large number of customers who were selling time on their mobiles to their friends. Vodacom established a franchise business offering modified and Vodacom-branded shipping containers as payphone kiosks with a number of cellphones as an investment option for these customers (p.232). Prepaid cards, being used 'reportedly' as payment for goods and services, have almost attained the status of legal-tender in some areas (p.62) while in other areas "people wishing to make or receive remittances can […] transfer prepaid minutes to other subscribers using text messaging" thus avoiding bank charges or the need for a bank account (p.223). Putting this trust and value on prepaid cards and credit shows the importance of mobile telephony in the daily lives of people in underdeveloped and developing countries.

Another innovative practice which has become fairly widespread in Africa is 'beeping' where "a person dials a number but hangs up before the call is answered." (p.66) Codes have developed, presumably somewhat similar to Morse Code, to convey messages on the basis of the number of beeps, thus exploiting the system for free communications.

One of the most successful commercial development initiatives is the Village Phone Program run by Grameenphone in Bangladesh. Grameenphone is a mobile telecommunications provider established by Telenor and Grameen Bank and based on the principles of the latter's microcredit system. The bank works on the basis that most poor people require the equivalent of only a few euro for the tools or raw material, such as a spade or wool, to start to extricate themselves from the poverty trap. It is better to start this way at the bottom of the economic system, at the origin of poverty and hunger, (Yunus, 2003, p.35) rather than wait for the trickle-down effect of overall economic growth while the poor become prisoners of the welfare state. It is also based on a belief that within every household there are skills waiting to be exploited - "not one single Grameen borrower requires any special training." (p.205) By 2002, over one million poor people had availed of loans totalling $444 million. (p.164) Another principle of the bank is that it concentrates mainly on women borrowers because while "[p]oor women in Bangladesh have the most insecure social standing […] it is evident that destitute women adapt quicker and better to the self-help process than men."(p.172)

The Village Phone Program provides access to phones in over 200,000 remote rural locations throughout Bangladesh each managed by an operator, in most cases a woman, for whom it provides an opportunity to earn a living while providing an invaluable service to the community. Grameenphone is also setting up Community Information Centres to provide voice, Internet, videoconferencing and other information services in rural areas and plans, in the short term, to have one of these in every local area (www.grameenphone.com). A modified version of the Grameen Village Phone Program is operating successfully in Uganda.

A very significant service provided by the Village Phone Program "appears to be its role in facilitating the flow of remittances from overseas or city-based relatives". (Castells *et al.,* 2007, p.270 n.4) In fact, migrants and ethnic groups are probably the people most dependent on mobile communication since it enables them to keep in touch with home and with one another. A survey of some migrant workers in China showed that they spent over 20%, on average, of their monthly income on mobile phone calls and felt compelled to update their handsets every "couple of years" at a cost in excess of one month's pay. To cover these costs, migrant workers "have to discipline themselves to work overtime, and work hard" and this, according to Castells *et al*. "can be seen as a covert means of labor control." (p.85)

Much of the rapid diffusion of mobile technology arises due to "the wave of urbanization" across the world "when billions of rural-to-urban migrants use the mobile phone as both a functional tool to cope with a new social environment and an instrument to shape their recently acquired urban identity." (p.59) There is much evidence of this "social and psychological need to achieve a status symbol which could be shown off in front of friends and even strangers in public." (p.85) This is very understandable for migrants trying to establish a place and an identity for themselves in strange surroundings, but it applies to many users as the mobile has become a fashion item, a topic I return to below. Castells *et al*. assert that while the mobile is seen as a very important support by the migrant workers, it "only operates at the micro level" and it cannot solve the structural problems with which they are confronted (p.62).

There are similarities and some overlap between the social situations of minority ethnic groups and migrants. This applies also to their use of technology where, in the U.S., ethnic minorities were found to be at a disadvantage in terms of access and skill (p.67). They had a negative view of computers and the Internet and felt that "they impeded personal communication" while mobile phones "were considered to be a necessity rather than a luxury in modern society."(p.70) "Both the African American and Hispanic populations [in the U.S.] have been found to have higher mobile phone ownership and usage levels than the Caucasian population."(p.60)

While mobile technology is probably ubiquitous today in the U.S., the take-up of the services there to 2007 (the latest date of the studies to hand) has interesting features. For perhaps the most advanced nation technologically, the take-up was quite slow. In particular, texting was slow to develop in the U.S. compared to Europe and Asia.(p.181) This is attributed, partly at any rate, to the fact that far fewer people in the U.S. use public transport and therefore have less opportunity for texting and for developing their skills in using mobile technology (p.37). Again, in contrast to Europe, it was found that a higher proportion of women than men used mobile phones (p.42).

In the more "collective, sociable cultures where there is a high level of mobile phone use, "there is little concern about the volume, location, or nature of public conversations." In the more individualistic society of the U.S., however, "a tendency to be extremely concerned about privacy and personal space has inhibited the adoption of mobile telephony."(p.71) A study from 1999, when mobile phones were still predominantly used for voice communication, concluded that people in the U.S. had a preference for asynchronous communication systems "such as e-mail and voice-mail, because they are considered more efficient, keep things brief, leave users in greater control, and are more formal and guarded."(p.37) At that stage Americans found pagers and caller-ID more perfectly adequate for their requirements.

Considering that young people account for a high proportion of mobile users elsewhere in the world, it is interesting that there was "little systematic and academic study of how young people in the United

States [were] using emerging technology. This is probably because *young people have not been a major element of the US industry until recently*"(p.133) i.e. 2007, It is difficult to relate this to the finding that in the U.S. in 2003, "mobile users spent US\$80-100 million on ring-tone downloads."(p.112)

We think of mobility in terms of physical movement but the success of the mobile phone is due to the fact that, perhaps unwittingly, it has addressed a much broader interpretation of mobility. An individual can move physically to a different location, but they can also move to, or find themselves in, different situations mentally, psychologically, socially, culturally or materially or various combinations of these. The mobile now has features which some may find useful in any of these situations. The mobile is also easy to use, at least relative to the PC and this is due, more than likely, to its size and limited capacity whereas with the PC additional power is used to compensate for bad design and a lack of engineering, particularly software engineering.

As examples of different situations, take Japan where texting was very popular early on with young people due to the "small living spaces and hence limited privacy" in contrast with some European countries where many children have their own rooms."(p.71) While much of the emphasis is on privacy, a different situation exists in many developing countries such as India where, as indicated earlier, the mobile phone is a substitute for the fixed line phone and is shared between family and friends (p.64) to the extent that in some cases a number of people can partake in a telephone conversation at either end. The phone call therefore becomes a social event and may even perform a social role similar to the now disappearing village pump.

A significant factor in determining the use of mobile technology is 'power distance'. For example, "in "high power distance" cultures, such as Korea, it was considered unacceptable to send text messages to a superior."(p.72) A study published in 2005 found that countries with "extremely low power distance", mainly in Scandinavia and Central Europe, had a penetration rate for mobile phones of almost 100%. These were also countries with high individualism and femininity. Western Europe and North America were deemed to have "individualistic, masculine cultures with 'low power distance'" and had a 70% penetration rate approximately. The 'late adopters' were collectivist cultures in Eastern Europe and South America with 'high power distance' and 'high uncertainty avoidance' characteristics (p.72).

It is tempting to ask if mobile telephony will eliminate, or at least reduce, these cultural differences as electronic media tend to do. However, there are other examples to show how mobile technology reinforces some cultural practices and has been assimilated by them. In some Muslim communities, a man can validly divorce his wife by uttering the word 'talaq' three times. This can now be done over the telephone provided two witnesses are present and the 'message' can be authenticated. The reference

to 'message' would appear to refer to SMS and the fact that there is an explicit ban on divorce by texting in Malaysia would indicate that it is valid elsewhere (p.73).

In South Korea, the mobile phone has had the effect of reinforcing traditional 'father-centred' family structures. Generally, parents give their teenage children mobile phones as presents but they control their use of the device through the phone bills. Also, the parents use the phones "to track down their children constantly and give orders anytime, anywhere."(pp.148-149)

Gender issues often come up for discussion in relation to ICT, particularly in relation to mobile phones and many people see them "as liberating users from gender limitations."(p.45) This argument is based on the view that mobile technologies provide protection for women, giving them a greater sense of safety and security and it also assists them in "carrying out family responsibilities across barriers of time and space."(p.46) It could however, and indeed is, argued that these reinforce rather than lessen gender role differences.

The aggressive versus passive attributes of male and female respectively become apparent in findings where "men [see] the advantages of mobile phones in terms of their ability to get access to others, while women [see] the benefits mainly in terms of other people having access to them."(p.47) Gender differences can also be detected in the way "men are more concerned with perceived usefulness, while women are more concerned with ease of use"(p.48) and men regard "the phone as an extension of themselves without which they could not function".(p.47) As a consumer item, the mobile phone exploits the gender differences in the market where "the 'cool' consumption styles include both 'masculine' technology and 'feminine' trend-consciousness."(p.50) One commentator has argued that the role of the mobile phone in Japan's *kawaii,* or 'cute culture' rather than empowering women, only "further subdue[s] females to the dominance of technological consumerism." (p.52)

As mentioned above, for a relatively long period after the introduction of the mobile phone to the market, the main telephone companies confined their mobile offerings mainly to commercial entities. This left the personal market open to be exploited by individual entrepreneurs. Young people, having limited budgets, were very quick to take advantage of the non-voice features of the mobile phone, such as texting, and they became the real innovators in its use. Generally, the entrepreneurial companies that paid attention to these innovators were the ones that succeeded and dominated what was fast becoming a very significant teenage market. They transformed the innovations "into new technologies, new products and new business models, in a virtuous circle of interaction between active consumers and receptive business." (p.245) So the first users of mobile technology were business people followed shortly after by young people and, therefore, Castells *et al.* suggest, "[b]ecause the first users are the

shapers of the technology itself, the youth culture and the professional culture have framed the forms and content of wireless communication."(pp. 245-246)

The 'interaction' between the young consumers and business is exemplified by the manner in which "the promotion of texting via television entertainment shows that encourage[d] their (mostly young) audiences to send voting messages via their cell phones."(p.136)   So anyone claiming, as Castells *et al.* do, that young people are "the drivers of the diffusion of wireless communication technology in developed countries" (p.245) must take account of the role the IT industry plays in leading them, steering them or, as some would see it, exploiting them.   And Castells *et al.*, perhaps somewhat ambiguously, warn about this exploitation and the power large corporations can exercise "in shaping the consumerist identity of young cell-phone users. Given the susceptibility of youth, and peer-group pressure now materialized in the hyper-fast networks of the mobile-phone, individual youngsters now have very little autonomy or independence not to get involved in the commercial vogue created by the likes of McDonalds and KFC."(p.167)

Choice and independence can mean almost the same thing, or at least there is a significant overlap in their meanings.   But a paradox also attaches to them in that they are often at their weakest where they are perceived to be at their strongest and this becomes very apparent in teenagers with their equal desire for independence and to be part of a group.   Mobile technology responds to these desires by "providing an ever-widening range of socializing and identification options "as an alternative to the "traditional socialization structures, such as the home, education system and broadcast media" (p.141) while the mobile phone itself provides an element of individual identity as "a miniature aesthetic statement about its owner."(p.112)

Mobile technology further complicates the relationship between young people and their parents and families. They wish for autonomy as individuals on the one hand but also require the security of their family.   They "make all the decisions in their everyday lives, but need their parents to solve life's problems." (p.143)   The mobile phone plays a significant role in the 'micro-coordination' of their lives (p.152).

Mobile technology "*modifies* but does not eliminate the power relations between parents and children."(p.147)   In some ways it reinforces them allowing parents to track down their children and establish their whereabouts when necessary.   Taking it from another angle, "with information technology […] although the education process remains vertical, roles have been reversed and the flow of knowledge has changed direction to rise from the younger generation up to the older."(p.151)

The mobile phone has been transformed "from its basic communications functions into a key fashion object, a signifier of modern urban lifestyle, and a major component of contemporary consumerism."(pp.56-57) Reference has been made already to the link between the wave of urbanisation in recent times coinciding with the diffusion of mobile technology. The importance of the mobile phone for migrants to the cities from rural areas or from abroad to enable them to keep in touch with home and with one another is obvious. But it is also important for them even as a fashion item to help them establish their identity in the new surroundings. Fashion in a mobile phone is represented for women, particularly in oriental countries, in its appearance and ease of use whereas for men it's represented in the phone's technical qualities although they might not admit to these being linked to fashion.

The individual and collective identities are, according to Castells *et al.*, linked through fashion. They define "collective identity in the youth culture [as] a break with the dominant culture" and fashion as "the personalization of this rupture to achieve an individualized identity. The sum of these individual identities, which express the collective identities in different ways, produces fashion."(p.145) They tend, however, to overlook the fact that with mobile technology in particular, this fashion and what it manifests has become the dominant culture.

The relationship between ICT and youth culture invites further investigation. The arguments of both Hill and Castells *et al.* indicate that the development of ICT is driven by an interaction between the technology and society, particularly by the youth culture within society. "Young people […] invented uses that had not been foreseen by the initial designers of the technology [and] the key to success for companies is to identify and follow the innovations of young users."(p.129) But the input from the youth culture is influenced, as mentioned earlier, by the "specificity of the technology." Castells *et al.* quote studies from Finland of the relationship between young people, from early childhood to late adolescents, and their mobile phone (pp.129-131). They show that the tendency is to view the mobile phone successively as a toy, a games machine, a communications device, a personalised statement of individuality, as the person moves through the stages of childhood.

Providing enticements for each stage of childhood could be regarded as exploitation on the part of the ICT industry - or, they could claim to be merely responding to the needs of the young and the children wouldn't have the technology without the agreement of the parents. But moral pressure can be exerted on those parents reluctant to provide the technology by assertions that they are depriving their children of vital educational media and even endangering their security when they're out of home without a phone. The arguments can be put either way and again do not help to resolve the question of whether the technology is deterministic or not. However, new factors enter the scene with ICT. Firstly, access to the Internet cannot be controlled effectively by parents, particularly since young people tend to be

more technically competent in relation to it than their parents so the protective or guardianship role of parents is, to a lesser or greater extent, subverted by the technology. There are legal age limits in most countries under which people cannot access alcohol or tobacco or pornographic films but there are no such controls on access to the Internet. Secondly, young people are now much more affluent than in previous generations and are therefore in a better position to access the technology independently of their parents. Thirdly, games were perhaps the most prominent application on the first personal computers or microcomputers to become widely available in the early 1980s because the limited power of the machines was not capable of much more. As a result, personal computers became established as gaming machines and have remained so (along with other applications) ever since.

It is interesting to note the development regarding toys in the early seventeenth century in Europe. Prior to this time, according to Sennett, "adults amused themselves with dolls, toy soldiers, and the other artifacts of childhood; such toys were few in number and costly. As the cost went down the number of toys increased. In this process toy objects also became the distinctive property of children."(Sennet, 2008, p.82) This phenomenon is repeating itself to a certain degree today with mobile technology.

The affordability of mobile technology is reflected in figures from both Gartner and IDC showing that over 1.8 billion mobile phones were sold throughout the world in 2013[26] while Worldbank data shows that there were 96.9 mobile phones per 100 people worldwide in 2014.[27] These figures ranged from 178 mobiles per 100 people in the United Arab Emirates to 64 in the UN category of 'Least Developed Countries' while the figures for Ireland and the EU were 105 and 123 respectively. The figures indicate how dependent we have all become on mobile technology. It is an integral part of our lives to the extent that, for those for whom is it less affordable, other necessities are being sacrificed in order to buy into the technology. Castells *et al.* give the example of Chile where "the average household now spends more on telecommunications than on water and electricity combined" and where sales of mobile phones are depressing the sales of clothing and footwear (Castells *et al.*, 2007, p.239)

Our dependence on mobile technology and on ICT generally raises again the question of whether it is a means or is an end in itself. It is a means of providing an individual with access to others - other people, other groups and other social systems. This is particularly important for people in developing countries or any groups who otherwise would feel excluded. Some see the technology as providing the "new garden fences" through which the "brief, frequent, spontaneous social networks of pre-

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[26] https://mobiforge.com/research-analysis/global-mobile-statistics-2014-part-a-mobile-subscribers-handset-market-share-mobile-operators#phone-shipments [Accessed 17th September, 2016]

[27] http://data.worldbank.org/indicator/IT.CEL.SETS.P2 [Accessed 17th September, 2016]

industrial communities" can be recreated (p.157). Others see it as a means of converting 'lost' or 'dead' time, such as waiting, using public transport or even driving, into productive time so that all time can become saturated with social practice (pp. 115, 174-177).

Mobile technology breaks down the barriers of time and place. But the primary purpose of barriers, and garden fences, is protection. Human beings, at the most basic animal level, require routine to allow time and space for food and rest. Technology doesn't need these and globalisation doesn't allow them since the sun never sets on the virtual global world. However, people, for their very survival, need the security of protected space and protected time. Yet one can detect language coming more and more into use which, inadvertently or otherwise, has the effect of confounding our understanding of these fundamentals. For example, Castells *et al.* argue that with mobile communications technology "[p]laces are subsumed into the space of flows, thus losing their meaning in the space of places" (p.174) and elsewhere they speak of wireless communication homogenising space and "redefining space into the space of communication."(p.178) The great benefit of being able to access people or services online 'anywhere/anytime' via mobile technology comes at the cost of being unable to isolate work, family, leisure or other commitments from one another but instead being exposed to the demands of all of them all of the time. Communicating via mobile "is not so much about a new technical capability or freedom of motion, but about a smug and intimate technosocial tethering, a personal device and communications that are a constant, lightweight and mundane presence in everyday life." (p.92)

It is claimed that "mobile communication has unequivocally demonstrated its usefulness for the coordination of daily family activities" (p.89) and this is correct but perhaps only superficially. There is now a randomness about the schedules of family members where there was previously a routine. This randomness is both caused by and managed by mobile communication. Overall, it reflects less family cohesiveness due to the technology.

The use of mobile technology in what would be regarded as productive spaces or to use 'dead' time profitably, raises some questions. A survey undertaken in 2004 found that a high proportion of all texting was done during busy meetings or in classrooms (pp.176-177). Such use is not just unproductive but indicates a lack of commitment that can be damaging in the long run. Also, if space is truly 'homogenised', then those who are physically present in a place with someone do not have any priority for the attention of that person over those who are only accessible via their mobile. Examples of this are common with individuals texting their friends for prolonged periods thereby excluding their physically present companions (pp.153-154).

One would expect that since mobile technology provides enhanced access and communications, it would enable stronger relationships to develop between people in the family, among friends, in business etc. Better access and better communication allow greater flexibility. Flexibility allows more choice, more options as prearranged meetings can be changed at short notice or one can opt out of the present company or discussion as in the examples above of people texting while present at meetings or when socialising with friends. This militates to some extent against commitment and personal trust which in turn weakens relationships.

The question of trust comes very much to the fore in the virtual world. Trust, according to Luhmann, is an "effective form of complexity reduction" in social systems and, as such, it allows for "increased possibilities for experience and action" (Luhmann, 1979, p.8) so it allows us to manage more complex social systems. One must distinguish between system trust which "counts on explicit processes" (p.58) and personal trust. Trust "strengthens states as opposed to events and thus makes it possible to live and act with greater complexity in relation to events. [..It] increases the tolerance of uncertainty." This must not be confused with what Luhmann refers to as the "instrumental mastery over events"(p.15) which provides the rationale for planning and which, if it can be assured, obviates the need for trust. But planning, according to Luhmann, as mentioned earlier when discussing technocracy, increases rather than decreases dependence on chance and therefore increases complexity. This increase in complexity can be counterbalanced by the occurrence of events which reduce uncertainty. Money provides some guarantee against future complexity and uncertainty because when an individual "holds the money symbol in his hand, he also really possesses the possibilities which it promises, so that he can confidently put off his decision about [its] final use." This depends, of course, on the individual putting his trust "in the stability of the value of money, and the continuity of a multiplicity of opportunities for spending it." (p.50)

Mobile technology has been playing a significant role in political motivation and mobilisation. It has provided an alternative to the mass-media for the dissemination of up-to-date news and can operate independently of the power of the state or of wealth. But it is principally at the micro level of organisation, as has been indicated also in other contexts above, that the technology proves its effectiveness rather than at the level of policy or strategy discussion and formulation. This has been demonstrated on a number of occasions in 'flash mobilisations' or flash mobs. Castells *et al.* provide, as an example, the overthrow of President Estrada in the Philippines in 2001 (Castells *et al.*, 2007, pp.186-193) Following a critical development in Estrada's impeachment trial, a "massive" demonstration formed "within hours" in Manila demanding his "immediate removal […] from the presidency." (p.187) It continued for four days until he was replaced.

The demonstration to remove Estrada was organised almost instantaneously via texting and part of the evidence for this was the strain on the mobile networks as they tried to cope with the huge increase in network traffic. It was the first time mobile phones were used effectively in such a significant political event. Compared to the events surrounding the overthrow of the Marcos regime in 1986, it has been argued that "there was less violence and military involvement […] and that the demonstration was more centred on information and IT."(p.188)

While mobile technology made a very important contribution to the success of democratic political events in the Philippines and elsewhere, the more excessive claims in this regard must be modified by, or at least take account of, some other factors. The fact that the overthrow of Estrada was relatively peaceful was partly as a result of the military taking the side of the protesters. Also, it ignores the violence that took place a few weeks previously when five bombs exploded in crowded areas of Manila although it is not totally clear if the events were connected. More significantly, when Estrada was formally arrested, "a crowd of perhaps one hundred thousand [gathered in Manila] and demanded Estrada's release and reinstatement." (p.189) The Estrada supporters were the poor of the slums and the rural areas who, in general, would not have had access to mobile phones, yet they were able to congregate very quickly and thereby called into question "the proclaimed importance of the new media." (p.190) They were dispersed by the military after a few days and received largely negative publicity from the press. The contrast between the middle-class, mobile-phone owning city dwellers and the poor has been highlighted.

Castells *et al.* give other examples of the use of mobile technology and ICT in general in political campaigns. One example is the election of Roh Moo-Hyun as president of South Korea in 2002 (pp.193-198). Having previously failed in a number of elections to other offices, he drew on the backing of an online supporter group called Nosamo which used the Internet and mobile phones for campaign management and coordination, for holding monthly committee meetings online and for membership recruitment through which it increased its membership from approximately 100 to 70-80,000 within a year. When, during the late morning on election day, the polls showed that Roh was losing, "[w]ithin minutes more than 800,000 e-mails were sent to mobile phones to urge supporters to go out and vote. Traditionally apathetic young voters surged to the polls, and by 2 p.m., Roh took the lead and went on to win the election." (p.196) What was significant about his campaign, besides the use of technology, was that "many of his closest aides […] were former student activists." (p.195)

Three days before the 2004 general election in Spain, bombs exploded on three suburban trains in Madrid "killing 192 people and injuring over a thousand." (p.198) Al-Qaeda claimed responsibility for the explosions and this was made credible by Spain's involvement in the Iraq War. The government,

however, blamed the Basque separatist group, ETA, and this claim was supported by most of the television and radio networks and the newspapers. It was established after the election that the government was deliberately withholding information but if its claim about ETA were taken as correct, it would have favoured the government party in the election. Spanish law prohibits political demonstrations and public statements on the day before general elections. However, the many citizens who were not convinced by the government's stance started a campaign via mobile phones and the Internet and as a result, 'flash mob' demonstrations took place "in all Spanish cities" (p.202) despite the legal ban. The election showed an increase of 2.5 million voters[28] over the previous election and approximately one million voters switched to the main opposition party, the Socialist Party while the government party, the People's Party (PP), lost the election.

The protests organised against the National Convention of the Republican Party in the New York in 2004 included "the largest ever Convention protest" (Castells *et al.,* 2007, p.203) in the form of a march with approximately half a million people. The Convention was held against the backdrop of the Iraq War. The protests were carefully planned over the previous year. Wireless technology was used extensively in the planning and coordination of the protests including the sending of 'alerts' prior to and during the protest themselves. The protests, although widespread, were not very effective and failed to disrupt the Convention and following the Convention, President Bush's popularity increased. The use of wireless technology was anticipated by the police who then exploited it by listening in or monitoring text messaging and getting access to information regarding the planned protests as well as information during the protests themselves which led to thousands of arrests. Also, alerts sent to protesters could be intercepted and counteracted by the police. The protest did not have a clear objective since it comprised various groups with different agendas "ranging from anti-war through animal rights to abortion rights."(p.206) Also, the fact that it was planned centrally and well in advance was very much in contrast to the spontaneity which is a strong feature of the more intimate mobile environment.

An effort was made in the province of Guangdong in China in 2003 by SARS victims together with their friends and the hospital staff treating them, to alert the wider population to the outbreak of the disease. The authorities denied the reports of the outbreak and launched a mass media campaign saying "the infections were no more than a variant of pneumonia [and] that it was already under control." Most people believed the official version "only to witness the SARS epidemic in full swing within weeks." (p.207) The mass media were perceived to have had a higher credibility than the mobile media.

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[28] Chari, 2004 available at: http://www.academia.edu/840991/The_2004_Spanish_election_terrorism_as_a_catalyst_for_change [Accessed 17th September, 2016]. This figure is at variance with that given by Castells (one million) but both he and Chari are in general agreement in their overall assement of the events.

In considering the role of media in political events, one cannot ignore the part played by the radio station, Radio Television Libres des Milles Collines (RTLM) in the Rwandan massacre in 1994. 800,000 Tutsis and moderate Hutus were killed over a three month period by extreme Hutus. This followed months of "extreme anti-Tutsi propaganda" broadcasts from RTLM which "explicitly directed that the [Tutsis] be exterminated."[29] RTLM, a private radio station, was on the air for only one year. This was before mobile technology was widely available. It is difficult to say whether the technology would have had any effect against the broadcasts and the horrifically efficient organisation of the genocide, particularly when the international community, including the UN, failed to take any action although the world at large was aware of what was happening.

The following conclusions can be drawn from the examples outlined above:

- Mobile technology can be very effective when used to mobilise and coordinate a large group to respond to some event, especially a sudden political event or manoeuvre but it can also be monitored, to some extent at least, by the authorities.

- Texting is confined to micro-coordination in the political arena, such as publicising the place and time of a meeting, as in other areas of life mentioned earlier. It provides little scope for developing ideas or strategies or elaborating on previous messages. Therefore "mobile phones and texting have to work closely with other media, such as the Internet and radio […] in order to deliver actual political consequences." (Castells *et al.*, 2007, p.193)

- Mobile technology has been effective in mass political movements where "other processes have been in play, including a precipitating event strong enough to arouse anger or other emotions, activist instigators, support from respected institutions such as the church, and supplementary information from mainstream and/or Internet sources."(p.212) It is also apparent that strong, determined leadership with clear, focused goals is required.

- Mobile technology can be used to bypass the mass media or to counteract misinformation disseminated through the mass media. However, false rumours can be spread more easily, although perhaps not as widely, via mobile technology and the Internet and it is easier to create a rumour than to dispel it.

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[29] http://www.rwandafile.com/rtlm/ [Accessed 17th September 2016]

- Castells *et al.* suggest that mobile technology "creates a new form of public space" (p.185) although they also argue that it does not always have high credibility or sufficient capacity to spur two-way civic deliberation."(p.193)

- When disseminating information via mobile phones, if every person forwards messages to those listed in their address books so that in each case the sender is known to the receiver, this enhances the credibility of the message and allows "the network of diffusion [to increase] at an exponential rate but without losing the proximity of the source."(p.201) An example of a contrasting situation occurred during the regional elections in Italy in 2004 when Prime Minister Berlusconi, who already owned some of the television networks, "decided on the eve of the election to send 13 million "personal" messages to cell phones."(p.211) There was widespread indignation at this perceived invasion of "personal and political privacy" and Berlusconi lost the election "by a larger margin than anticipated."

- "It is the person-to-person, horizontal, mass communication, rather than a new technology for top-down mass communication, that accounts for the difference in the mobilizing impact of a given message."(p.211)

- A notable feature of networking technology has been the development of relatively spontaneous communities of practice with a particular goal - flash mobs being the extreme example. Experience suggests that to sustain them long-term, they, or some central steering group, should meet offline on a regular basis.

- Throughout Castells *et al.*'s study, there is an implicit assumption, although with some specific exceptions, that the overwhelming majority of mobile users are young, middle-class and tend to think along the same lines politically.

Beaumont's analysis of events in the early stages of the 'Arab Spring' would support these conclusions. (Beaumont, The Guardian, 25th Feb. 2011) The events led to the overthrow of governments in Egypt, Libya, Tunisia and Yemeni as well as uprisings in other countries throughout the Middle East and North Africa. The role of the Internet and social networking has been exaggerated by some groups and undervalued by others due to over-simplistic assessments of the different situations. Beaumont says the role of the social networks has been "important as it also has been complex, contradictory and misunderstood." It varies according to the local situation and "how people live their lives online in individual countries and what state limits were in place."

In Tunisia, the state was weak as was the case in the Philippines when Estrada was ousted. This may appear a truism but it is unlikely at this point that one could find an example of mobile or social media having an impact against the wishes of a strong repressive state. While the technology may be seen in most cases as democratic, it can also be exploited by autocratic powers. The government in Tunisia shut down Facebook but was then "confronted with a threat by cyber activists to close [the government's] internet accounts" so they had to relent and instead they started diverting accounts to "a fake login page" to steal passwords. (Beaumont) It is possible that such cyber battles will form part of future political revolts.

The events of the Arab Spring were triggered by Mohammed Bouazizi burning himself in Tunisiain protest at his treatment by the authorities. A few months previously, another man had done the same but it wasn't recorded on photograph or film whereas Bouazizi's death was and the images were posted on Facebook to be seen throughout the world. (Beaumont)

The use of mobile technology during the Arab Spring was most effective when complementing other media. For example, in Egypt, while "details of demonstrations were circulated by both Facebook and Twitter, [an] activists' 12-page guide to confronting the regime was distributed by email." (Beaumont) Also, protesters were able to send images and film via Facebook and YouTube to the mainstream media such as Al Jazeera who would then transmit them worldwide including the country of origin where possible.

The significant advantage of mobile and Internet technology over the mass media can be summarised in its relative freedom from the cost constraints of the latter and the fact that it is "unlimited by publication deadlines and broadcast news slots." (Beaumont)

4.2   Information and Knowledge

Data, information and knowledge form a hierarchy with data at the bottom and knowledge at the top. Despite these terms, particularly information and knowledge, being used as prefixes to describe so many aspects of the world, e.g. -society, -industry, -economy, -revolution, etc., there are no agreed, workable definitions. In fact the terms are often used interchangeably. Machlup quotes various definitions including "[i]nformation…. is essentially raw data, Knowledge ….is interpreted data." (Machlup, 1980, p.8) This, however, would imply an inversion of the relationship between data and information as given earlier. Machlup himself distinguishes between information and knowledge by defining information as a "process by which knowledge […] is transmitted." But he immediately qualifies it by saying that when the term 'information' is used to describe the contents of the communication rather than the

process, "one may want information to refer to the knowledge currently conveyed by [the process] in contrast to the knowledge previously accumulated in the knower's mind or records."(pp.8-9) Roszak quoting Machlup says "Information […] is acquired by being told, whereas knowledge can be acquired by thinking." (Roszak, 1994, p.93)

Brown and Duguid also refer to the role of the 'knower' in relation to knowledge. Whereas information is independent, "more-or-less self-sufficient" and can be easily retrieved, forwarded, quantified, compared etc., "knowledge seems to require more by way of assimilation. Knowledge is something we digest rather than merely hold." Knowledge "entails a knower" and because of this attachment, it is "harder to detach than information." (Brown & Duguid, 2002, pp.119-120) From this they conclude that "as the abundance of information overwhelms us all, we need not simply more information, but people to assimilate, understand, and make sense of it." (p.121)

Lyotard, in contrast, expects "a thorough exteriorization of knowledge with respect to the "knower"" and believes that the "old principle that the acquisition of knowledge is indissociable from the training (*Bildung*) of minds, or even of individuals, is becoming obsolete and will become ever more so." (Lyotard, 1984, p.4) For Lyotard, knowledge has two principal functions - "research and the transmission of acquired learning." The channels through which learning is transmitted are being transformed "by the proliferation of information-processing machines" and knowledge "can fit into the new channels, and become operational, only if learning is translated into quantities of information." (p.4)

Following Mintzberg, one could locate data, information and knowledge along a 'hard/soft' scale with data occupying the hard end, resident in a machine and having a high level of accuracy, a high degree of certainty but not possessing the richness of knowledge which would occupy the other end of the scale. Knowledge is soft, resides in people's heads and would have a lower level of accuracy and certainty than data. On this continuum, information would be located between the hard data and the soft knowledge (Adam & Murphy, 1999, p.36). Other than this, it is very difficult to find a clear and satisfactory definition of the term 'data' anywhere else in the literature. However, because of their almost universal influence on ICT, it is worth noting Schmidt & Cohen's somewhat stark definition that "data itself is a tool" and "[e]veryone in society benefits from digital data." (Schmit & Cohen, 2013, p.15)[30]

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[30]Eric Schmidt and Jared Cohen are Executive Chairman and Director respectively of Google.

Luhmann defines information, within the context of autopoietic systems, as an event which is part of a communication. It "is a surprising selection from among several possibilities. As a surprise, it can neither be enduring nor able to be transported; and it has to be produced within the system, since it presupposes comparison with expectations." (Luhmann, 2012, p.36) "If one utters a specific sentence, this sentence is chosen from the set of all sentences that could be uttered. This set is determined by what was said beforehand." (Luhmann, 2013, p.216) The range of possibilities for selection, the "horizon of expectations," (p.217) sets the context. The message is understood in the context of the communications that preceded it. This should eliminate any possibility of ambiguity. Luhmann notes that the code for the mass media, i.e. information/non-information, is very different to the code for art. "Works of art must display sufficient ambiguity, a plurality of potential readings" and he cites Finnegans Wake as an example. (Luhmann, 2000, p.128, n.15)

Since, within Luhmann's theory, information provides a surprise, then it cannot be repeated. "If it is repeated, the only information that is still there is that apparently someone considers it necessary to repeat it." (Luhmann, 2013, p.217) When a news item is repeated in the media, it retains its meaning "but it loses its information value" so the media system is constantly "transforming information into non-information." However, the autopoietic process is feeding the non-information back into the system "and in doing so forces itself constantly to provide new information." (Luhmann, 2000, p.20) Advertising, of course, makes use of repetition. Luhmann explains it as "the reflexive figure of the information value of non-information [being] used as an indicator of significance and of meriting rememberance." The viewer "notices the repetition of the value of the product." (p.20) The consistency of the message stands out particularly against the background of constantly changing news.

Luhmann gives other examples to highlight the distinction between information and meaning. In the language of biologists, "genetic codes contain information, although as a matter of fact they consist of structures and not of events." Also, following one of his examples, University College Cork is not information. One is not surprised every time one sees it that it is still there. It is a structure and it has meaning - we know why it exists - but it "has no informational value." (Luhmann, 2013, p.90)

The Kennedy-Nixon debates in the 1960 U.S. Presidential Election were broadcast on radio and television. After the first debate, polls of television viewers put Kennedy ahead while polls of radio listeners put Nixon ahead. Both groups heard the same discussion but for some, if not all of the viewers, the visual image provided an additional element to assist them in making a judgement. Kennedy presented the better image and this was reflected in different ways. His darker suit made him stand out more prominently; he looked more relaxed and therefore more confident and credible, and he appeared to focus more on the viewers, i.e. the electorate, whereas Nixon was seen to focus mainly on his

opponent (Dallek, 2003, pp.284-287). By accommodating two of the senses rather than just one, the television broadcast provided more information, a greater richness and more context.

Most of the information processed on computers is communicated to us visually, i.e. primarily via text but also via images. The information we impart is, in most cases, visual or auditory. However, we gather information through the five senses. Therefore, the information we receive through the electronic media is limited, and limited essentially to 'hard' information.

Roszak highlights how simple projects such as making breakfast "have defied the best efforts of cognitive scientists to program them." (Roszak, 1994, p.237) However, the preparation of food may require all of the five senses in order to process the relevant information to accomplish the task properly. So, from an information processing perspective, making breakfast is quite a complex task as are most of the things we do instinctively. But it is not just the additional senses that introduce extra complexity. For example, if two people meet to discuss something, how they greet one another could influence the content of the discussion. A cold greeting by one might be seen by the other as signifying an expression of power and dominance and as a result they might be less open or forthcoming in the discussion. It may be possible to write an AI-type program to represent the 'cold' greeting, but whether a high level of accuracy could be achieved is debatable and in practical terms it would be dependent on a high level of abstraction in the programming.

A high level of abstraction is closer to the vernacular than low-level computer languages which are closer to the operational processes of the machine. If a program is written in a very high-level language, the programmer can focus primarily on the problem to be solved rather than on the workings of the computer and on the unique features of the particular model of machine being used. The program will probably generate a larger program or set of programs automatically in a lower language and these may generate further programs with the cycle continuing down the levels until eventually the last stage is reached where the compiler translates the program or programs into machine instructions which can be processed directly by the computer. Colburn describes three types of abstraction in programming - language abstraction as described above; procedural abstraction to accommodate commonly used procedures such as matrix multiplication; and data abstraction to manage machine-oriented data types such as arrays, floating-point numbers etc. (Colburn, in Floridi 2004, pp.322-325)

Roszak expresses concern that such abstraction further removes the machine from human responsibility and quotes Donald Michie as saying that it could lead to a "technological black hole" in which "humans will not be able to understand the reasoning behind computer results that make key decisions."(Roszak,

1994, p.231)[31] The Y2K project that dominated the latter half of the 1990s is evidence that this risk was, and probably still is, widespread.

The abstraction is achieved through language, in this case various levels of computer programming languages. It is worth noting in this context Lyotard's comment that "for the last forty years the "leading" sciences and technologies have had to do with language." (Lyotard, 1984, p.3)[32] According to Roszak "the new biology has been so tightly entwined with the language and imagery of information science that it is almost impossible to imagine the field developing at all without the aid of the computer paradigm." He provides examples of how biochemists latched on to the concepts and terminology of information science and those developed by Norbert Weiner for his theory of cybernetics (Roszak, 1994, p.17). And it is interesting to note that much of this was subsequently adopted by Luhmann for his theory of society.

In the field of astronomy, Bernard Lovell asked if computers are "antiserendipitous" since they "act as very narrow filters of information; they must be oriented to specific observations. In other words, they have to be programmed for the kinds of results that the observer expects." This raises the question of whether "they may be obscuring from our understanding further major features of the universe". (p.115, quoted from Science Digest, June 1984, p.94) A similar question arises in relation to the Human Genome Project which set out to "revolutionize the diagnosis, prevention and treatment of most, if not all, human diseases" through sequencing the human genome. While it provided some valuable insights, the project failed in its stated objective. This, some would claim was due to an overall strategy that focused primarily on the computational aspects of DNA sequencing rather than on the biological aspects of genes (Hall, 2010, pp.60-67).

4.3   Communication

Luhmann defines society as a communication system (Luhmann, 2012, p.52) comprising functionally differentiated subsystems (p.75). This is in contrast to the stratified traditional and tribal societies that persisted until feudal times and were differentiated on the basis of status. The Greeks were the first to make a move away from the tribal society which was dominated in their case, as mentioned above, by the druids. This followed the invention of writing using the phonetic alphabet around the eight century BC (Havelock, 1963, p.39) which "moves speech from the oral-aural to a new sensory world, that of

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[31] Quoting from "Computers that could lead to Disaster", in New Scientist, January 17th 1980, p.160
[32] The areas of science Lyotard refers to are "phonology and theories of linguistics, problems of communication and cybernetics, modern theories of algebra and informatics, computers and their languages, problems of information storage and data banks, telematics and the perfection of intelligent terminals, paradoxology." He was writing this in the late 1970s before the first microcomputers (PCs) became available. He says this list is not exhaustive.

vision [and] transforms speech and thought as well" and restructures the human lifeworld (Ong, 1982, p.85). The phonetic alphabet, according to McLuhan, provides "the meaningless sign linked to the meaningless sound [with which] we have built the shape and meaning of Western man" (McLuhan, 1962, p.50) and "sacrifices worlds of meaning and perception that were secured by forms like the hieroglyph and the Chinese ideogram."(McLuhan, 1967, p.93)

Speech at its most primitive is emotive, even animals can express emotions acoustically. As speech developed through language it became more propositional although to this day practically all speech, other than formal sentences of mathematics, retains "a certain affective emotional tinge." (Cassirer, 1992, p.29) Speech tends towards the emotive, writing tends towards the objective. Speech is embodied, writing tends to be disembodied and detached. The visual is focused, the acoustical is not. "In tribal cultures, experience is arranged by a dominant auditory sense-life that represses visual values. The auditory sense […] is hyper-esthetic and delicate and all-inclusive. Oral cultures act and react at the same time. Phonetic culture endows men with the means of repressing their feelings and emotions when engaged in action." (McLuhan, 1967, p.96) People in oral cultures who have no experience of writing "learn a great deal and possess and practice great wisdom, but they do not 'study'." (Ong, 1982, p.9)

The phonetic alphabet enabled a high level of abstraction and this has been taken to the extreme with the development of binary digital representation of information. The introduction of electricity was, obviously, the other significant factor in the development of communications since they could now be transmitted instantaneously, or at the "speed of total causality." (McLuhan, 1967, p.370) In other words, based on our present level of knowledge, we have reached the limit in terms of abstraction capability and of speed in communications technology and this should provide us with far greater clarity of understanding in our communications. But electricity has other attributes besides speed which complicate the situation.

Mechanisation implies a linear sequence of operations but automation, enabled by electricity, allows "instant synchronization of numerous operations." (p.372) With electrical technology "the utmost variety and extent of operations in industry and society quickly assume a unified posture" just as the "central nervous system is not merely an electric network, but […] constitutes a single unified field of experience."(p.371) If McLuhan were around to experience the Internet, he would regard it as an extension of the central nervous system. But McLuhan also suggested that those of us in the Western world are facing a significant disadvantage "as against the "backward countries" [since it] is our enormous backlog of literate and mechanistic technology that renders us so helpless and inept in handling the new electric technology." (McLuhan, 1962, p.27)

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Through radio and television we are informed almost instantaneously of events around the world. The news is shared across the globe and our world becomes the Global Village. It becomes more difficult to remain detached from what is happening around us. But there are different levels of detachment/involvement. In the case of an event such as a football match, there are the players who are participating in the sport; the spectators in the stadium who are participating in the event and the television viewers who are passively viewing and listening to the mediated report of the event. This applies across most areas of public life such as politics, citizenship, the arts etc. where there are few active participants but there are many whose involvement is confined to viewing and listening. This brings back, to some extent, the passive aspect of tribalism which literacy helped to eliminate. Some aspects of pre-literate culture can be experienced again. The dominance of the written word is challenged by the oral-aural experience, an experience Ong refers to as 'secondary orality', which is an orality "that is sustained by telephone, radio, television, and other electronic devices that depend for their existence and functioning on writing and print." (Ong, 1982, p.11)

Feenberg substitutes the distinction "between *repeatable* and *retrievable* discourse" for that between oral and literate cultures (Feenberg, 1995, p.136) to highlight their roles in preserving the social memory and social integration. For the preservation of social memory, oral cultures "rely heavily on repetition […] and access to the text is not under individual control but regulated socially through participation in public functions and performances" whereas individuals in a literate culture who are free from such regulation can access, and interpret for themselves, permanent texts of the present and past whenever they wish. However, Feenberg notes that the distinction is not as significant today due to the fact that speech can be recorded and retrieved also.(p.136) But the retrieved speech (or image) can be edited, changed or reproduced in a different context to the original and the source material does not, yet at any rate, have the same authority as the written word.

Havelock takes a different view, stating that in every society there is "a linguistic statement or paradigm, telling us what we are and how we should behave" and this is " drilled into the successive generations" in literate societies " through books or controlled by written documents as it was in preliterate society which lacked documents." He adds that "a collective social memory, tenacious and reliable, is an absolute prerequisite for maintaining the apparatus of any civilisation." (Havelock, 1963, p.42) But is such a paradigm, geared towards social cohesion or integration, compatible with a functionally differentiated society? Does ubiquitous technological connectivity express today's paradigm? I return to these questions below (See 4.5).

The Internet provides for active involvement which effectively does not exist for radio listeners or television viewers. But, while one can participate in public discussion on the Internet, one can use anonymity or a false identification to refrain from taking responsibility or committing oneself.

By definition, all media mediate and they can do it at a number of levels. In mediating, they select or tailor the context. Reporters mediate as do commentators, editors, script-writers, cameras, microphones etc. It is impossible to communicate information without mediating.

4.4   Reach of ICT

4.4.1   ICT in the Home

In a research paper prepared in 2000, Lewis sets out a vision of ICT in the connected or networked home (Lewis, 2000). While all the technology envisaged by Lewis was available when she produced the report, it has not yet been adopted on a wide-scale basis. This is, perhaps, because while the technology is available, the necessary infrastructure is not fully in place or perhaps it is such a major innovation - an invasion of what many would regard as a protected space - that the 'market' is not yet ready for it. The success of the smartphone, however, could accelerate the adoption of the 'smart' home since it could act as the integrated remote control to manage all the systems whether one is at home or away.

The vision for the home of the future that Lewis sets out is one where practically all appliances and systems are connected so that they can be controlled automatically, locally or remotely via the Internet. These include the systems for heating, cooling, lighting, security, entertainment, health care, home office systems for personal and work-related business including teleworking, e-learning and distance education systems as well as the standard text, voice and video communications systems for keeping in touch with family and friends. These systems would be controlled by "digital butlers" which would monitor the internal and external environment and adjust accordingly. Voice-activated control systems and biometric systems for security would also be used as would alarm systems to detect defects such as leaks etc. Other facilities would include telemedicine-based applications for the elderly, infirm or housebound and links to local services providing immediate information on buses, trains and other services as well as links to government services for tax returns etc.

In the context of today's technology, there is nothing extraordinary in Lewis' vision but the vantage point from which some see it can raise concerns about what's driving it. For example, Roszak quotes an article in the Futurist which reassures us that "[o]nce your house can talk to you, you may never feel alone again" and he quotes Pamela McCorduck saying that the future home will be "equipped with a "geriatric robot" that will solve "the problems of aging."" (Roszak, 1994, p.35)

Though everyone knows what home is, it is not easy to give a complete definition. It is often defined as the family residence but it is more than a building, a house or a location. It also comprises relationships within the family and relationships with the local community and the wider world. Emotional attachments are a particularly significant attribute of the home. The life of the home is very much in contrast with the rational workings of the external environment, the civic world or the world of work. While the Internet can help to keep families connected, it is unlikely that it, or any other physical technology, could adequately represent the connections that exist in the home. This is best summed up by Dreyfus' remark that "[w]hatever hugs do for people, I'm quite sure telehugs won't do it." (Dreyfus, 2009, p.68) The home is a protected space even though the physical space may overlap with the workspace in the case of people working from 'home'.

While the Internet and the associated technologies can help to maintain communications with those who are physically absent, people regularly absent themselves mentally from their physical surroundings through their preoccupation with these technologies and it can be argued that this is leading to the breakdown of relationships within the home as we know it. The Internet can not only connect people, it can also separate or isolate them. Schmidt and Cohen state that the Internet and mobile devices enable "individuals to transcend their current environment" (Schmidt & Cohen, 2013, p.185) but in doing so it is in danger of impairing some of the existing environments. The secure and intimate environment of the home could be sacrificed for the technologist-designed environment of the Internet.

The basis of the model which Lewis describes is quite simple - connect everything. While it refers to the house, it nevertheless tries to blast through every aspect of the protected emotional space that is the home. There is no purpose behind it other than the fact that it can be done, like Mallory's reason for climbing Everest "because it is there." The model is expressed today in the 'Internet of Things' although it's not far removed from the dystopian version described almost a century ago by E.M.Forster (Forster, 2011).[33]

4.4.2   *ICT in Education*

Illich, in his proposals to 'deschool' society, or put another way, to democratise education, argues that effective skills training can be achieved only if it is "freed from curricular restraints" and an effective liberal education can be achieved only if it is "dissociated from obligatory

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[33] Forster's *The Machine Stops* was originally published in 1928.

attendance." (Illich, 2002, p.17) He is opposed to the institutionalisation of education, because the control of education and of other social services by the state marginalises the poor and leaves them without power over their own circumstances (p.3). For Postman, "[s]chools became technocracy's first secular bureaucracies, structures for legitimizing some parts of the flow of information and discrediting other parts […] in short, a means of governing the ecology of information." (Postman, 1993, p.63) He uses the term 'ecology' to convey that attribute of the information environment whereby a significant change in one area or component changes the whole environment. He extends it to the world of technology saying that a "new technology does not add or subtract something. It changes everything." (p.18)

The alternative to traditional schooling that Illich proposes is to provide ready access to the available resources for anyone who wants to learn at any stage in their lives. He would be in agreement with Brown and Duguid, when they say that while learning tends to be regarded "as a supply-side matter, thought to follow teaching, training, or information delivery", it is in fact "much more demand driven. People learn in response to need." (Brown & Duguid, 2002, p.136) They refer to Tagore's story about the teacher who was "determined to teach [him] music, and consequently no learning took place." But he did "pick up from him a certain amount of stolen knowledge" by watching and listening to him when he "played for his own and other's entertainment." (p.136)

Illich categorises the necessary learning resources under four headings. First, *things* such as books, libraries, laboratories, workshops etc. Second, *models,* that is people with particular skills or expertise that they are willing to share with anyone wishing to learn them. Third, *peers* such as colleagues with whom the learner can share or discuss their studies or wider issues reflecting to some extent the environment Newman suggested for his university. Fourth, *elders*, who would act as consultants providing direction and advice for the learner (Illich, 2002, pp.75-76). The initiative is with the learner who creates a small support community around him or her and reciprocates in the process by supporting their endeavours.

Writing a good while before the Worldwide Web or even the Internet became a reality, Illich encourages the use of technology to develop these communities and in this context mentions computers, telephones, film, and recordings (p.19) while designating the "the reticular structures for mutual access" in the communities as 'learning webs' or 'educational webs' since 'web' is a "word less evocative of entrapment" than 'network.' He gives the example of the TV networks which have become institutionalised by the bureaucrats who decide on the content which they believe is "good for or in demand by the people" and he warns that "[t]echnology is available to develop either independence and learning or bureaucracy and teaching (pp.76-

77)." This is very pertinent in the light of some of the excessive claims being made about the benefits of ICT in liberating the education system by its evangelists as is the warning from Dewey issued long before technology became a significant factor in school. While advocating greater freedom in the education process than exists in the traditional school, he says "that an educational philosophy which professes to be based on the idea of freedom may become as dogmatic as ever was the traditional education which is reacted against." (p.22)

Illich's ideas are very revolutionary but are not out of harmony with Dewey's more moderate approach. Dewey was opposed to the authoritarianism and rigidity of the traditional school system and the way in which the subjects taught were not, or at least not necessarily, related to the life experience of the learner. Rather, there should be "an intimate and necessary relation between the processes of actual experience and education." (Dewey, 1963, p.20) He argues for an education environment based on individual freedom and "democratic social arrangements", on "mutual consultation and convictions reached through persuasion." (p.34)

Learning should develop through progressive experiences which "are linked cumulatively to one another" and avoid the disconnectedness that "may artificially generate dispersive, disintegrated, centrifugal habits." (p.26) But the progression of experience could go in the wrong direction and induce, for example, "a lack of sensitivity and of responsiveness" which might restrict the possibility of richer experiences later or the learner's "automatic skill in a particular direction [could] land him in a groove or rut." (pp.25-26) It is the role of the educator, who possesses greater insight and more mature experience, to evaluate the direction and "moving force" of the learner's experience and organise the conditions to enable it. The learner's experience is dependent on his or her previous experience and on the experience of the educator since "all human experience is ultimately social." (p.38)

Stonier sees "the decentralisation and democratisation of education" leading to the "expansion of information [which] will make it increasingly difficult for teachers to keep up with new developments." As a result "there will be increasing reliance on students teaching students and students teaching teachers. The common effort exploring new knowledge can be extremely rewarding." (Stonier, 1983, p.179)

In his critique of distance learning, Dreyfus outlines five stages in the learning process that one must progress through to become an expert in a particular domain with a sixth stage if one is to become a master. (Dreyfus, 2009, pp.27-44) These stages are as follows:

1. *Novice:* The learner is introduced to facts, rules and procedures and the learning is essentially a matter of drill and practice. Information is to be consumed and this can be facilitated by the Internet which "can offer an improved version of the correspondence course."

2. *Advanced beginner*: The information is put in context through the introduction of new "situational aspects" and ideally this would be achieved through direct interaction between instructor and learner but it could be achieved also through distance learning.

3. *Competence*: The learner recognises the wide range of possible situations, distinguished only by subtle differences and with solutions which are less well-defined. The learner has to take responsibility for the decisions and emotions come into play - emotions of fear in anticipation and relief or joy or alternatively disappointment at the outcome. The learner becomes very dependent on the experience of the instructor and the relationship between them in this and subsequent stages has to be embodied through face-to-face contact. Dreyfus stresses the Internet's shortcomings in this area which "may well leave students stuck at competence."

4. *Proficiency:* In this stage emotional involvement is essential and the "resulting positive and negative emotional experiences will strengthen successful responses and inhibit unsuccessful ones." The proficient performer can intuitively "discriminate among a variety of situations" but will still have to work out the best solution.

5. *Expertise:* The individual can be deemed an expert when they are capable of providing an "immediate intuitive situational response" to a problem or event. Reaching this level of expertise requires significant involvement in real-life situations or simulations such as case studies.

6. *Master:* Mastery is achieved when one has the confidence to "respond to novel situations without time for deliberation" or to consciously override "conventional expertise […] to yield improved performance." These situations require a strong emotional involvement from the master.

One can achieve only competence via distance learning. Each level requires a greater commitment, a greater personal or emotional involvement on the part of the learner. One has to develop a greater passion in relation to the discipline, matter or mechanism with which one

is working. It would be very difficult to achieve this in the detached environment of distance learning. Proficiency and expertise require the experience and example of an instructor while mastery is achieved by those with expertise who, on their own, push out the boundaries of their field or discipline.

Getting personally involved in order to become proficient or expert in an area means that one has to make a commitment to the area, a commitment that cannot be easily revoked. In doing this one has to put one's trust in others - instructors, teachers, other learners in the group or class etc. - and trust involves risk. In Luhmann's words "it must be possible for the partner to abuse the trust; indeed it must not merely be possible for him to do so but he must also have a considerable interest in doing so." (Luhmann, 1979, p.42) There is also the risk of failure, the fear of which is made particularly acute by the presence of others. This is balanced by the possibility of experiencing success, an experience which is intensified by their presence. The intensification of the experiences, both positive and negative, is a very significant factor in the learning process since it helps one to remember and to hone one's skills.

Not alone does the learner make him/herself vulnerable in entering the commitment but the instructor is doing the same. Any perceived weakness in the expertise of the instructor will diminish the learner's confidence in him/her and the awareness of this risk will help to further sharpen the instructor's skills. This contributes to the instructor's mastery of the subject or discipline and must, in turn, contribute to its development.

The learner also makes him/herself vulnerable when doing experiments in the laboratory but this vulnerability is largely removed when the experiments are simulated on a computer. As Roszak notes, the experiment "already edits reality for purposes of focus and control; the simulation now edits the experiment by eliminating the real scientific work involved […] But even worse, it neatly eliminates the risk, which is the whole point of experimentation." (Roszak, 1994, p.70)

For Dreyfus "the crucial question is whether our relation to the world is that of a disembodied detached spectator or an involved embodied agent" (Dreyfus, 2009, p.53) and there are aspects of learning, such as cultural style, which are "too embodied to be captured in a theory." (p.46) He also refers to the term 'Urdoxa', which he describes as an embodied and "constant readiness to cope with things in general that goes beyond our readiness to cope with any specific thing." (p.56)[34] Human interaction cannot be understood in its full context unless perceived by the

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[34] Dreyfus attributes the term 'Urdoxa' to Merleau-Ponty but the reference given appears incorrect.

whole body and quoting two roboticists, he says that "it cannot be captured by adding together 3D images, stereo sound, remote robot control, and so forth." (p.57)[35] For Merleau-Ponty,"[the] life of consciousness […] is subtended by an 'intentional arc' which projects round about us our past, our future, our human setting, our physical, ideological and moral situation [and] brings about the unity of the senses, of intelligence, of sensibility and motility." (Merleau-Ponty, 1962, p.136)

Dreyfus points to the example of why people attend the theatre when they could see a film for a small fraction of the price. It is the presence of the cast and the audience and the interaction between them that provides a richer experience and also the fact that the individual members of the audience can choose what to focus on at any particular time whereas in the cinema that is decided by the Director (Dreyfus, 2009, p.60).   Something similar happens when a teacher is delivering a lecture over a video link.   The teacher cannot choose very easily who or what to focus on in the class. Nor can the teacher pick up what she would normally get through peripheral vision.   She cannot make eye contact with the students or detect very interested or bored students. More importantly, what is missing "is a sense of the context, […] the mood in the room."(p.59) This can have a strong influence on the interaction between the teacher and students.   In a somewhat similar vein, Brown and Duguid emphasise the significant role of the social forces in the background. It is not "the information that creates that background. The background has to be in place for the information to register" and they use the analogy of the ripple from a disturbance on the lake - "[w]e notice the ripple and take the lake for granted. Yet clearly the lake shapes the ripple more than the ripple shapes the lake." (Brown & Duguid, 2002, pp.138-139) Teachers or students in a distance learning situation can focus in on the 'ripple' but they can't fully experience the 'lake' and all that is happening in and around it just on the PC screen.

Discussing the integration of technology into the school system, Schmidt and Cohen forecast a transformation of education to "a more flexible experience adapting itself to children's learning styles and pace."(Schmidt & Cohen, 2013, p.21) Technology will provide for more interactive workshops for the students. "Critical thinking and problem-solving skills will become the focus in many school systems as ubiquitous digital-knowledge tools […] reduce the importance of rote memorization."(p.21) This brings us back to King Thamus' response to Thetus when the latter reported that he had invented writing, something which "will make the Egyptians wiser and will improve their memory; I have invented a potion for memory and for wisdom." Thamus

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[35] The two roboticists, John Canny and Eric Paulos, "criticize the attempt to break down human- human interaction into a set of context-independent communication channels such as video, audio, haptics, etc."

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replied that "[y]ou have not discovered a potion for remembering, but for reminding; you provide your students with the appearance of wisdom but not with its reality […] And they will be difficult to get along with, since they will merely appear to be wise instead of really being so." (Plato, 1997, pp. 551-552 (*Phaedrus 274 e – 275*)

Schmidt and Cohen advocate an educational environment which will still be based primarily in the school but will make extensive use of tools "in the spirit of the Khan Academy, a nonprofit organization that produces thousands of short videos (the majority in science and math) and shares them online for free." (Schmidt & Cohen, 2013, p.21) Steven Duggan of Microsoft speaks of the potential of resources such as the Khan Academy, which "reaches 216 million students with 26 teachers" in the developing world (Irish Times, Technology Section, 10th April 2013) but he has "mixed feelings" about the effectiveness of such resources in the developed world where the education system is using "bankrupt models" and the challenge is "to convince parents that things are broken." The need, he says, is for "a personalised learning and teaching" and he points to "the irony of collaborative learning projects that culminate with students sitting exams individually."

For Schmidt and Cohen, personalization is also "the key advance" that technology provides through "devices, screens and various machines [which] will offer entertainment, wanted distraction, intellectual and cultural enrichment, relaxation and opportunities to share things with others." For the educational experience in countries in the underdeveloped and developing world which "will not be left out of the advances in gadgetry and other hi-tech machinery," (Schmidt & Cohen, 2013, p.15) they advocate the predictability of the virtual world to overcome the volatility of the physical world (pp.22-23).

It is clear that there are, at least potentially, many shortcomings or inconsistencies in the examples above but they are provided by individuals from two of the top ICT companies in the world, Google and Microsoft whose ultimate interest is in selling technology. The analysis they provide of the existing problems in education is superficial. If the experience of students is confined to the predictability of the virtual world, they will not be well equipped to face the uncertainties of the real world. Technology can be a great educational resource particularly where there is a need to reach large numbers of students or where teachers are in short supply. However, to say that technology can provide an overall superior educational experience to that provided by people is to claim that the virtual world is more real than the physical world. Teachers, instructors or mentors are still needed to manage and assist in the delivery of the material to the students. If the greatest universities in the world still require a large team of librarians to assist the academics in their use of the information resources, how can those with

poor education, limited or no literacy and few resources of any kind, be expected to get full benefit from hi-tech systems without the presence of significant personal help?

Making the case for the deployment of ICT in education is not confined to sources within the industry itself. It is taken up, even more enthusiastically in some cases, by teachers, parents, education administrators, politicians and most of those in any way involved or interested in the education system but the arguments tend to remain at a very superficial level. One school principal insists that ICT enables "the expansion of the role of the teacher as an "information provider" to accommodate that of "information facilitator"."(Irish Times, Education Today, Teaching Matters, 25th April, 2006)[36] The idea of learning is moving from that of a social activity to that of information consumption. Roszak's definition of education as "the unmediated encounter of two minds" (Roszak, 1994, p.63) is an irrelevancy in this scenario.

David Puttnam acknowledges the crucial role of teachers as "trusted learning guides" through the "cornucopia of information" provided by the worldwide web (Irish Examiner, 29th August 2012, p.13). He says we must prepare today's students "for a world of increasing unpredictability" and unprecedented "competition and complexity" and that digital technology is "likely to be the driving force" behind such developments. Nevertheless, his overall argument is for intensive planning and investment to harness the opportunities provided by digital technology - in other words, we should invest in more digital technology to overcome the problems caused by it.

The circularity in Puttnam's argument is reflected in Stonier. He says the "basic principle of new wealth creation" in the post-industrial economy is "the conversion of 'non-resources' into useful products" through the application of advanced technology which is based on "knowledge, especially advanced science." He adds that "its store of information is [society's] principal asset, its greatest potential source of wealth" in a post-industrial economy (Stonier, 1983, p.12). He says an expansion of education "is required to upgrade the human capital to make the workforce economically more productive […]; to create an informed citizenry capable of manoeuvring effectively in an information economy; and to keep everyone from going neurotic in a rapidly changing information environment." (p.13) He also says that "education will grow to become the largest industry in the post-industrial society." (p.18) The question must be asked: in this scenario, is there any element of functional differentiation left between education and industry?

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[36] See also, under same heading, on 20th March 2007

Puttnam's call for greater investment in ICT in schools is one that has been echoing through the education world for almost four decades. As soon as the first PCs or 'microcomputers' came on the market in the late 1970s, there was a major push to get them into the schools. This came, not just from the ICT industry, but from the education and government sectors and, to a lesser extent at that stage, from business and industry generally. Despite the concentrated effort to get the machines into the schools there was no clear policy or plan to indicate whether the schools were "to teach *about* computers, or *through* computers, or *by way of* computers" (Roszak, 1994, p.50) or whether the curriculum was "to adapt to the computer or the computer to the curriculum (p.52).

The drive to put computers in schools was part of a wider campaign in many countries to get the population generally to accept the new technology. The campaign in Britain, as a good example, has been well documented by Webster and Robins. In 1978, Prime Minister Callaghan spoke of the rapid industrial change that was beginning to happen and which would provide the people with "a range of goods and services they could never previously afford." But they had to be well prepared for it because they couldn't lose any time if they were "to reap the maximum benefit from the new technology." (Webster & Robbins, 1986, p.14)

In 1982, Prime Minister Thatcher's Conservative Government launched a major campaign, *IT'82*, "offering a program of travelling exhibitions, subsidized conferences, and demonstration projects." (p.15) Assurances were given that it would "not dodge the issue of social change" but, in fact, it was "nothing less than a massive propaganda exercise extolling I.T." and as it progressed it came to define its role as that of "informing and enthusing as many people as possible of the benefits of Information Technology" with the Prime Minister herself promising that the government would "continue to encourage people to *accept* the new technology." (p.15, original emphasis) The campaign pressed many of the clichéd emotive buttons - IT would help care for premature babies; care for people from birth to old age; eliminate boredom and danger from the workplace; provide more leisure time; "Is the technology in your local more advanced than the technology in your factory?!" and the call to patriotism: "Without IT, Britain will decline."(p.15)

IT'82 focused particularly on the schools, providing literature, films, posters etc., some of which was partly funded by the ICT industry as well as encouraging 'computer camps.' In parallel with *IT'82* other programmes were initiated such as the Microelectronics Education Program while in the universities, extra resources were provided for computing and electronic engineering "while research funds [were] cut almost everywhere else." (p.16) Meanwhile, Occasional Papers from the Council for Educational Technology were calling for "an injection

of technology into the curriculum [because] the task of education" is to help "our kind to make the transition to a new lifestyle."(p.16)

The circular argument of Puttnam's above is heard again in *IT'82:* "IT is […] helping to educate our children and to equip them to exploit fully the information revolution."(p.15)

Galbraith warns that as far as demand and production are concerned, education "is a double-edged sword." On the one hand "it is essential to the technical and scientific requirements of modern industry" (Galbraith, 1970, p.228) while on the other hand, by "inducing more independent and critical attitudes, it undermines the want-creating power […] and enables people to see how they are managed in the interest of the mechanism that is assumed to serve them."(pp.228-229) Rather than being a threat to demand, however, a process got underway to make ICT an integral part of the educational system once the first personal computers came on the market. This was achieved in three ways. Firstly, despite the very limited functionality and high cost of the early machines, they were introduced into some schools - in many cases sponsored by the industry - but they were enough to associate them with a status which other schools would feel under pressure to emulate. Secondly, the schools became part of a system, particularly when the Internet arrived and it became more difficult for individuals or schools to opt out. Thirdly, the industry focused on the younger generation, down to the pre-teenagers, as providing the gateway to the market.

Games were a very prominent feature in the early personal or microcomputers so even very young people were attracted to them and quickly understood how to use them. Also, they didn't have the inhibitions older people had about possible damage they could cause by submitting the wrong command. Then a series of developments took place such as the downloading of games and music once the worldwide web became available, followed by social media and then by the marketing of the mobile phone as a consumer device with attractive payment options. These developments maintained the focus on the younger generation as the key to the wider market. This process was not confined to the ICT industry. Other sectors such as the fast food industry as in the example of McDonalds and KFC mentioned above on page 96 and the media industry itself identified ways in which they were able to exploit social media for their own marketing. It became obvious that "the cell-phone [could] further empower large corporations in shaping the consumerist identity of young cell-phone users."(Castells *et al.*, 2007,p.167)

The situation was exemplified by the launch of the iPhone6 in September 2014. The advance publicity centred on the fact that the screen size would be 4.7" as against the 4" screen on the

iPhone5. The event itself, which included a performance by U2, was headline news across much of the world media and received many pages of what was effectively free advertising in the newspapers.[37] By the following week the product itself was shown to have serious defects in the software and in the hardware. A similar example was the publicity given to the thoughts of Mark Zuckerberg, the CEO of Facebook, where the radio and television headlines throughout the day carried the story that he was considering adding a 'dislike button' to the Facebook application (RTE and NBC news bulletins, 16th September 2015). This is about as close as one can get to deification.

The role of ICT in education cannot be defined until the role of education itself is defined. Postman says that the answer given to the question why computers are considered necessary in the classroom, is: "To make learning more efficient and more interesting" and this is considered quite adequate because in the environment created in society by the new technologies (i.e. "Technopoly"), "efficiency and interest need no justification." ""Efficiency and interest" is a technical answer, an answer about means, not ends." It does not tell us what learning is for.(Postman, 1993, p.171) Sixty years earlier, Russell made the same observation that the "narrowly utilitarian conception of education ignores the necessity of training a man's purposes as well as his skill." (Russell, 2004, p.23)

Russell's advocacy of the "contemplative habit of mind" is also relevant here since the use of computers by children is associated very much with interactivity and in some cases, hyperactivity. For him, "[t]here is in the world too much readiness, not only for action without previous reflection, but also for some sort of action on occasions on which wisdom would counsel inaction […] Action is best when it emerges from a profound apprehension of the universe and human destiny."(p.24) One has to ask how there appears to be more intensive action required in this information age when the promise was that it would deliver much more leisure time.

4.4.3   ICT in Business and Government

In this section I use the term 'business' in the widest sense covering the provision and exchange of goods and services in the private, public and voluntary sectors and take account of the organisational and economic environments within which these operations take place.

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[37]Coverage in the main Irish newspapers on 10th September 2014, the day after the launch, included front page coverage and all of page 3 in the Irish Examiner; a front page banner entry plus half page 2 and all page 3 in the Irish Independent and significant front page coverage plus all the reportage on page 3 in the Irish Times.

In the mid-1990s a project was proposed to develop an integrated human resources and payroll system for the health boards and health agencies throughout the country.[38]   The project was called PPARS (Personnel, Payroll and Related Systems) and the initial budget estimate in 1998 was €9.14 million.   By 2002 the estimated cost was €109 million and this had increased to €230 million by 2004.[39] It is widely regarded as one of the classic project failures in ICT and perhaps the most significant one ever in Ireland.[40]

Looking at it in retrospect, many of the failures in the PPARS project should have been foreseen.   However, it highlights the difficulties that organisations generally were, and to a lesser extent still are, encountering in changing not just their individual systems but their whole environment to accommodate computerised and networked systems.   The response of the health agencies (i.e. the project sponsors) to these difficulties would not have been very different in many instances to that of other project sponsors/managers in various organisations but the scale of the project and the emotive potential of any failures in the area in question (i.e. health) ensured that it was regular headline news.

Some of the problems that became apparent were as follows:

- Even though the project was viewed as a computer system implementation, it was in fact part of a change management programme although the programme may not have been formally defined. A new approach to HR management was envisaged which would avail of the facilities provided by a networked system to have both centrally managed and locally distributed HR services. However, this had not been thought through fully or articulated clearly and these shortcomings were exposed by the attempt to computerise the system.

- Discrepancies arising from failures to implement directives from the Department of Finance in relation to pay and conditions in a consistent manner across all agencies over a long number of years were also exposed through the difficulties encountered in trying to

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[38]The Health Services Executive would, in 2005, take over responsibility for the services provided by all of these agencies.

[39] These cost figures are taken from the Comptroller & Auditor General's 'Report on the Value for Money Examination' of the HSE's PPARS project.   In its edition of the 3rd September 2010, the Irish Examiner stated that the project had cost €180 million to that date and was continuing to cost over €6 million per year.   The costs must also be seen in the context of the overall budget for health services which, in 2004, was €10.8 billion (Dept. of Public Expenditure & Reform - Book of Estimates for 2005)

[40] While regarded as a failure, much of the system is in place and delivering the required services although it has not been possible to get accurate details of the current state of the project.

rationalise the systems (Comptroller & Auditor General's 'Report on the Value for Money Examination').

- Over 2,500 variations were identified in the way processes or transactions were handled in similar systems across the different agencies.   While approximately a quarter of these were resolved in the new system, the remainder necessitated the continuation of manual workarounds. (C&AG's Report)

- "Close to 26,000 coded grades" covering approximately 140,000 staff were identified.[41]

By any reckoning this has to be seen as an organisational management problem rather than an ICT failure. This should have been understood by those sponsoring and managing the project and they should have foreseen the problems outlined above, but they didn't and hence the failure to manage expectations.   During a debate on the issue in the Dáil, the Taoiseach insisted that what was under discussion was "not an IT system [but a] transition from a payroll system to a whole human resource management system" (Taoiseach, Bertie Ahern during Dáil Debates, 4 October 2005) and for this he was highly criticised and ridiculed.

The transition to a HR management system doesn't provide the full context either because the whole health administration system was being rationalised as the health boards and other health agencies were being reorganised under a single corporate body, the Health Services Executive. It is very unlikely that this would have been undertaken without strong political opposition at national, local and office level.   Also, the exceptionally large number of grades across the agencies as well as the large number of variances identified indicate that the administration of the individual agencies depended on a substantial amount of local tacit knowledge which would not have been immediately available to the PPARS project.   That is not to say that the information was deliberately withheld.

Tacit knowledge is of critical importance in any business or any organisation and can have a significant influence on the outcome of projects involving the computerisation of existing systems. For any project, it is difficult to ascertain whether the tacit knowledge has been accommodated, bypassed by using workarounds, or ignored.   However, if a system is running successfully and without difficulty for a long period then this would indicate that the relevant tacit knowledge of the users of the replaced system has been taken on board but if the project

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[41]Leader of the Opposition, Enda Kenny during Leader's Questions, Dáil Debates, Tuesday, 4 October 2005

fails, then the lack of adequate attention to the tacit knowledge is likely to be at least one of the causes of failure.

Brown and Duguid describe tacit knowledge as implicit knowledge and, quoting Michael Polanyi, say that "no amount of explicit knowledge provides you with the implicit."(Brown & Duguid, 2002, p.134) They also mention the need to improvise which many employees do for efficiency reasons based on their local specialist knowledge which derives from the division of labour. Improvisation, by definition, will be conflicting to some degree with the rules or routines of the firm. Without improvisation, businesses will stagnate or drown in bureaucracy. Yet, deviations from standard practice cannot be recognised officially.   "Employees negotiate the gap between their actual practice and recognised routines […and this] helps turn unauthorized practice, however effective, into authorized routine, however inept."(pp.109-110) A blind eye is turned and there is tacit agreement on this type of tacit knowledge.

Tacit knowledge falls into the category of expertise or mastery described by Dreyfus above. Arthur notes that some tacit knowledge might not be specific to one individual but "derives collectively from a shared culture of beliefs, an unspoken culture of common experience" and quotes Brian Cathcart's example of the Cavendish Laboratory during the early decades of the twentieth century when "[to] any problem in atomic physics there would surely be an answer somewhere in the [Cavendish]." (Arthur, 2009, p.160)

One can be almost certain that much of the expenditure on the PPARS system arose from the effort to obtain the tacit knowledge that sustained the existing systems within the various agencies.   There is no easy or rational way of extracting this information.   Most of it has to be done through trial and error and I would argue that many of the failures that the PPARS team encountered were in fact part of this trial and error process and therefore necessary events in the HR transformation exercise - there may not have been any easier way to accomplish it.[42] In a study by Fahy and Murphy "Exploring the Tacit Dimension with Manager Developed Systems", they found that 84% of the managers partaking in the study with their own end user computing (EUC) systems "were of the opinion that when they developed systems they were not just trying to understand what was happening, but rather, were trying to be more explicit in describing the problem."   In some cases the results produced by the system "were secondary to the insight and understanding of the problem they got from their systems." (Fahy & Murphy, 2000, p.198)

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[42] I am not making any judgement here as to whether the PPARS project was, ultimately, a success or a failure.

Many of the failures, budget and schedule overruns, or other project difficulties encountered during the computerisation process could be regarded as part of the trial and error exercise or, indeed, as prototyping and the real failure is in not recognising it as such in advance of the commencement of projects. Also, the questions arise as to what is lost in the attempt to rationalise all the tacit knowledge and why do we tend *always* to try and transfer to machines the management, administrative and clerical tasks which are undertaken in a simpler manner by people?

While in the long run the rationalisation which accompanies the introduction of ICT to the firm or other concern is aimed at streamlining processes and making them easier to manage, the technology and in particular the Internet opens up many new options in terms of reorganisation within the firm and across the industry or interest group. There are conflicting opinions as to which direction these developments are likely to take.

Both Carr and McCarthy *et al*, go back to Coase's theory on how the boundaries of the firm are determined by the cost of transactions with suppliers etc. (Coase, 1937, pp.386-405) The firm will "expand its organization to encompass any activity that it can carry out more cheaply than the total of the market price for performing the activity plus the attendant transaction costs."(Carr, 2004, p.100) According to McCarthy *et al.*, developments in ICT (together with an easing of some anti-trust regulations) have "encouraged the proliferation of cooperative ventures "which have resulted in a shift towards a more open structure of interfirm network relationships and a decline in the relative significance of the traditional pyramid-like structure of organizational hierarchy […] Firms became specialist 'integrators' of different systems of knowledge." As subunits within the firm participate independently in different networks, their relationships within the network may take precedence over their relationships with other subunits within their firm. (McCarthy *et al.,* 2011, pp.4-5)

For Carr, the view outlined above belongs to the "post-company school" which tends to "confuse business with information processing." Quoting Andrew McAfee, he suggests that the vertically integrated hierarchical firm may be better suited to the task of "integrating complex information systems" than the "often conflicting interactions of free agents in a marketplace."(Carr, 2004, p.102) He rejects the idea that industries will "adopt the Hollywood model of production" where teams of specialists will form to make a particular film and will then disband to reassemble "in new ways as market forces dictate" for other productions (p.100). Carr says that the Internet will allow some businesses "to expand by bringing more work inside" while it will make it more profitable for others to shrink by outsourcing more work. Coase had predicted correctly that the telephone and telegraph would "tend to increase

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the size of the firm" since they reduced "the cost of organising spatially." To these Carr adds the railroad and the car as further "infrastructural technologies that reduced communication and coordination costs [and] brought into being giant, vertically integrated companies."(p.101)

The type of organisation that McCarthy *et al.* discussed is seen in its extreme form in what Rochlin describes as the heterogeneous system (Rochlin, 1997, pp.69-71) and he gives the Eurotransplant system as an example. The system facilitates and coordinates "the availability of human organs, surgical teams and potential recipients" and it does this through a database linked to various hospitals, medical personnel, potential recipients, and ground and air transport systems. Other than the coordinating computers and database, the system does not have an infrastructure of its own but comprises a heterogeneous assembly "of selected functions of pre-existing [systems]." Such systems can be relatively easy to create and modify and can be very cost-effective but assuring accountability can be a problem and, in the case of Eurotransplant for example, Rochlin asks whether "a computer programmer be sued for malpractice for a programming error?" He adds that as we have been accustomed to having functions arranged in a vertical organisation, "we are hard pressed to locate, let alone improvise, means for assuring accountability […] as they are dispersed along and across the new networks of interconnection." (p.71)

Reflecting McCarthy *et al.'s* view of the firm, Brown & Duguid, discussing the Xerox Corporation as typical of any large business, emphasise that employees don't just become members of the particular firm, but "become members of its different communities of practice – technical representatives, engineers, research managers, or sales analysts."(Brown & Duguid, 2002, p.153) They add that "while they are linked to other communities in the same firm through a relationship of *complementary* practices, they link to communities in other firms through *common* or shared practices."(p.162)

The communities of practice tend to be the sources of innovation and probably the best example of this is Silicon Valley which, in 2013, attracted 41% of total US venture capital, i.e. over $12 billion (PriceWaterhouse Coopers, 2013, p.9). Here, despite many of the firms being in direct competition with one another, there is a cross-fertilisation of ideas through the communities of shared practice which stimulates growth for the industry as a whole. It is best described in a National Geographic article from 1982, twenty seven years after William Stockley established the first laboratory in the Valley, as:

> "an incestuous network of suppliers, customers, venture capitalists, brains, research
> institutes, computer and software companies, schools, and headhunters, the
> executive recruiters who move men around the valley at a dizzying rate in a tradition

of musical jobs that is a key to the valley's contagious vitality." (Johnston, 1982, p.468)

This, of course, defeats the general argument of the people who occupy Silicon Valley today that, thanks to the Internet, it doesn't matter to the success of a business how it distributes itself spatially. It also hints at the internal market that exists within the ICT industry and which raises a question with regard to the net productivity of the total ICT market, a question I return to below. However, Silicon Valley exemplifies what Brown and Duguid call the "dense reciprocity needed to make and maintain […] strong and informative informal links" (Brown & Duguid, 2002, p.169) and this cannot be achieved as effectively over a network.

Regarding transaction costs, McFarlan and Nolan (McFarlan & Nolan, 2003) say that "driven by Moore's Law" these have been decreasing continually for every industry such that company boundaries "have become permeable, organic and global in scope." One manifestation of this is the widespread engagement by businesses today in outsourcing their operations which pushes down costs for the company but at the social cost in many cases of the lower wages and the diminished job satisfaction that result from the division of labour. The social cost may not be very significant, if significant at all, when the outsourcing is on a local or national basis but, unfortunately, much of it is international which is only reinforcing the boundary between the Western economy and that of the Third World.

McFarlan and Nolan were responding to Carr's article "IT Doesn't Matter" (Carr, 2003)[43] in which he argues that since the cost of information technology has decreased significantly, it is now available to most businesses and has essentially become part of the infrastructure so it no longer provides a competitive advantage to any one business. He adds that the "leading IT vendors […] are rushing to position themselves as [utilities]." (Carr, 2004, p85)

The problem, according to Carr, is that organisations fail to recognise the point where returns on ICT investment diminish significantly. They continue investing heavily despite having more than adequately catered for their needs in terms of processing power, storage, and communication networks. He quotes Gordon saying in 2000 "that the most important uses of computers were developed more than a decade into the past, not currently."(Carr, 2004, p.61 quoting from Gordon, 2000) Carr also quotes the chairman of "one of the largest North American financial institutions" as saying that their customers and staff use, at most, 20% of

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[43] This article appeared in the May 2003 issue of the Harvard Business Review and Carr followed up with the publication of the book "Does IT Matter" in 2004 which is what I will be referencing.

their ICT capabilities (Carr, 2004, p.61). More significantly, he refers to statements expressing similar sentiments made independently on different occasions during 2003 by three leaders of the ICT industry where they were asking if we had seen the end of growth, or at least a serious slowdown in growth, in the industry (p.61).[44]

Carr quotes a study in 1997 by Prasad and Harker of "the impact of IT capital spending on business performance in the U.S. banking industry." Because of the nature of the business and the volume of transactions, banking would be expected to provide a very high return on investment in ICT. Having examined 47 major retail banks, Prasad and Harker "found no evidence that spending on IT capital had enhanced profitability, as measured by either return on assets or return on equity" but even more significantly found that it "had not even boosted productivity as the costs of installing the system outweighed the resulting gains in performance."(pp.64-65)

Numerous studies, and several levels of meta-studies, examining the impact of ICT on productivity have been undertaken. Many of these studies were in response to Solow who, in a book review in 1987, noted that the computer revolution had been accompanied by a decrease rather than an increase in productivity growth and remarked that "you can see the computer age everywhere but in the productivity statistics." (Solow, 1987, p.36) This became known as the 'Solow paradox'. It is difficult, if not impossible, to find a study that resolves the paradox. In one report, the World Economic Forum says that "the pace of adoption of [ICT] has been fast and recent - thus limiting the validity of longitudinal studies and making it difficult for data collection agencies to keep pace with the definition and collection of appropriate metrics." (World Economic Forum, 2013) Also, it refers to the difficulty in isolating "the impact of ICTs as their economic impacts have often occurred when combined with other broad social and business changes" and this is a theme running through many of the studies.

Oz quotes Brynjolfsson and Yang who, having completed a survey of over 150 studies, "concluded that not only was the link between IT and productivity inconclusive, but also that measuring such a link was practically impossible due to lack of data and use of inadequate analytical methods(Oz, 2004)." Oz also questions the reliability of data used by Strassman in some of his studies. Many of the difficulties mentioned in various studies arise, it is claimed, from the lack of clear definitions - how is investment in ICT defined? Precisely what is covered by the definition of ICT itself? In terms of productivity it isn't always clear whether what is

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[44] Ibid. p.155 n.36 The statements were made by the CEO of Oracle, Larry Ellison; the CEO of Hewlett-Packard, Carly Fiorina and the co-founder of Sun Microsystems, Bill joy.

being discussed is worker productivity or productivity at firm or industry level, or productivity across the whole economy. It is interesting that an industry which is always ready to offer a comprehensive set of the necessary tools for data collection, management and analysis in relation to almost any phenomenon is unable to provide a convincing analysis of its own contribution to the economy.

Dedrick *et al.* claim to have undertaken "the largest study of IT and productivity at the national level […] and the first to include data from the post-2000 period.(Dedrick *et al.,* 2013, p.116)" Earlier studies from the 1990s had concluded that investment in IT had boosted productivity in some countries in the developed world but not in the developing countries. Dedric *et al.* were reviewing this in the light of the more recent data and arrived at the following conclusions:

- "There is strong empirical evidence that the positive effects of IT at the country level extend to both developed and developing countries"(p.117) but only the better-off developing countries were included because of the lack of data for the others (p.118).

- The effectiveness of IT is dependent on, not just the level of use, but also on foreign investment, the level of Internet and mobile penetration, and by education levels.

- "There may be some critical level of IT capital stock or some minimum level of accumulated experience" required before productivity gains will become evident (p.117).

- The effects of IT depend on the presence of resources and favourable policies to support IT (p.117).

- "The greatest effects of IT are realised when IT investment is aimed at economic [or revenue] growth rather than cost reduction (p.117)[45]."

It is significant that this study refers only to IT and explicitly excludes communications other than data communications from the analysis (p.119 n.3) although the authors highlight the fact that their study is the first study on this scale to take account of developments in electronic commerce, "interorganizational systems" and "rapid globalization."(p.117)

The above conclusions imply that the development of ICT is dependent on strong state support and on the existence of the appropriate infrastructure.   But the nature of ICT is largely

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[45] Although not stated explicitly, it is implied that this is true at both national and firm level.

infrastructural itself and here we have the circularity problem, or Luhmannian self-referencing, which causes difficulty in any effort to evaluate the effectiveness of ICT. Because of the ubiquity of ICT, it is difficult to circumscribe it for the purposes of analysis - the exclusion of telecommunications equipment in the above study was an attempt to do this. This is analogous to the occasional media reports comparing the cost of public transport by road and by rail. The cost of the road infrastructure is rarely taken into account in the former because of the difficulty of deciding which road costs to include, but the full infrastructure costs tend to be included in the figures for rail transport.

The suggestion above that IT investment is more effective when aimed at economic growth rather than cost reduction is in line with the conclusions of other reports such as the World Economic Forum report. But this is again side-stepping the difficulty of establishing, with some level of precision, the effectiveness of a technology and an industry which claims to be in a position to provide the means for arriving at answers such as this.

A report from McKinsey Global Institute in 2002 examined the relationship between IT and labour productivity particularly in the context of the strong economic improvement in the US in the latter half of the 1990s which had been widely attributed, at least in part, to investment in IT (McKinsey Global Institute, 2002).[46] The report found no correlation at economy-wide level "between jumps in productivity, and jumps in IT intensity." But the study did reveal "specific instances where IT failed to raise productivity." (McKinsey, p.2) The study also found that of the 58 industry sectors examined in the US, 43 "experienced positive productivity growth in the 1990s" but of these, just "six sectors of the economy, comprising 32% of GDP, contributed 66% of the gross productivity gains […] and 76% of net productivity growth (after subtracting out negatively contributing sectors)." Significantly, three of these were ICT industries – semiconductors, computer assembly and telecom while the other three, wholesale, retail and securities, are likely to have been heavy ICT users.(p.5) There is strong evidence that the ICT industry is contributing substantially to economic growth but there is less direct evidence that the industry's products are doing so. This again is the circularity issue.

With regard to the financial sector in the U.S., the McKinsey report says that the adoption of online banking during the 1990s was significantly lower than that of online trading. In the "securities industry, the emergence of online channels permitted the sector to process explosive trading volume growth without adding traders […] who would otherwise have been

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[46] While the main emphasis is on the US economy, the report also covers France and Germany.

necessary."(p.17)   This was clearly the beginning of the journey towards the financial meltdown on Wall Street in 2008. The meltdown was due to the fact that people did not know what they were doing. This was because the real meaning of what they were doing was lost to them in the multiple levels of abstraction manifesting itself in layers of leveraging at the bottom of which was very little equity while at the top were phenomena like "the interest-only negative amortising adjustable-rate subprime mortgage."(Lewis, 2011, pp.27-28)

Another relevant aspect of the financial crisis was the performance of the ratings agencies. Ratings are coming more into use to help in decision making in situations where there is far too much information to digest although in many cases the abundance of information is produced to assist the decision making process. Ratings help us to manage complexity. The rating formulae are usually confidential and the ratings are not, therefore, transparent. Where they are transparent, they tend to be manipulated.   Because of the confidentiality, people on Wall Street didn't know that when they asked for certain rating information, the ratings by the two main agencies were based on averages without any consideration of the spread and the averages didn't show up the high risk loans (pp.99-100).

State support for the ICT industry, which Dedric *et al.* imply is essential for its effective development, has been very forthcoming in many countries.   In some cases this support was very significant as far back as the 1960s (Webster & Robins, 1986, pp.257-281).   It has been effected through government procurement contracts, through government investment in the relevant infrastructure, through state-sponsored R&D and through the education system.   In some cases these channels have, in Galbraith's view, enabled a convenient relationship between the military and the state technostructure (Galbraith, p.74, pp.310-313)

As a business, ICT has developed the almost perfect model for regeneration through built-in obsolescence in which software and hardware leapfrog one another in a constant cycle of upgrading where they are both fully dependent on one another.   Triplett illustrates this using the following analogy: "We have the software equivalent of a new toll road for you to drive, but you must buy our new Rolls-Royce equivalent computer to use it.   And you can't drive on the old highway, which was already paid for, because we don't maintain it anymore." (Triplett, 1999, p.325)

4.4.4   *ICT and the Mass Media*

Chomsky describes two models of the media. The first, how it should function, is as "a counter-weight to government […] in order to preserve the right of the people to know, and to help the

population assert meaningful control over the political process." The second, in contrast, is what he refers to as the "Propaganda Model" which "defends and inculcates the economic, social, and political agendas of the privileged groups that dominate the domestic economy, and who therefore also largely control the government." (Chomsky, 2003, p.15) The propaganda model is the one followed by the large media corporations which, Chomsky notes, is only to be expected since they could not function if they were to do otherwise. (pp.14-15) He adds that these corporations have a product, namely audiences, to sell in the advertising market. This echoes McLuhan's remark that the advertisers "buy a piece of the reader, listener or viewer" and would gladly pay them directly for their "time and attention if they knew how to do so."(McLuhan, 1967, p.221)

According to Chomsky, the propaganda model is supported by the intellectual elite who believe it is necessary to control "the public mind" in particular circumstances. This, he says, can be traced back to the English Civil Wars of the 17th century when both the rising landed and merchant classes represented by the Parliamentarians, and the traditional elite represented by the Royalists, became concerned about the likely breakdown of civil rule generally as more radical elements challenging all authority began to appear among the population everywhere (Chomsky, 2003, pp.15-16). The intellectual elite, including political scientists, journalists, PR consultants etc., who are concerned about such things are strongly of the view that where "the state has lost the power to coerce, elites need to have more effective propaganda to control the public mind." (p.16) Paraphrasing a PR manual from the 1920s, Chomsky says that propaganda is "the conscious and intelligent manipulation of the organised habits and opinions of the masses [and] is a central feature of a democratic system." (p.17)

Conventional wisdom can provide a strong basis for self-verification which in turn facilitates the acceptance of propaganda and this circular process continues developing and reinforcing itself unless its foundations are undermined by having its lack of authenticity exposed. According to Chomsky, reporters when looking for sources listen to vested interests rather than expert opinion because the vested interests are self-verifying. For example, to report "an atrocity carried out by guerrillas, all you need is one hearsay witness. You talk about torture carried out by an American military officer, you're going to need videotapes." (p.25)

The debates taking place in the media reflect and react to the debates and tensions occurring in the political arena. The politics of government are not controlled by a single monolithic elite. There will be different interest groups among the elite and power will shift from one to another over time. Chomsky claims that there is, however, a broad set of assumptions which would reflect the views of all of the interest groups and from which "dissident perspectives are weeded

out" and what remains provides a framework within which the media presents "a range of debate" which merely "enhances the strength of the assumptions." (p.13)

A similar message, but from a different perspective reflective of the time, was offered by *The Hibbert Journal* in 1927 which claimed that "[t]he daily press and fictional literature have done much to focus the minds of all classes on the subjects of common interest, and to promote that sense of mutuality, of membership one with another, which must form the basis of any just demand for the establishment of rights and the recognition of duties." (Nisbet, 1980, p.298)

The specialist media can be more independent and objective in their coverage of current affairs. For example, newspapers such as the Financial Times or Wall Street Journal depend for their success on their coverage of business and finance issues, much of which comprises mainly factual information such as indexes, prices, and other metrics. When it comes to opinion and analysis of current affairs, they are not under the same obligation to their readers to adopt particular slants. In fact their core readership expect "a realistic picture of what's happening in the world if they're going to make sane decisions about their money." (Chomsky, 2003, p.28 referring to the Wall Street Journal)

Price expresses the view that the media, despite their constant calls for action, are in fact "an impediment to action" and he says their power "to secure political change is greatly inferior to their ability to stand in its way." (Price, 2010, p.447) Politicians are afraid to speak their minds, "raise interesting questions" or depart in any way from the script because if they do they are likely to "be crushed by the same negative forces that complain that modern politicians are uninspiring, never tell the truth and never engage honestly with the public." (p.447 quoting Guardian columnist, Polly Toynbee)

John Bercow, the Speaker in the UK House of Commons, suggests that parliament is being sidelined as a result of the demand for 24-hour news coverage. The ministers, with their departmental resources, are the only ones capable of responding to this demand so the "debate on policy or events is essentially a joust between the media and the minister" and the MPs are "struggling to catch up with what has been released and to probe the minister about it." (p.453)

Managing their relationship with the press has become a priority with many politicians and probably *the* priority especially among those on the front benches. The media set the agenda or have been allowed to set the agenda. An example of this can be seen in the Irish health services. Taking the period since the early 1980s, the predominant topic in the news across the whole three decades has been the crisis regarding hospital waiting lists. The figures,

represented in the news by the number of patients on trolleys in emergency departments awaiting admission to the hospitals, are quoted regularly. These figures are a symptom of very difficult and complex problems across the health service but rarely does one get any comprehensive analysis of these problems. With the pressure from the media, politicians are forced to respond to the figures and are not allowed the space to develop a solution to the deeper problems. The symptoms are addressed so the problems will reappear after a short while and the media will continue to have a story. A special cabinet meeting which took place in May 2001 to address the issue of funding in the health services became almost an irrelevancy since, as described by Wren, the agenda was more or less set and the outcome determined by the press briefings beforehand and the statements to the press after the meeting.(Wren, 2003, pp.251-253) As Price has commented, "the job of restoring the credibility of both [politicians and journalists] would be made easier if prime ministers stopped trying to write headlines and newspapers stopped trying to make policy."(Price, 2010, p.455)

Today, any significant political action will be relayed by the media to the public almost as soon as it happens and this is likely to undermine, to a greater or lesser extent, the influence of the politicians on subsequent events as seen in the example above. This is very much a feature of the electronic media and bears out McLuhan's assertion that "[a]s the speed of information increases, the tendency is for politics to move away from representation and delegation of constituents toward immediate involvement of the entire community in the central acts of decision."(McLuhan, 1967, p.217) But the community is involved only via the media rather than through their elected politicians. Social media could now be used by all citizens to bypass the established media and participate directly in political decision-making. But some mechanism would be required to enable a consensus to be reached or a decision made. Unless each citizen votes directly on every issue, and this is technically feasible, there would again be a need for one or more levels of representation or delegation.

It is a paradox of democracy that if power in decision-making is distributed equally to all citizens then no one has any effective power other than the individual or institution that selects the decisions to be made. The overall effect was well illustrated in the 1971 British film *The Rise and Rise of Michael Rimmer*, a political satire in which the Prime Minister who was very adept at public relations introduced total democracy. This was achieved by allowing everyone to have an input in all government decisions, initially by using opinion polls and eventually by providing every house with a telephone hotline through which the occupants could vote directly. But with power distributed equally to all citizens, no one had any real power except the Prime Minister himself who decided - as someone had to - what issues were to be voted on. He, in effect, became a dictator which suited the citizens who had grown weary of all the votes

in which they felt obliged to participate. They came around to Schumpeter's preference, quoted above, for government *approved* by the people rather than government by the people. This also illustrates McLuhan's contention that the "those who control the media "always endeavour to give the public what it wants, because they sense that their power is in the *medium* and not in the *message*." (McLuhan, 1967, p.231) Elsewhere he says " it is the medium that shapes and controls the scale and form of human association and action." (p.16)

Governments, to protect themselves from the intense probing of journalists, maintain a regime of the utmost secrecy. But they can invert this to take advantage of the valuable mechanism of 'kite-flying' to test public reaction to any proposals they might be considering or, as McLuhan puts it, "Top secrecy is translated into public participation and responsibility by the magic flexibility of the controlled news leak."(p.227)[47] Kite-flying usually takes place during the 'silly season', that period of the summer where there is little political activity to report and is an indication of governments' somewhat enigmatic relationship with the press.

McLuhan was primarily interested in the electric, and later electronic, media. Whereas the technology of mechanisation provided extensions of our senses or our limbs, electric technology, i.e. the technology of automation, provides an extension of our nervous system. Mechanisation breaks down a process into individual operations but electricity unifies "because its speed of operation requires a high degree of interdependence among all phases of any operation."(p.376) The versatility of electricity derives partly from its speed which makes it virtually instantaneous and also from the fact that its source can be located independently of the process it's driving (p.370). For McLuhan, one is missing the point if they consider the application of electricity to a mechanised process as a means of improving the process in terms of speed, efficiency, etc. Rather, it should be seen as "the invasion of the mechanical world by the instantaneous character of electricity [which] is why those involved in automation insist that it is a way of thinking, as much as it is a way of doing." (pp.371-372) Electricity, like light, is a "nonspecialist kind of energy or power that is identical with information and knowledge." While it "illuminates a total field [it] does not dictate what shall be done."(p.373) In this he was anticipating the Internet almost three decades before it became a reality.

McLuhan distinguished between 'hot' and 'cool' media. (p.31) Hot media require little participation from the listener, reader, or viewer whereas cool media require a high level of participation. The hot medium "is one that extends one single sense in "high definition.""(p.

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[47] In this discussion, McLuhan cites Douglas Cater's *The Fourth Branch of Government. (No bibliographic details provided)*

31) The telephone is a cool medium while the radio is a hot medium. In fact he refers to the radio as "the medium for frenzy" and to how it can be used for "hotting up tribal blood" (p.331). We saw an example of that earlier where radio was used to provoke the Rwandan genocide. Hitler used it very effectively in a similar way. Radio was used for a different type of engagement by President F.D. Roosevelt in his regular 'fireside chats' with the American people. In these he was using the medium but bypassing the mediators, i.e. the journalists, to engage directly with the people.

Most of the mass media depend heavily on advertising with the composition of prominent advertisements, McLuhan observed, receiving "more thought and care" than the articles or editorials (p.243).[48] The same would have applied to TV advertising since TV was a 'cool' medium requiring greater engagement from the audience and it was therefore less effective at a subliminal level, unlike the 'hot' medium of radio. TV was 'cool' because it was low definition when McLuhan was writing about it - indeed he may have been the one who coined the phrases 'low definition' and 'high definition'.[49] With colour, high definition, and much more sophisticated production techniques today, it is likely that TV would now be classified as a 'hot' medium.

For Luhmann, there is a strong interdependence through advertising between the mass media and the economy (Luhmann, 2000, p.66). Along similar lines, McLuhan describes the aim of advertising, almost lyrically: "When all production and all consumption are brought into a pre-established harmony with all desire and all effort, then advertising will have liquidated itself by its own success." (McLuhan, 1967, p.242) In his analysis, Luhmann shows the many ways in which advertising is manipulative and insincere (Luhmann, 2000, pp.44-50). He illustrates "the appropriation of the opposing motive" in examples such as offering 'exclusive' opportunities to the public at large and convincing people they can save by spending money. Advertising provides those "who have no taste with taste […since] there is no longer any convincing upper social stratum to which one might look to see what is 'acceptable' and what is 'not acceptable'. (pp.45-47) Further, he notes that sponsorship "serves the purpose of advertising rather than good causes." (p.46)

There is a strong relationship between fashion and taste. Sometimes it can be an inverse relationship where one or more individuals might express their identity by going against the current fashion, since taste tends to be associated with individuals while fashion is associated

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[48] McLuhan was referring to the print media only - this was written in 1964 or earlier.
[49] McLuhan uses the terms 'low definition' and 'high definition' throughout his works.

with groups. However, in most cases fashion and taste are aligned to the point of being indistinguishable. Advertising is a vehicle for disseminating information about fashion. A new fashion for a product may take a few years to develop but once it's ready for the market, information about it must be made available immediately. Luhmann says that for many people fashion "seems to be self-motivating [and for them to] go along with fashion – as soon as possible – is almost a must." (p.47) Advertising conveys the information in time to help them achieve this and it helps generate "the speed of change." (p.48) Meanwhile the next fashion is under development. One of the problems for the supplier is continuously changing products or introducing new products while generating and maintaining brand loyalty. But fashion can accommodate this since, "even ridiculousness can temporarily be nullified by fashion."(p.48)

Continuous upgrading is a feature of ICT installations. Large installations, for example in the business sector, are unlikely to admit to upgrading for the sake of fashion. Rather, it is more likely that they upgrade to keep up with, or ahead of, their competitors even though ICT might not be factor in the competition and we could get into an infinite regress asking why the competitors upgraded. At any rate, the line between fashion and competition is very thin, if it exists at all. Fashion is about competition - not competition to come first but competition to ensure that one is at least with the pack and not among those left behind. Fashion is based not just on appearance but also on power and on the levels of functionality even though it is likely that, in cars for example, neither of these features are fully exploited by most of the purchasers. Where upgrades are required because existing ICT capacity cannot cope with increased demand, it is likely that some of this extra demand is due to traffic from the increasing number of mobiles, tablets and other commodity items in the ICT marketplace. As we saw already, a very high proportion of these are purchased by fashion conscious teenagers. Leaving aside the scale of the event and the fact that only one product (with some variations) was being launched, the media event that launched the Apple iPhone 6 looked very similar to a Paris fashion show. Ten million units were sold within three days[50] while numerous discussions were already underway on the Internet speculating on the launch of the   iPhone 7.

For the mass media, communication is essentially one-way. It is not possible to have interaction among all the participants or between the 'consumers' and the mass media other than letters or phone calls in response to articles or programmes but these are used by the media solely for their own purpose of filling space or time - otherwise they are ignored. In Luhmannian terms "they are included in the autopoiesis of the system […and…] serve the reproduction of the

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[50] http://www.forbes.com/sites/briansolomon/2014/09/22/iphone-6-breaks-record-with-10-million-sold-even-without-china/#20aba5392543   [Accessed 17th September 2016]

system of the mass media and not the system's contact with its environment." (Luhmann, 2000, p.127) The only feedback the media really take on board are sales figures and "listener or viewer ratings, but not as a counteractive influence."(p.16) Autopoiesis ensures that each piece of news will result in more news since news "generates and reproduces future uncertainties" (p.35) and this remains the driver for the media.

News, once communicated, is no longer news. However, today, more and more news items are being stored digitally to provide easily retrievable content for in-depth reports. Different items can be combined - some perhaps much older than others - to provide new contexts or to be reviewed in the context of new information (pp.35-36). The reports are constructed as are all news items in the media. When we watch, read, or hear the news in the media, we are observers of the media observing reality.   An unbiased account of an event would require every detail of the event itself and every detail of the context in which it took place. Both sets of details would be infinite in number so the reporter has to select enough details of the event to compile a report which makes sense. Luhmann describes the likely criteria on which selections for news and reports in the mass media are made.   A story is more likely to be selected if, for example, it contains an element of surprise, is topical, has local relevance, is about conflict or norm violations and morality issues, etc. (pp. 27-35)   To say that the news is manipulated by the mass media adds little or nothing to our understanding of it since all information reported to us is manipulated.   Identifying the selectors used, however, adds to the context and to our understanding of the content.

ICT has the potential to disintermediate the reporting of news. With email, social media, blogs etc., we can get reports directly from individuals at the source of events and we can reciprocate by reporting on events of which we have direct experience. But we face two major difficulties in understanding the news we receive from such sources.   The first problem is information overload. If one wants to keep abreast of current affairs throughout the world and is dependent on direct reports from the locations of significant events, then the problem of information overload arises.   When the volume of information becomes unmanageable, it loses its information content and becomes data which needs to be refined and processed before it can be assimilated.

The second problem is reliability.   The anonymity of the Internet raises doubts about the authenticity of the source of reports.   Also, short-sightedness can be as big a problem as far-sightedness and a person who is in very close proximity to a conflict situation, for example, might have even less understanding of the overall situation than the person far away to whom they are reporting.

The most important attribute of the mass media is that they provide accreditation. Journalists are trained and qualified. They will usually report directly from where events are happening but they can contextualise these by relating them to other events they have experienced directly and they can develop their reports within an environment of other journalists and editors who can add to the context through different experiences. They can write a story to convey the essence of what is happening. Just as important is the fact that if one is taking one's news regularly from the mass media, for example from RTE Lyric FM or 96FM, from The New Statesman or the Daily Express, from Fox News or CNN, one is likely to be at least somewhat aware of how they are applying Luhmann's criteria in selecting their reportage.

The mass media have taken on the challenge of ICT, particularly that of social media, by providing opportunities for their customers to respond to their reports and articles. While 'Letters to the Editor' were always popular, individual journalists and columnists are increasingly engaging with their readers and listeners via social media and many develop their reports in their blogs. It is also becoming increasingly common to see immediate responses to programmes via texts or Twitter, on television in particular, and to see votes from the public being taken live on issues raised during a programme.

How the relationship between the mass media and the social media will develop is difficult to predict. It could encourage a far richer engagement by the public in current affairs with journalists providing an important moderating role. Alternatively, journalists might find themselves gradually becoming just ordinary members of discussion groups. There is also the danger that journalists will just rely on the Internet to gather news rather than going on location themselves. This happens to some extent already but it could develop to a point where the journalists abandon their most important role as reporters and become columnists instead and it is possible that the value of this role will not be appreciated until it has disappeared.

For McLuhan, advertisements are always good news in contrast to the bad news that tends to dominate the rest of the media and it's this contrast that heightens the awareness of the advertisements. However, he says that the Presidency in the US suffers on the PR front due to its efforts "to be a source of good news and noble directive" while Congress can raise aspects "of the seamy side so necessary to the vitality of the press." (McLuhan, 1967, p.224)

4.5   ICT and Functional Dedifferentiation

As mentioned earlier, the increasing involvement of governments in economic management is blurring the boundaries between the political system and the economic system and is causing at least some dedifferentiation of these systems. But this is not confined to politics and the economy, other social systems such as the legal, medical, education, science etc. systems are also showing symptoms of dedifferentiation. The implications of dedifferentiation are significant since the functionally differentiated society provides access, at least in principle, for every citizen to every functional system as required in contrast to earlier societies where differentiation was on the basis of status - each individual knew their place within the strata of society. The dedifferentiation of society tends to erode democracy.

Thornhill, in his critique of Luhmann, says that "[s]ocieties determined by a condition of realised differentiation are always likely to have pluralistic and *democratic* political systems (King & Thornhill, 2006, p.90)." Conversely, dedifferentiation of the functional systems in society tends to support the centralisation of power and this can lead to more autocratic government. Verschraegen emphasises the human rights aspect of having functionally differentiated systems. He says, following Luhman, that by "equipping individuals with rights and claims to participation in politics, economy, law, education", it is expected that they will decide for themselves how they vote and on the choice of profession etc. He adds that by encouraging them "to participate freely in different function systems and by preventing one subsystem or social group from completely controlling [them], human rights strengthen and protect the high degree of individual mobility and communicative openness upon which modern society is built." (pp.108-109)

An individual takes on a different role within each of the functional systems so a person can be a voter within the political system, a teacher within the education system, a patient within the medical system, etc. This is important as a human rights safeguard since, as Verschraegen says, "[e]qual treatment then implies that only *functionally specific* role expectations and requirements should be taken into account. So, consumers should be treated *as* consumers, voters *as* voters, […] normally other roles cannot be taken into consideration." (p.118) He quotes Luhmann's example "[a]n entrepreneur should not be subsidised because he is an adherent of a particular religion; one should not let a student pass because his or her parents belong to the city's nobility" since such personal role combinations are "a violation of the principle of equality" and while there can be exceptions, they can be "justified only if they indicate specific grounds for unequal treatment." (p.118)

Differentiation is just one side of the coin as it is usually accompanied by a process of dedifferentiation. For example, the development of functional differentiation could not have taken place without the dedifferentiation of the stratified, status based, society which preceded it. Tiryakian, noting that

rationalisation and differentiation are the two "master processes of Western social change,"(Tiryakian, 1992, p.79)[51] points to the French Revolution as an example of dedifferentiation (p.92).

Differentiated systems may themselves be further differentiated into a number of subsystems. For example, Luhmann argues for the differentiation of the political system into government, administration, and public subsystems as a means of ensuring the separation of powers. In general, the differentiated functional systems should provide the checks and balances to ensure probity and stability across society. This, however, did not happen in the case of the 2008 financial crisis. Most people would agree that the crisis was caused by the lack of adequate or any regulation in the banking and financial sector. Many governments, including the Irish government, had been maintaining a policy of 'light touch' regulation which was being pursued vigorously by President Raegan in the US and British Prime Minister Thatcher with the latter being heavily influenced by Hayek. When the crisis hit Ireland, the government was blamed because it did not do anything to prevent it, that is, it did not regulate the banks and other financial institutions. But by not taking action, it could be argued that the government was merely adhering to what Luhmann and others would have recommended by avoiding a process of dedifferentiation.

Some people would use the counter argument that the government was implementing a deliberate policy of minimal financial regulation in order to attract investment for the development of the financial services industry which was becoming a major player in the Irish economy. This would mean that with the government doing little or nothing, the political system was taking an 'active' role in the economic system and thereby engaged in a process of dedifferentiation. So who was responsible? Perhaps it was the legal system for not providing the penalties to deter the irresponsible practices within the financial services. At any rate, this episode would indicate that neither the causal chain nor the differentiation boundaries are always as distinct as one would infer from a reading of Luhmann or other commentators in this area.

Van Vught examines a number of studies undertaken in different countries[52] on diversity in higher education and the effectiveness of higher education policies in cultivating diversity through differentiation. The rationale behind these policies is the widely held set of beliefs that a diverse set of institutions will be in a better position to meet student needs and the needs of the labour market, as well as providing for social mobility, cultivating innovation and making the institutions more effective (van

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[51] Tiryakian,Edward A.; *Dialectics of Modernity: Reenchantment and Dedifferentiation as Counterprocesses;* in Haferkamp, Hans, and Neil J. Smelser, editors *Social Change and Modernity.* Berkeley: University of California Press, 1992
http://ark.cdlib.org/ark:/13030/ft6000078s/ [Accessed: 17th September 2016]

[52] The countries included the U.S., Canada, Australia, the U.K., Sweden, France and the Netherlands.

Vught, 2007, pp.5-6). The outcomes, however, with the exception of one case,[53] were not what the policy makers intended. Rather than increased diversity between institutions, there was significant dedifferentiation and homogenisation.

In the Netherlands, where the institutions were granted "enlarged autonomy" by the government, the conclusion was, somewhat ironically, that "innovations all seem to go in the same direction of homogenisation."(p.13)   The other significant factors leading to homogeneity were professionalism which ensured a "predominance of academic norms and values" (p.14) and competition.   While the level of competition in the market for students and academics was as anticipated, the competition in the 'reputation race' was underestimated. (p.17) Competition has to be towards the one goal[54] and this in itself will lead to dedifferentiation and therefore to homogenisation.   As institutions compete, they begin to mimic one another and in particular, the lower status institutions will mimic the higher status ones.   Van Vught refers to Birnbaum's findings in relation to the U.S. which provide evidence of centralised planning and "the application of rigid criteria for the approval of new institutions and programs. Based on this Birnbaum argues that government policies "may be a major factor in producing processes of dedifferentiation." (p.7) Van Vught notes that DiMaggio and Powell's three forms of institutional isomorphism (p.11) are in evidence here. The first is the coercive isomorphism, which is applied by other organisations such as government in the environment. The second is the mimetic isomorphism, which can stem, for example, from uncertainty or from ranking instruments and the third is the normative isomorphism, which arises from professionalisation.

The objective was to achieve greater diversity between higher level educational institutions through differentiation.   But competition became the predominant element - competition for reputation and for the resources necessary to develop it with the rules being set by governments or their agencies and with the leaders, i.e. the elite universities, setting the pace and influencing the direction. The result was that stringent efforts to stimulate differentiation in the higher education sector resulted in dedifferentiation in all but one case.

Dedifferentiation - the blurring or gradual disappearance of political, social and economic boundaries - is part of the process of globalisation. Boundaries, according to Kohr, are not barriers. "[O]ur instincts drive us constantly to *create* boundaries, not to *tear them down*." (Kohr, 2001, p.173) Boundaries protect us, like the pier in the harbour, it protects us from the storm but doesn't block the sea. Kohr

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[53] California was the exception where a master-plan succeeded in preventing homogenisation.

[54] The goal could be reputation although there can be secondary goals such as size.   The greater the reputation of an institution, the more control it can exercise over its size but, on the other hand, its reputation could be dependent, at least partly, on its size. Size is also related to available resources which provides another driver to compete.

was arguing for having things on a 'human scale' twenty years before Schumacher took up the theme in 'Small is Beautiful'. For Kohr, the "ideal state of competitive capitalism [is] where every business unit casts its own boundaries until it is automatically checked by the forces of competition." He paints a picture of a world of small states where the aggregation of power would be minimised and which would be an area full of breathing, changing and self-controlling business boundaries, but free of all obstructing unnatural obstacles such as customs and traffic barriers." (p.173) This would be a fully differentiated un-globalised world.`

In contrast, Berthon describes the undifferentiated world created by the Web which "dissolves perimeters of time, place, and culture. Boundaries between nations, home and work, intimate time and business time, between night and day, and between individuals and organizations." (Berthon, n.d.) More and more individuals can, from their computers at home, do their work; undertake the domestic transactions of paying bills and ordering groceries and household goods for delivery; submit their tax returns; pay their insurance premiums; claim their health benefits etc. The interfaces through which the individuals undertake most of the transactions are broadly similar and each fits on the same screen and the differences between them are, by and large, hidden behind the screen - the user sees only the dedifferentiated world on the screen.

Thirty years ago when it became apparent that there were few, if any, technical barriers to having the Revenue Commissioners and the then Department of Social Welfare share data from their respective databases or indeed from a common database, the strongly held view was that this would not be acceptable. But now the situation has changed and the departments share some of this information while each citizen is assigned a PPS number through which they can be identified by any department of state. The individual's relationship with the private sector services is somewhat similar although not as complete. Shops and other services are building up profiles on CRM databases of their customers from which they can deduce some of the customers' likes and dislikes and behavior patterns. We are arriving at a situation where citizens are dealing with what they see as an undifferentiated mass of organisations in 'the cloud' while these organisations can clearly identify each distinct individual. The functions within society are now being dedifferentiated while it is the people who are being differentiated.

4.6   Disintermediation

The elimination of intermediaries, or at least reduced dependence on them, was promulgated early on as one of the most beneficial features of the Web. With direct access to the relevant information on the Web, one could in many cases, when looking for products, services or assistance, bypass the experts

and specialists ranging from retailers and wholesalers to the professions including medicine, education, law etc.   This is often compared to the 'democratisation' that occurred following the development of the printing press and the translation of the Bible which resulted in "the whole classical curriculum and the conventions of academic argument" being called into question and people started asking "were the universities of any use at all?" (Hill, Christopher, 1994, pp.198-199) Faint echoes of this can be heard in some of the predictions for e-learning.

Disintermediation via the Web is seen by purchasers as simplifying the shopping experience while at the same time providing them with ready access to a global marketplace which, of course, is also a major attraction for the sellers.   Disintermediation eliminates the physical marketplace thereby diminishing what is not just a commercial outlet but is, furthermore, a major social outlet in the community and has been such throughout history. This is an element that has been taken so much for granted that it is rarely alluded to in the literature.   However, the growth in popularity recently of local markets such as farmers' markets, are evidence of a feeling that something in the community is in danger of being lost.   Interestingly, and perhaps even ironically, these markets provide the clearest possible examples of disintermediation.

One of the best examples of effective disintermediation on the Web is provided by Dell where they, as computer manufacturers, deal directly with the end-user customers. Within their product range they tailor the configurations to each individual customer's needs. They have been successful in this because selling directly to end-users was a key element of their business plan from the beginning and therefore their business was built around it.   In contrast, the jeans manufacturer, Levi Strauss, provides the classic example of failure when they abandoned their attempt to bypass wholesalers and retailers and deal directly with their individual customers. (King, Julia, 1999) Although they had invested heavily in this initiative, they found that dealing in individual pairs of jeans rather than bulk orders was not cost-effective.   This was probably due to the fact that they were a well-established company that could not fully adapt itself to the new way of doing business and also due to the nature of the product since in most cases people need to try on clothes before they buy them.

The expected advantages of disintermediation for the purchaser are a saving of time and travel while having access to a wide range of sellers which should result in much lower prices. The advantages for the seller include higher profits since they are no longer shared with the wholesalers etc. and, very significantly, direct sales provide the manufacturer with far more detailed and comprehensive market information.   In the case of many products it might be difficult to sustain direct sales in the long term due to the phenomenon whereby consumers go window shopping on the 'high street' to see what items are available and to check them or try them out and then return home to order them from an online store. This trend is already leading to the closure of shops as people realising too late what has been lost.

Leaving fewer intermediaries, disintermediation tends to centralise control as we can experience, for example, in the case of Google and Amazon. The various takeovers and partnerships in the ICT sector over the years are due, according to Brown and Duguid, to the struggle between the various corporations to ensure that they remain among the few intermediaries left.(Brown & Duguid, 2002, p.28)

Strategies of disintermediation are rarely as clearcut as the Dell example. Amazon is often seen in a similar way as eliminating the middleman. But Amazon is an intermediary - it is an additional link in the chain. Amazon, while it holds some stock in the manner of a wholesaler, could in most cases be said to act as a broker or agent between the buyer and the retailer. Amazon started out as an online bookseller but today, with over one hundred and seventy 'departments' on its website, it sells anything from books to bathroom fittings and from wine to car wheels and tyres. With its huge customer base which keeps growing in tandem with its product range, Amazon is an attractive intermediary for any producer seeking a global outlet. Amazon's role is an example of reintermediation.

The experience of disintermediation highlighted the somewhat transparent role in the value chain of intermediaries such as wholesalers through marketing and logistics including warehousing, inventory management, distribution etc. But there are also the internet intermediaries who support the infrastructure for e-business. These include "[i]nternet service providers (ISPs), hosting providers, search engines, e-commerce intermediaries, payment intermediaries and participative networked platforms." (OECD, 2013)[55]

Recognising fully the role of the intermediaries, producers are now more likely to develop a new relationship with their distributors, a relationship which takes account of the e-business environment. Among the typical outcomes is the development of online sales and marketing systems by the wholesalers and retailers and quite likely in collaboration with the producers. This strengthening of the role of the intermediaries is an example of reintermediation as alluded to already in the case of Amazon.

Carr goes a step further and has coined the phrase 'hypermediation' in reference to the proliferation of intermediaries in the typical e-business process. (Carr, 2000) He provides an example of a typical online transaction for $8.97 which involves nine intermediaries with each of them making some profit on it. He explains that the effectiveness of e-business is dependent on the high volume of transactions.

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[55] The OECD report also lists the functions of these intermediaries as " *i)* to provide infrastructure; *ii)* to collect, organise and evaluate dispersed information; *iii)* to facilitate social communication and information exchange; *iv)* to aggregate supply and demand; *v)* to facilitate market processes; *vi)* to provide trust; and *vii)* to take account of the needs of both buyers/users and sellers/advertisers.

It is only in very rare circumstances that one could make a profit on "penny transactions" in a physical business, but online, once the appropriate system has been developed, "the incremental cost of an on-line transaction is basically zero" and the takings are "almost pure profit." With a high volume of transactions where "people make billions of clicks on the Web every day, and because each click represents a personal choice, each also entails the delivery of value and thus an opportunity to make money. A penny isn't a lot of money in itself, but when you start gathering millions or billions of them, you've got a business." (Carr, 2000)

Disintermediation empowers people by giving them greater access to information relevant to them. In doing this it disempowers the institutions, professions, experts and others on whom people depended. This can be seen as democratisation but individuals can be over-confident with their new-found expertise and this can lead to problems such as misdiagnosis of ailments etc. Like the intermediaries in the business value chain, the role of professionals can be under-appreciated. Problems arise because of the volume of information and the unreliability of some of the information on the Internet. In many cases intermediaries are introduced to help manage the volume of information and this is often done using ratings and rankings. The rating and ranking sites include *tripadvisor.com, ratemyteacher.com, ratemysolicitor.com,* and *ratemds.com*(for doctors). Some of these are useful although none of them can be relied on completely while others have been totally discredited since there is little or no control to prevent the manipulation of the ratings.

The wider issue is that most information needs to be mediated. This is the fulltime job of journalists although the role is by no means theirs exclusively and everyone puts their own 'spin' or interpretation on the information or presents it in their own context. Rarely is information totally objective.

Disintermediation also occurs where suppliers and manufacturers, particularly in the ICT sector, focus their advertising campaigns on children thereby bypassing their parents.   The children generate the market initially, the products become embedded in the ICT environment as system components which the adults are left with little real option except to follow. This is enabled by the fact that many of the consumer products in the ICT market are fashion items. Producers control markets based on fashion; customers control markets based on needs.

4.7   Virtual Reality

Virtuality is a concept which has been part of computing for half a century. Early applications included 'virtual storage' where a portion of relatively plentiful disk storage was used as a virtual extension of the more expensive main storage (i.e. central processor memory), and 'virtual machines' where a single

computer could accommodate a number of differently configured virtual computers with different operating systems running simultaneously. More recently, such machines could be 'delivered' over the Internet from suppliers such as Amazon and they are now becoming available via cloud computing. These applications used software to overcome the physical constraints of the hardware[56] or one could say that they marked the beginning of a shift from a tangible reality to a software-generated virtuality.

It is tempting to define virtual reality at its simplest as a software-generated simulation of some aspect of reality. But this would not be correct since virtual reality can provide representations of objects, people, events, or other phenomena which do not exist in the 'real' world as we know it and therefore it is not a simulation in these cases since it is not simulating anything. This gives some idea of the enormous difficulty one faces in trying to define virtual reality. If it is not directly related to reality as we know it, then perhaps it is not a reality at all but, if it isn't, then what is this phenomenon that some people experience as a virtual reality? If it is an alternative reality - and as I will illustrate below this cannot be ruled out - then we need an alternative lexicon to define it because a lexicon is derived from the reality of our experience.

For Søraker, virtuality is a defining characteristic of the new media. To make his point, he gives mundane examples such as the fact that "a virtual document can be *within* a virtual folder and *moved* to another, you can go *back* and *forth* between Web sites, a hard drive can be *full* or *empty.*" While we are used to thinking of media in terms of channels, these examples illustrate how the new media are "more akin to *places* [where virtual] entities can be located in a geometric three-dimensional environment." (Søraker, 2011, p.46) But they are also topological spaces where entities are ordered or 'indexed' (p.56) so that their location is defined "in relation to other virtual entities." (p.46) So, rather than having information transferred to the user through a channel, it is made available in the virtual environment and Søraker quotes Steuer suggesting that in the new media, the focus is on "the relationship between an individual who is both a sender and receiver, and the mediated environment with which he or she interacts." There is, therefore, "no clear distinction between the medium and the information" so "the message is the medium." (p.47)

There is general agreement that, as Steuer suggests, interaction is a key element of virtuality. Søraker defines virtuality as "interactive computer simulations" (p.58) while noting that there are "entities that are interactive without being computer simulations," such as a car "and entities that are computer simulations without being interactive" such as "calculations performed on the basis of pre-programmed parameters without human intervention." (p.50)

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[56]But there had to be some hardware available somewhere. Also, it was often a matter of substituting a different type of hardware. In the case of virtual storage, disk storage was substituted for RAM and high-speed (physical) channels were required for the transfer of data between the disks and the processor.

Stanovsky would agree with Søraker's definition but would see it as incomplete. For him, a very significant feature of virtual reality is the facility to allow a number of users to share the experience by interacting simultaneously via the network with the simulations. This, he says, "is one of the features by which virtual reality can be distinguished from fantasy [since] one of the tests of reality is that it be available intersubjectively." (Stanovsky, 2004, p.169) This would appear to have been overlooked by many of the other writers on the subject.

Virtual reality has now developed to a point where one can, not just interact with it, but can become immersed in it. Wearing the appropriate equipment, virtual reality "aims at being able to produce and reproduce every aspect of our sensory world with users interacting [….] through looking, talking, listening, touching, moving, etc." (p.169) Stanovsky notes dreams are also immersive "matching in sensory clarity and distinctness even the most optimistic science fiction accounts of virtual reality" (p.171) and this underlines the importance of the intersubjective element mentioned above and Søraker's emphasis on *computer based* simulation when defining virtual reality. He says "it is the computer that underpins the virtual world that facilitates its epistemological objectivity and, in that respect, makes virtual worlds *similar* to the physical world and dramatically different from dreams, hallucinations, and other products of the mind. At the same time, there are clearly differences between the virtual and the physical, precisely because a computer simulation is a necessary condition for the existence of the virtual world." (Søraker, 2011, p.55)

Immersion is taken a step further in what Heim refers to as 'full-body immersion'. This is virtual reality "in which the user moves without encumbering gear." The user doesn't wear anything special but is followed by cameras which capture the user's movements and these are then synthesised with the artificial environment. (Heim, 1997 in Scharff & Dusek, 2003, p.549)

Lanier, who coined the term 'virtual reality', describes how, "when you are in VR […] you are no longer aware of your physical body. Your brain has accepted the avatar as your body." He adds that "[t]he body and the rest of reality no longer have a prescribed boundary. […] You are floating in there as a centre of experience. You notice you exist because what else could be going on? I think of VR as a consciousness-noticing machine." (Lanier, 2010, p.187)

Something that militates against immersion is the fairly widespread emphasis on the visual aspect of virtual reality. As Heim puts it, the "visual bias of current VR brings out a possible detachment in the user's sense of the world. Seeing takes place at a distance, whereas hearing and the other senses are more intimate to our organic life." (Heim, 1997, p.554) It is significant that Negroponte, in discussing virtual reality, deals almost exclusively with the visual aspects (Negroponte, 1996, pp.115-126) and

while the situation may have changed somewhat since Negroponte and Heim wrote the pieces referenced here - i.e. 1996 and 1997 respectively - the significance of the non-visual sensory aspects are still not adequately appreciated.

Another feature of virtual reality is 'telepresence'. In the broadest interpretation, this can include videoconferencing, e-learning and even phone calls. However, in the context of virtual reality, it is usually taken to mean the performance of tasks such as controlling tools, instruments or other technology at a location where one is not physically present. A common example today is in medicine, or 'telemedicine', where "surgeries are […] performed via computer-controlled instruments, and surgeons interface with a video screen rather than a patient." (Stanovsky, 2004 p.170) Heim gives the example of gall bladder removal "without the traditional scalpel incisions." He says that since telepresence allows immersion, it provides the operator with greater control over the process. But, on the negative side, he adds that "a psycho-technological gap opens up between doctor and patient. Surgeons complain of losing hands-on contact as the patient evaporates into a phantom of bits and bytes" (Heim, 1997, pp.548-549) although there would appear to be a conflict between this gap and the immersion aspect.

Telepresence is very much part of space exploration such as on recent missions to Mars. It is also used extensively by the military for example in bombing raids particularly in drone-type raids which are becoming increasingly common. In these exercises, while the operator can be totally immersed in what they are doing with the controls, the remoteness or abstraction provided by the psycho-technological gap is likely to be one of the reasons that makes this a popular application since it shields the operator from the effects of their actions.

Understanding and defining reality is the key pursuit in metaphysics and has occupied philosophers since the time of Plato and his Theory of Forms and even further back. But, what reality is, is still an open question and while some of the arguments about this would seem worthy of inclusion among what Russell calls "the infantile diseases of philosophy", (Russell, 1984, p.143) virtual reality forces us to look again at some of the dominant theories. In the words of Stanovsky "[v]irtual reality presses at the very limits of the metaphysical imagination and further tangles and troubles long standing problems concerning how things seem versus how they really are." (Stanovsky, 2004, p.170) One must add that developments in areas such as quantum physics and complexity theory are intensifying the need for a resolution to this question.

Stanovsky suggests that "[v]irtual reality may turn out to provide a laboratory for the exploration of Kantian metaphysics" (p.173) while Søraker points to the similarity between Kant's view of the need for "certain organizing principles (time, space, causality, permanence, etc.) […] as conditions of

possibility to make our experiences intelligible" (Søraker, 2011, p.55) and the "stability, persistence, predictability, and intersubjective availability" which are provided by computer simulation and, as mentioned earlier, "separate the virtual from mere dreams." (p.54)

4.8 Identity in Cyberspace

Identity theft is now a major problem.   Saying that we can define our identity and package it in such a way that it can be stolen must be one of the most significant statements we can make about the age in which we live.   Our identity defines us.   It is how we see ourselves, how others see us individually and collectively and how we would wish others to see us.   One's identity is not clear and rational - there are many versions of it depending on the contexts and the observers.   Identity theft is not a new phenomenon.   There have always been impostors, at least as far back as Jacob posing as his brother before Isaac in the Book of Genesis but there is no evidence that it was a common occurrence in the past.   Today, however, identity theft is a concern whenever we enter cyberspace and it is there that we are spending more and more of our time.

A person's identity, according to Arendt, distinguishes them as a "unique being among equals." (Arendt, 1998, p.178) She differentiates between one's physical identity which manifests itself through one's appearance and the sound of one's voice, and the identity a person reveals through acting and speaking. Further she refers to the *who* and the *what* aspects of identity.   The *what* aspects comprise the "qualities, gifts, talents, and shortcomings, which [a person] may display or hide" while the *who* "is implicit in everything somebody says and does. It can be hidden only in complete silence and perfect passivity, but its disclosure can almost never be achieved as a wilful purpose."(p.179) It is "the essence of who somebody is." (p.193)

Floridi describes three identities which we possess, or three aspects of our one identity – personal identity, self-conception and social self.   The personal identity and the social self should influence and "support each other in a mutually healthy relationship." Floridi quotes Proust saying the social self "is created by the thoughts of other people."   The social self, that is how others see us, influences our self-conception but significantly, according to Floridi, "the social self is the main channel through which ICTs, and especially interactive social media, exercise a deep impact on our personal identities." (Floridi, 2014, p.60)

Castells describes three "forms and origins of identity building" namely, "legitimizing identity", "resistance identity" and "project identity". (Castells, 2010, pp.7-8)   Legitimising identity "generates civil society" which comprises the organisations, institutions and "social actors" that reproduce "the

identity that rationalizes the sources of structural domination." (p.8) Castells says that civil society is an ambiguous concept since it "generally suggests a positive connotation of democratic social change." He follows Gramsci's formulation of civil society as the "series of 'apparatuses,' such as the Church(es), unions, parties, cooperatives, civic associations and so on" which sustain the state while being "deeply rooted among people."(pp.8-9) Althusser, uses the term "ideological state apparatuses" - as distinct from the "repressive state apparatuses" comprising government, administration, police, courts, prisons etc. - to cover a somewhat similar list of institutions. However, he argues that the "educational ideological apparatus" is the dominant one since "no other Ideological State Apparatus has the obligatory […] audience of the totality of the children in the capitalist social formation, eight hours a day for five or six days out of seven."[57] Following this line of argument, the schools become, overall, the most powerful influences on the formation of legitimising identity.

Resistance identity is described paradoxically by Castells as "the exclusion of the excluders by the excluded." It is constructed by well-defined groups (e.g. in terms of ethnicity, territory, gender, religion,etc.) as a form "of collective resistance against otherwise unbearable oppression" (Castells, 2010, p.9) "on the basis of principles different from, or opposed to, those permeating the institutions of society." (p.8) Resistance identity reinforces boundaries, can develop identity politics but can also manifest itself in the fundamentalism and extreme nationalism we see today.

Project identity is a development of resistance identity. Castells uses the example of feminism as it moves from resistance based on women's rights and identity "to challenge patriarchalism, thus the patriarchal family, and thus the entire structure of production, reproduction, sexuality, and personality." In pursuing this women are seeking to redefine "their position in society and, by so doing, seek the transformation of overall social structure." (p.8)

Identity, according to Castells, "is people's primary source of meaning and existence" and is constructed by them "on the basis of a cultural attribute" or attributes.(p.6) Both individuals and groups can possess an identity or identities. Identities must be distinguished from roles such as a mother, a churchgoer, a worker, a union member etc. Roles "are defined by the institutions and organizations of society" while identities are defined by the subjects themselves. "[I]dentities organize the meaning, while roles organize the functions." (p.7)

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[57] Althusser, Louis; *Ideology and Ideological State Apparatuses (Notes towards an Investigation);* Trans: Brewster, Ben; First published in La Pensee, 1970
http://www.marxists.org/reference/archive/althusser/1970/ideology.htm [Accessed: 17 September 2016]

The more Castells elaborates on the meaning of 'identity' in *The Power of Identity*, the more complex and obscure it becomes and this merely highlights the difficulty in getting reasonably succinct definition of the term. However, he concludes the volume by suggesting that the reason identities are so powerful is "because they build interests, values, and projects, around experience, and refuse to dissolve by establishing a specific connection between nature, history, geography, and culture." (p.425) He senses the power of identity creating the "embryos of a new society" in "alternative electronic networks or in grassrooted networks of communal resistance […] away from the halls of power […] in the back alleys of society." (p.428)

Svendsen doesn't make the distinction between roles and identities and emphasises the fundamental importance of work in giving meaning to our lives and defining our identity (Svendsen, 2008, pp. 2, 96). For example, on meeting people for the first time we tend to ask them "what they do for a living, as if that gives us instant access to what sort of people they are." He also notes that in a person's obituary, their work "is usually prominent in the description of their life." (p.10) He says that "since very few people in the West have to struggle for their survival, […] instead they search frantically for their identity" and this manifests itself in increased consumption (p.98).

Moeller, quoting Luhmann, also emphasises the significance of work to one's identity. "[In] modern society the career […] has advanced to become the most important mechanism for the integration of individuals and society." (Moeller, 2006, p.92) He adds that even what would be regarded as a failed career, such as being a criminal, would still provide an identity. Although he says that one makes a career within a function system, it can be across a number of function systems. For example, the work of a professor of science in a university would have her participating in the science and education function systems as well as in the economic function system since she would be spending her earnings in the economy.

One's identity within the stratified society of the past was much clearer since it was, in part, determined by status or class and was therefore defined within relatively narrow constraints. Functional differentiation should go a good way towards eliminating the inequalities of this system since it provides a greater number of access routes into society and it should be easier, therefore, to build a positive identity as seen by oneself and by others. However, Wilkinson and Pickett found that "crude differences in wealth gradually become overlaid by differences in clothing, aesthetic taste, education, sense of self and all the other markers of class identity." (Wilkinson & Pickett, 2010, p.28) That inequalities exist which leave some communities marginalised, is no surprise. What is significant here is the maintenance of what is essentially a class structure and the role of symbols, in other words fashion, in this structure. The symbols are derived from the structure but they are also developing and reinforcing it. What is even more noteworthy is the failure of the functionally differentiated society. The stratified society as

represented by status derived from wealth is still in existence because one functional system, the economy, appears to be dominating all others or determining access to all others based on economic means.

We take part in many different activities and play different roles in our lives and in metaphysics there have been different interpretations of reality but, to quote Stanovsky "[w]hether Platonist, or Cartesian, or Kantian in orientation, in all of these systems there is a unified, and unifying, subject whose existence provides a ground for knowledge, action, and personal identity." (Stanovsky, 2004, p.174) The subject, or self, provides the anchor for our identity. The identity reflects something that is real. But virtual reality and social media etc. undermine again our understanding of reality and since we can represent ourselves and see ourselves through these media, we can provide or can have different identities.

Databases held by shops, online stores etc. hold various pieces of statistical and demographic information about us or our 'identity' as seen from their perspective in the marketplace. Negroponte rails against this, objecting to being classified as "a statistical subset". The digital 'me' he envisages in the 'post-information age' would provide enough information to allow machines to understand "individuals with the same degree of subtlety (or more than) we can expect from other human beings, including idiosyncrasies." (Negroponte, 1996, p.164) That means knowing everything about us but in the resulting information overload the real meaning or 'essence' of our lives would be lost. That, would be best represented in a narrative, different to Negroponte's narrative. In the words of Arendt, the essence of someone's life "can come into being only when life departs, leaving behind nothing but a story." (Arendt, 1998, p.193)

We have seen earlier, particularly in the mobile communications case study, the significant role commodified ICT products such as mobile phones play in defining fashion and in presenting or projecting identity. But ICT plays a further role by allowing us to build a virtual identity or identities which might not bear any relation to the embodied subject or self and of which the person perceiving it might have no inkling that it is a virtual rather than a 'real' identity. There are, therefore, three perspectives from which identities can be constructed or described - how others see us; how we see ourselves; and how we would like others to see us. It is for this last one that we are likely to rely most on the virtual identity.

I have control over my virtual identity and it could be a complete misrepresentation of my real self but then it would not mean anything since it would not represent anything other than the fact that I intentionally misrepresent myself. Others can develop a virtual version of my identity as they see me but this would be undertaken in most cases by parties representing state authorities such as those

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responsible for security, taxation, social services, etc. Such identities are built, in most cases, from formal, objective information but they can also include informal information some of which may come from hostile or, at least, less than friendly sources. Since this information, or changes in the information, can trigger actions affecting me directly, issues such as privacy and the accuracy, validity and security of the information become critical. That security is threatened by "[cookies], monitoring software and malware [which] have made more and more of us realize that the screen in front of us is not a shield for our privacy […] but a window onto our lives online, through which virtually anything may be seen." (Floridi, 2014, p.111)

According to Floridi, approximately ten million Americans annually are victims of identity theft (p.121) but he assures us that "digital ICTs are already providing some means to counterbalance the risks and challenges that they represent" and that they can even protect our privacy."(p.115) This is technology providing solutions for the problems it creates, solutions which generate further problems. In other words, it is the security industry gearing up within the ICT sector and intensifying the fears of users in the process. This is exemplified by Google as represented by Schmidt & Cohen who tell us that our identities will be our "most valuable commodity", will "exist primarily online" and are likely to come into being before birth (Schmidt & Cohen, 2013, p.36). They advise parents to help their children by having "the privacy-and-security talk even before the sex talk" and suggest that in selecting a child's name, the "parents will […] consider how online search rankings will affect the child's future."(p.37) Our online identity will, according to Schmidt & Cohen, become a "powerful currency" (p.39) but companies will provide insurance protection against identity theft or hacking or "against reputational damage caused by what [our] children do online." Additional security services will be provided by "identity managers" and "online reputation companies."(p.38)

Discussing the concept of identity in the type of language and expressions employed by Schmidt & Cohen, is inducing in people a fear[58] which is likely to push them towards searching for the solutions and services envisaged by Schmidt & Cohen whose 'vision' thereby becomes a self-fulfilling prophecy. This process reflects to some extent Heidegger's idea of technological 'enframing'.

One's identity reflects the meaning of one's life. As mentioned already, it is the narrative or story of one's life. To speak of it as a commodity or currency liable to theft or being exchanged is to remove much of its substance. If our identity is, as in Castell's words quoted above, "our primary source of meaning and existence", and if it can be traded in the market as a commodity or currency - which is

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[58] An example of such fear is provided by the reaction to the request by Irish Water Ltd. for the PPSN (Personal Public Service Number) of every householder in the state, availing of public water supply or disposal services. The Government was forced to intervene and Irish Water had to withdraw the request.

likely since this is what the prophets of technology are telling us and they would seem, based on past experience, to have the power to bring it about - then we have reached a very significant limit where money becomes the single measure and medium for everything including our inner selves.

Floridi, in a somewhat similar vein, says "'you are your information', so anything done to your information is done to you, not to your belongings." (Floridi, 2014, p.120) If this is so then we are reduced to something resembling Negroponte's 'statistical subset.'   It is rhetoric which, if not deliberately intended, at least tends to predispose us towards accepting the primacy of ICT and its development in our lives.

The right to be forgotten, to have one's online identity or versions of it removed from the Internet is a contentious issue.   It is a right to privacy which Floridi says also gives one the right to a fresh start, to renew one's identity "without having records that mummify your personal identity for ever taking away the power to form and mould who you are." (p.124) This, however, does not accommodate Proust's 'social identity' which, as mentioned earlier is "created by the thoughts of other people."

If we are very active online, then our online personal identities are likely to be under constant development and, according to Floridi, we arrive at a paradox which is best illustrated by Plutarch in the paradox of Theseus' ship which had various parts replaced over time as they decayed until eventually all the part had been replaced. The question then arose, and it can be asked about anything that develops - was it still the same ship? (pp.65-66)   Floridi doesn't answer the question directly in relation to identities but says it depends on the "context, purpose, and perspective" since otherwise it "leads to paradoxical nonsense." He adds that such "[q]uestions about identity and sameness through different times are really goal-directed questions, asked in order to attribute responsibility, plan a journey, collect taxes" etc. (p.67) But then, personal identities are about people as active agents. This argument, like many of the issues around online identity, may sound like sophistry but it is important because it is not unlike some of the arguments relating to virtual reality.   We saw earlier the difficulties encountered in trying to arrive at definitions which clearly distinguish 'reality' from 'virtual reality' even though instinctively in nearly all, if not all, cases we have no problem distinguishing them from one another.

Floridi, in discussing privacy, compares the situation in the local village community to that in the digital global village and says there is little privacy within small communities but little transparency between communities.(p.110) What is significant, however, about small communities is that a person has a fair idea of how much is known about them and by whom.   This is no longer the case in the 'Big Brother' environment of cyberspace.   Floridi also raises the question "whether a society devoid of any privacy

may not be a better society after all, with a higher common welfare […] since the defence of privacy in the home may actually be used as a subterfuge to hide the dark side of privacy; domestic abuse, neglect, or mistreatment." (p.117)

Chapter Conclusion

I have highlighted the embodiment/disembodiment relations between technology and people in this chapter. In Ihde's description of the way we relate to technology, he shows how we become so familiar with using the technology that we no longer notice it - it 'withdraws'. It becomes embodied. In the applications of ICT in different sectors of society, I have noted the concerns of Dreyfus and others that we are becoming detached spectators rather than involved agents in the world as we are allowing ICT to take on an increasingly greater role in our lives. We 'withdraw', our relationships are via ICT. They become disembodied. We can also see from the foregoing the difficulties involved in maintaining an identity in a disembodied virtual world.

Chapter 5   Analysis

Chapter Introduction

Having completed the literature review for democracy, technology, and ICT, I proceed in this chapter to identify from the review, the main themes we encounter in the development of ICT and which also have implications for democracy and the main themes in democracy which are affected by or related in some way to ICT.   These themes then provide me with the material from which I draw the overall conclusions that follow this chapter.

5.1   ANALYSIS - ICT

In a recent book, the Editor-in-Chief and the Managing Editor of *The Economist* praised the introduction of CCTV cameras to monitor public behaviour and thereby reduce crime (Micklethwait & Wooldridge, 2014, p.182) while some pages later they are critical of the same CCTV cameras through which the police of the "nanny" state keep "a permanent watch on citizens". (p.226)   They overlook this simple contradiction but it is symptomatic of how we view ICT - some aspects, as they affect us, are good and some are bad.   This applies, not just to ICT, but to most technologies.   We cannot select just the good parts because technologies as systems have interconnections and interdependencies and we must therefore be prepared for the wider and unanticipated implications.   These interdependencies are not just within systems but also between systems.   An online computer user is dependent on the Internet but this in turn is dependent on 'shadow' systems such as the electric grid which is dependent on a primary energy supply system.

Almost any act we undertake has consequences beyond the intended purpose because everything in the universe is part of one or more systems as exemplified in the 'butterfly effect' and we may not have an immediate or acute awareness of the effects of our individual actions on the more remote 'shadow' systems.   This, for example, is the main difficulty in motivating society to address climate change. Also, depending on the particular systems, it may be difficult over time to keep track of the interdependencies.   This is why it is usually less problematic to add components to a system than it is to remove them or to reconfigure or redesign the system - the implications of adding a component are generally easier to identify.   Evidence of this can be seen in the frequency of software patches and updates.

A system must be kept in balance, otherwise it could become overloaded causing a bottleneck or a breakdown.   Yet with many of our social systems there is a very strong urge to push them to the limit

resulting in economic, political or other crises.   It is part of my thesis that within society we are pushing ICT development to the limit and we are also pushing some of our political systems, particularly democracy, to the limit and therefore we are seriously endangering society as we know it.   More particularly, in spite of the rhetoric, we are doing little to develop effective interconnections between the ICT and democracy systems.

What drives the development of technology?   The drive is not initiated by the users, it comes from within technology itself, that is, if we take technology in the Heideggerian sense or in the sense of Kelley's technium.   While producers will try and convince us about the high demand for their products and this might or might not be true, it would be difficult to identify a demand for a product before it has been invented or produced.   The impetus comes from the technologists who identify opportunities for technologies or devices they have discovered, invented or consider developing.

ICT is now the major driver of technological development particularly since the definition of information has been stretched beyond the requirement for meaning with Claude Shannon's assertion that meaning is "irrelevant to the engineering problem." (Gleick, 2012, p.416)[59]   Large volumes of information can be embedded within devices and machinery to manage and control them with no need for humans to receive or access it.   Because there are few areas of technology where ICT cannot be applied through embedded chips, it is applied.

ICT is based almost exclusively on digital technology or, to be more precise, on *binary* digital technology. This takes it to the absolute limit of abstraction, at least as we can envisage it today, and the more abstract a phenomenon, the wider its applicability. Hence, the ubiquity of ICT and it was attained in a relatively short period.

As an indication of its significance, the total spending worldwide on ICT in 2013 was $3.5 trillion (Gartner Worldwide IT Spending Forecast).[60]   To put this figure in context, the total spending on food worldwide in 2012 was $4 trillion.[61]   The ICT industry has been developing rapidly since the introduction of the earliest personal computers or 'microcomputers' in the late 1970s and development accelerated with the commercialisation of the Internet from the mid-1990s onwards. Despite many shortcomings including numerous high-profile ICT project failures, user frustration with unfriendly

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[59] Shannon had some reservations about using the term 'information' in this context and considered using 'communications' instead while John von Neumann suggested 'entropy', but the term 'information' won out. According to Warren Weaver, Shannon insisted that "information is only a measure of the difficulty in producing the sequences produced by some information source." (Scientific American, July 1949, p.12) quoted by Roszak, 1994.

[60] The IT figure includes spending on telecommunications.

[61] US Department of Agriculture, Economic Research Service.

interfaces and difficulty generally in getting to grips with the technology, the achievements have been spectacular.   A number of features have contributed to the growth of the industry.   They are as follows:

5.1.1   *Primacy of Means over Ends*

The most significant feature driving the development of ICT is the primacy given to means over ends. This was highlighted by Ellul who, as noted above, stressed the interdependence of the different technological systems and components to the extent that they cannot be separated.   In other words, this accumulation of technology or the technological 'milieu' develops from a causal process which is not related to ends.   Feenberg takes this further claiming that when using technology we focus on goals rather than meaning.   For example, once it's decided to computerise a system, the technical people with a focus on the computerisation process itself are employed and the wider implications and social issues are neglected. And, with the ubiquity of ICT, there are few aspects of life that can escape this focus. In ICT we can see how this came about initially in the mainframe era when, for any business, the cost of a computer was enormous and the initial applications rarely exhausted the capacity of the machine. To improve the cost-effectiveness of the computer, other applications were identified and developed until 100% utilisation was achieved. The full costs were rarely allocated to the 'owner' departments within the organisations so the relationship between cost and return disappeared or became very unclear.   The primary emphasis was on the technology rather than the applications which bears out Heidegger's theory that the impetus behind the spread of technology comes from within technology itself.   The ICT environment has changed enormously since the mainframe era but the emphasis on means has lost none of its force although it is more subtle.

Speaking of machines generally, Arendt gives a slightly different perspective when she says "where production consists primarily in preparation for consumption, the very distinction between means and ends […] simply does not make sense."(Arendt, 1998, p.145)

5.1.2   *Technology Generates the Need for More Technology*

Once ICT products go on the market, they create a demand for other new technologies.   They require supporting technologies; many of them require an infrastructure which can sometimes be very extensive, and they can provide an opportunity or create a demand for accessories. Another aspect of this is when a problem arises with a technology, the solution is usually more technology - i.e. the toolkit or instrumentation required to fix the problem, the replacement part to rectify it or the additional technology to enhance or upgrade it. When a particular model

of computer is no longer adequate to run the standard applications, a new model is introduced with more power, memory etc. But with the additional capacity, the opportunity is taken to enhance the applications and within a short period of time the applications are again exhausting the capabilities of the machine and there is a never-ending cycle of technology demanding more technology as illustrated (p.133 above) by Triplett.

Crowd psychology within the user community sustains this phenomenon and carries it along. Take the example of 'The Cloud'. The concept is not new. It is unlikely to provide the most cost-effective data storage solution for most organisations. And it is doubtful if it provides a higher level of security when the owner does not have possession of the data. However, once it was launched by the industry, users saw it as the direction for the future and from a fear of being left behind and the fear of trying to upgrade from an obsolete infrastructure later on, they started to upskill in preparation for new technology since that is what everyone else appeared to be doing and then there was no turning back.

5.1.3   *Circular Arguments Supporting ICT*

There is a circularity about the manner in which ICT is used to solve some of the problems it creates. For example, the whole software element of the ICT environment is built from very simple routines used recursively (autopoiesis). The same does not apply to the hardware element but most of the essential hardware is built from the same basic electronic elements repeated and combined in huge volumes.

As noted above (p.122), Puttnam emphasises the need for an adjustment of our education systems to prepare students for the complexities of the information age - the complexities being caused by the increasingly dominant ICT environment. In addition, he says we should be using the facilities ICT offers to deliver this education. The implications of Stonier's argument is that knowledge will be our greatest asset and we must therefore train our students so that they will be equipped to manage the technology and that education should become the primary industry in the knowledge economy. These arguments are not merely circular, they present ICT as a vortex sucking the energy from everything around it. But Puttnam and Stonier are merely expressing the general views held by most people in the ICT industry, in government and in education.

Another area of circular argument is the role of ICT in productivity improvement. As we saw (p.132 above), it was assumed that productivity improvement in the U.S. in the 1990s was

largely due to the adoption of ICT in industry and business. It was found however, that a major proportion of the improvement in the U.S. was within the ICT industry itself and, because of its size, it contributed hugely to the overall productivity improvement figures for the U.S.

5.1.4   *Sub-Standard Software Engineering*

The offer of unlimited choice in the configuration of ICT products is possible because they are software-based, integrated circuit memory is cheap and getting progressively cheaper, and processors are getting faster.   When these were more expensive there was a greater incentive for system designers to be more selective and for programmers to be more rigorous in developing efficient and robust software since it had to run in memory and processors which were severely restricted in size and speed respectively. Today, the constraints of memory size and processor speed have diminished very significantly but the time taken to engineer software is getting more expensive so the business imperatives determine that software quality is less of a priority since the deficiencies can be compensated for with more memory and processing power. It is easier and faster to write long inefficient software programs than short, tightly coded, efficient ones.   And the inefficient software generates further demand in the market for memory and processing power, the addition of which will usually allow enough capacity to accommodate more software features and applications and so begins the upgrade cycle.   Also, due to an absence in many areas of effective software design, there tends to be a very large amount of redundant software on most systems (see below).

The poor quality of much of the software is revealed through the need for frequent system updates and 'fixes' as well as regular reports of security breaches. The software fixes that are applied, however, while probably solving the immediate problem, exacerbate the situation by adding to the size and complexity of the system overall and this contributes to the software/hardware upgrading cycle.   In the majority of cases the fixes are applied by the software vendor on the user's computer, usually independently of the user. Often, their purpose is to patch security holes and prevent hackers from gaining access to the machine. In effect, the user's machine is a battlefield where the suppliers and the hackers challenge one another in a contest over which the user has no control and from which the supplier, and sometimes the hacker, benefits.

The owner of a system can block the software updates but they usually happen by default since most owners have neither the time nor the competence to make a judgement as to whether the updates are really for their benefit.   It might be argued that this is no different to taking the advice of any expert but in nearly all other cases advice or assistance is requested from the

expert - they don't just appear inside one's house to fix a problem of which the owner is completely unaware.

The constantly repeating hardware/software upgrading cycle is a significant driver of ICT development in the market. This is somewhat paradoxical since defective software products are, more than likely, the principal cause and should, by the normal laws of economics, be inhibiting development. But, instead, the industry benefits materially and its reputation suffers little damage since, in most cases, there is practically no evidence of critical comment from the user community.

The frequent upgrades support a culture of consumerism and built-in obsolescence and this puts the focus on the technology *per se* rather than on its use. The focus on technology feeds into the masculine psyche and then is often channelled through the corporate world. Perhaps, even more significant where mobile technology is concerned, the constant upgrades feed into the youth culture and the need to identify with the latest fashion which is always ready to be exploited by the ICT industry. The focus on consumerism and technology fit in with the principles of Archigram[62] - a movement in the 1960s which influenced the design of the Pompidou Centre in Paris and the Lloyds Building in London in both of which the technology, i.e. the electrical, elevator, plumbing and heating infrastructure, was installed on the outside to prevent it cluttering the interior space but resulted in the technology itself becoming the most notable feature of the buildings.

It is perhaps unfortunate that the poorly designed software provides the strongest link between the human character and the computer since they're both fallible and somewhat unpredictable. The hardware of any technology is determinate. It is completely predictable until it begins to wear out. Software, however, reflects the human being. It actually is the thinking of a human being in a particular situation at a particular point in time. It could be argued that the software is totally predictable if one examined it thoroughly in advance, but the same could be done with the thinking of a human provided all the 'if-then-elses' and other conditions are taken into account. It would be difficult but not impossible. In a paradoxical way, such fallibility is probably one of the strongest arguments in support of artificial intelligence.

5.1.5 Design, Fashion, Personalisation

One of the great marketing achievements of the ICT industry is the way in which it has been able to exploit concepts of design, personalisation, and fashion, particularly in the mobile

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[62] http://archigram.westminster.ac.uk/ [Accessed 17th September 2016]

technology market.   A good design addresses a set of constraints to provide something which is productive, protective, satisfying or pleasing to the senses or some combination of these in the simplest possible way.   There is always some conflict between these requirements which generates additional constraints resulting in trade-offs between them.   Design involves creativity and the more severe and numerous the constraints, the more creative and elegant the design that addresses them.   However, this concept of design has been turned on its head by the ICT industry.   For example, rather than tailoring the PC or mobile phone to suit the requirements of the majority of users, or different categories of users, the suppliers include everything they have available for each system and leave it to the user to 'personalise' it on their PC.   As a result, in preparing this document there are thirteen menus and twenty six sub-menus open on the screen at present and each of these has up to sixty options, very few of which are ever used.   Along with the time wasted by the user in making the selections, all of these features result in a large proportion of redundant software on the machine.   The redundant software uses memory and therefore adds to the cost of the PC and, more importantly, it increases the complexity and therefore the vulnerability of the system overall.

With mobile technology the facility to personalise one's phone has been propagated as one of the outstanding and beneficial attributes of the technology, with fashion being the accompanying subliminal message.   The essential requirement of a phone is to enable one to communicate with others through voice, text or via the Web and the most effective way of providing this service would be through the simplest, most easy-to-use device.   Instead, most of the design work is omitted by the producer and left to the user and this omission is traded as one of the key benefits.

In most cases the users cannot define what they want because they are not fully aware of the facilities or services available or of the implications of various combinations of these.   The omission by the ICT industry of the user requirements determination meant the abandonment of the traditional standard approach to design.   The promotional language was adapted to support the new approach.   What is really an unfinished product is now a product that offers 'choice' to the purchaser who can 'personalise' it to show their individuality as they buy into the latest fashion, a fashion that has now become part of our culture.   The focus is no longer primarily on the utility of the technology. Even Castells *et al.* fall into the trap reciting the often repeated sentiment that "users are no longer just users; they are also producers or "co-creators"." (Castells, p.107)   They imply that this promotes inclusiveness since "mobile technologies are woven into the everyday behaviour of consumers, sometimes by formerly neglected groups, such as women, in ways not envisaged by manufacturers or service providers" (p.107). However, it is more a spellbinding than a voluntary inclusiveness.

Choice involves decision-making. With the ICT commodity market extended to include fashion items such as ringtones and mobile covers, the range of choices is enormous. Making a decision costs time or money or both but with ICT this is sold, in every sense of the term, to the user under the personalisation label.   In other words the user pays for the work the designer didn't do.   It could be argued that personalisation democratises the technology and there is some validity in this but the decision-making for the user is confined mainly to details concerning appearance and presentation rather than function.   Also, the range of choices and the complexity of the technology make the decision-making process much more difficult. The effort involved in making the choices could be seen as an attempt by the industry to increase the penetration of the technology into our lives with personalisation as the bait.

5.1.6 *The Subtle Use of Language*

As mentioned above, Hill's analysis of technological development centres on the alignment of the technological culture with the wider culture of society. This is achieved in ICT principally through language, not just through the language of marketing and advertising but specifically through the appropriation by the ICT industry of common everyday English words to the extent that, in many cases, people begin to associate them more with their new technical meaning than with their original meaning. Examples include *menu, home, architecture, protocol, virus, the cloud, memory, patch, utility, routine, hardware,* etc. Language reflects culture and culture is influenced by language as can be seen today in the emphasis placed on the political correctness of language.   The use of terms such as those just mentioned enables most people to 'speak the language' of ICT whether or not they understand the full specific meaning of the terms.   They do not feel as excluded as they do from other specialist or professional environments. This helps in presenting the ICT revolution as a social movement.

Language is also used in an effort to give pre-eminence to the role of information in today's world. This can be seen in terms such as 'the Internet of Things' which, I argue below, is not a rational concept. However, the term places greater significance on the information about any *thing* than on the essence of the *thing* itself.   In a similar manner, DNA is often referred to as information.   But DNA is not information, it is a molecular structure which determines our physical makeup and *provides* important information.   DNA is matter and could not be more physical but the tendency is to stress the virtual in the language we use as though we were trying to disembody the very source of our physical being.

5.1.7 The Teenage Market

Much of the ICT market has been captured indirectly through the younger generation. Being more open to novelty and to experimentation without the caution shown by the older generation towards computers, they embraced ICT mainly through games on the early PCs, then through music and other downloads and finally through social media. It didn't take too long before the mobile phone was brought within their budget. It helped to give them independence and identity and the industry was quick to deliver applications and accessories to satisfy their wants. Many of the applications were developed by their peers and indeed many of today's major software companies were started by people in their early twenties or even younger.

Once the industry was in a position to make ICT devices available as handheld consumer items, the teenage market was a relatively easy one to capture. With that accomplished, there was effectively an army of evangelists ready to convert the reluctant adults who now saw the increasing dominance of ICT in day-to-day living or parents who began to feel somewhat excluded from their childrens' lives if they didn't have access to the Internet or have mobile access to them. Even more significantly, the demands on datacentres and telecommunications providers is increased enormously not just by the number of teenage users but also by the type of information they are likely to be transmitting, much of it being graphical or video material. The ICT industry, therefore, leverages the teenage market to increase the demands across all sectors of the business.

5.1.8 Security and Privacy

Protecting the privacy of information is a difficult task due to the volume of business that most individuals and organisations conduct on the Internet. Most money is now virtual. It exists on servers and in various parts of the Internet rather than in banks, safes or banknotes and money is only a fraction of the valuable high-risk information on the Internet.

Fear is a great motivator and as such, it is exploited fully by the ICT security industry just as it is in the security industry generally. The fear of theft of money or information on the Internet is much more prevalent now than theft from homes or cars etc. because of people's uncertainty or a lack of knowledge about the security of regular transactions. Such fears are not without justification considering the reports of security problems in the systems of established and respected banks and other institutions.

Theft, however, is not the only security concern in relation to ICT. Privacy in some cases is an even greater concern as it is likely that records are kept by state agencies about most individuals

in the world and if they don't receive it voluntarily from the individuals themselves, they get it through their intelligence services. In 2013, details of the US National Security Agency's PRISM project were leaked to the press. PRISM provided the NSA with "direct access from the servers of […] Microsoft, Yahoo, Google, Facebook, Paltalk, AOL, Skype YouTube, Apple."[63] In most cases the companies denied any knowledge of the Prism project although in a few cases it was admitted that information was provided on the basis of court orders.

Security is one of the top concerns for large organisations who do a lot of business on the Internet. The total expenditure worldwide on ICT security was estimated by Gartner at over €120 billion in 2012 (Wheatman, 2011) while Forbes predicts expenditure on security to increase tenfold over ten years (Stiennon, 2013).[64] It is becoming a very significant element of the ICT industry. Security could be greatly enhanced through more rigorous software design and engineering and therefore less complex systems although this would not necessarily be to the short-term benefit of the ICT industry. Instead, the ICT security industry is likely to continue growing with the fear factor as the driver and investment as the proposed solution.

5.1.9 Moore's Law

As indicated at 5.1.4 above, when software systems need to be modified to correct errors or to provide for new functions etc., there is a tendency to add to the existing programs without refining or fine tuning them to maximise their efficiency. The result is that inefficient and possibly redundant software accumulates in the system and wastes resources. This can be accommodated because the cost of memory and processing power is constantly falling in line with Moore's Law. The 'law' began simply as an observation Moore made in 1965 on the development of transistor technology up to that time. The observation was taken as a law by others sometime later with the result that the doubling of power on a chip every two years has become a target for the industry. Therefore, instead of using brain power to design and build efficient software, the industry instead uses memory and processing power. Moore's Law has become a self-fulfilling prophecy as Moore himself had predicted and has become essentially a driving force for the industry.

5.1.10 State Sponsorship of ICT Industry

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[63] Guardian, The; 6th June 2013; www.theguardian.com/world/2013/jun/07/prism-tech-giants-shock-nsa-data-mining [Accessed: 17 September 2016)

[64] The baseline figures quoted in this article are at variance with the Gartner figures.

ICT is an ideal industry from the politicians' point of view. The main resource it requires is a skilled workforce, the provision of which is a choice open to most governments, at least in developed countries. On the software and services side it is adaptable, relatively mobile and requires little, if any, raw material. Most importantly, almost every citizen has a vested interest in it. Very simple ideas can generate enormous wealth and citizens tend to be very tolerant of whatever direction the industry takes once it has positive economic outcomes. Governments are prepared to invest heavily in the ICT industry and are concerned with the means, not with the ends. There is little or no evidence of prioritisation or discrimination regarding different products or different sectors of the industry. For example, the following statement by the Irish Minister for Communications when launching the rollout of a new €11m. broadband network for the Midlands, provoked no public comment, as far as one can determine. In the course of an interview on national television he said: "We will be able to put on new services such as music streaming, video streaming - you see, in Korea where they are completely interactive across the Internet from the games point of view, that hasn't really happened here in Ireland or indeed in Western Europe to a large extent but it has in those places like Korea and Singapore and we're trying to emulate those."(Ahern, 2003) The only real concern is for the impact on employment and GDP figures and they usually show a readiness to adjust any of the state resources to suit the industry.

5.1.11 *Rationality*

ICT is a product of rationality. Bureaucracy - within which for this discussion, I will include technocracy - being a completely rational process has been greatly strengthened through the application of ICT. Computer processing is a perfect fit for Weber's idea of bureaucracy with its purely objective 'dehumanised' processes and comprising calculable rules, information management and technical (in the sense of tekhnē) expertise. Even before the era of the computer, bureaucracy was sometimes referred to as a machine, and it is interesting to note that it was the introduction of machinery into the factories that caused a rapid development of bureaucracy because of the need to manage the investment, the technology and the organisation that resulted from the division of labour. The major expansion of state bureaucracy occurred with the development of the welfare state.

With bureaucracy comes regulation. The larger the bureaucracy, the greater the potential for identifying areas of regulation. Regulation can be expanded both in the scope and in the detail of the targeted areas. It can also be expanded, virtually without limit, in the intensity of the recordkeeping. With electronic sensors and wireless technology the auditing of regulations can, in many cases, be automated and it is possible that in the future the implementation of

most, if not all, regulations could be fully automated. This would reduce or remove completely the role of law enforcement and state bureaucracy in the implementation of regulations. The implications of this would be very serious in terms of autocracy and centralisation and, if done effectively, should reduce the size of the bureaucracy but increase its power.

There were some constraints on the rate of development of bureaucracy before computers were available but once they came on the scene, the interdependencies between ICT and bureaucracy initiated an ongoing cycle with each encouraging further growth in the other.

5.1.12 *Efficiency*

There is the generally unquestioned belief in efficiency. The individualism of our liberal society diminishes social cohesion and reduces considerably the likelihood of shared values. One of the few exceptions to this is efficiency which, as Feenberg, quoted above, said "is a universal value and as such subject to rational agreement." If it is, then it must be assessed against other generally agreed values such as, for example, survival, quality of life, protection of natural resources. Some of these will be in conflict with one another so they cannot all be accommodated equally but they are all concerned with 'ends' whereas efficiency has to do with 'means'. The difficulty is that the positive aspects of efficiency are easily and more immediately quantifiable in productivity figures whereas the potentially negative aspects such as impaired working conditions and less social interaction etc. are difficult to quantify. Therefore it is much more difficult to make the case against efficiency than for it, even though the negative effects might be far more significant in intensity, in distribution, and in long-term consequences. For Taylor, efficiency provides a measure for the success of instrumental reason which, together with the increasing emphasis on individualism, have resulted in "institutions and structures of industrial-technological society [that] severely restrict our choices" and "may even be highly destructive."(Taylor, 1991, pp.2-8) These are the "malaises of modernity" (p.1) that are of particular concern to Taylor.

Potential levels of efficiency, particularly in business, are generally seen to be almost limitless and the goal of efficiency thereby provides seemingly endless opportunities. The levels can be stretched upwards through faster production, faster delivery of services, higher quality, or by providing for a larger numbers of customers. Technology enables these enhancements in nearly all cases and ICT is extremely effective in expanding the customer base and speeding up delivery at practically zero incremental cost for many types of service as illustrated by Carr above. So for many of today's internet services, production and delivery are simple issues, in

fact they are almost transparent or incidental. Attracting customers is the major problem but some of the other features above take care of that.

Using a spreadsheet is not always more efficient for simple calculations than doing them in one's head or on paper nor is customer service always more satisfactory via a call-centre or online as against direct personal contact. Also, the spreadsheet provides an example of a fairly common problem which is that the widespread use of spreadsheets has all but eliminated the arithmetic skills which most people used to have, so they are now dependent on the technology for even the simplest calculations for which it is not well suited. Nevertheless, when looking for business, the proposal which offers the highest levels of efficiency is the one most likely to be accepted because efficiency is easy to explain, illustrate, and benchmark.

While the above are features that have been used in the market as drivers for the development of ICT, there are other features which may also be drivers, but have a special significance since they provide us with major benefits or present us with serious dangers or indicate the likely direction of development in the future.

5.1.13 Abstraction

As we saw, with binary digital technology we have taken abstraction to the absolute limit and this allows for the widespread applicability of the technology. This is similar to the situation with Hayek's rules of just conduct. He insists that these should be developed in the abstract to ensure that they are not biased towards any particular situation but are general enough so they can be applied to any situation that arises. However, this means that it is not possible to predict the type of situations in which they will be used. Similarly, we are often surprised at the types of applications for which ICT can be usefully employed.

While abstraction allows one to generalise, it also, paradoxically, tends to confine one's conceptualisation to a particular framework or at least steer it in a particular direction. It is a commonly held view that many of the disciplines within the humanities are tending towards those areas which are easily computable, particularly in history, sociology, political science and literature. In many of these cases the computer is being used to process statistical data to provide empirical evidence. But it could also be argued that the empirical evidence, although it might be in a different form, is missing because it has been discarded in the process of abstraction. It is as though one is in an inductive-deductive loop.

Steering one in a particular direction is what gives rise to Lovell's concern about computers being 'antiserendipitous' (p.109 above) since they must be programmed to receive results of particular observations and this can result in reinforcing existing knowledge rather than discovering something new.

Abstraction takes the person studying a particular object or phenomenon further away from the entity itself so that they often have access only to a model or analogue of the real entity. This is probably nowhere more pronounced than in the financial markets where the "electronic money transactions […] have become decoupled from the stock of underlying reserves" (Rochlin, 1997, p.95) and are therefore unconstrained by them. As a result, the transactions make sense only within the financial services system itself which, in Luhmanian terms, isolates itself from its environment and ignores the signals or 'irritations' from the environment which would help it to forestall the otherwise inevitable crash.

Abstraction underlies telemedicine where, for example, a surgeon can perform an operation remotely on a patient at another location. This has great advantages where there is a shortage of expertise. Despite the nature of the task, however, the experience is a disembodied one and the doctor - patient relationship suffers somewhat as a result. Nevertheless, the technology does not replace the expertise of the surgeon or reduce in any way their ability to do their work - it only enhances it.

The most worrying application of performance at a distance is remote controlled warfare through drone and similar technologies which allow the operator to be detached from the results of their action or, as Sclove describes it, the "psychological distancing from moral consequences." (Sclove, 1995, p.80) The history of remote controlled warfare stretches back to when the musket or even the longbow replaced face-to-face combat. However, the availability today of low cost drone technology with a capability for extensive destruction undertaken anonymously, must be a serious concern even for the most fanatical libertarians.

5.1.14 Big Data and The Internet of Things

There are a number of estimates of the amount of information we have accumulated in the world throughout history but it is difficult to find an unambiguous one.[65] However, an indication of

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[65] For example, Schmidt and Cohen (2013, p.253) say that "[e]very two days we create as much digital content as we did from the dawn of civilisation until 2013". Floridi (2014, p.13) quotes research from Berkeley's

the magnitude involved can be discerned from Floridi's estimate that the total amount of data "is expected to grow fourfold approximately every three years." (Floridi, 2014, p.13) Most of this data is generated by computers and related digital equipment from existing information and data.   More computers are needed to process the data so it generates a self-reproducing (*autopoietic*) process. This is the milieu in which we find *big data*.

Big data and the *internet of things* (IOT) support and reinforce one another. The objective for the IOT is to have a processor, monitor or sensor in every possible object to control the objects themselves. But the information produced by these processors etc. can then be accumulated and processed further using 'big data analytics'.   Gartner estimate that the IOT will have 26 billion things connected within the next five years (Gartner Report, March 2014) while Cisco estimate that it will be 50 billion (Anderson & Rainie, 2014).

Much of what we call information is independent of human intervention. It is generated by machines to drive other machines or other parts of the same machine.   Is it any different to the levers of an old-style typewriter or the springs of a clock and are these any different to the camshaft of a car or the PTO of a tractor?   Are these really transmitters of information?   If they are, then everything can be information, i.e. the Internet of Things.

With the Internet of Things, we have again pushed innovation - if the term is even appropriate here - to the limit just, as noted above, as we have done with abstraction and with the speed of communications. For a technology based on strict logic and the applications of which are meant to follow a rational analysis of needs, we have taken it beyond the rational. In the Internet of Things, there is no defined purpose other than to connect everything, which tells us nothing. There is no identifiable analysis of user needs, only of the needs of the technology producers. We abandon rationality and cover everything indiscriminately with the technology.

There isn't a clear definition of the term 'big data'.   It is one of those things which, Floridi says, is "difficult to define", but you recognise it when you see it (Floridi, 2014, p.13).   The same could be said of the IOT. One of the purposes of a definition is to clarify boundaries. But big data and the IOT do away with boundaries. They are anti-definitions and as such their

School of Information that found that 12 exabytes of information had been accumulated by humanity throughout history until the commodification of computers, "but that it had already reached 180 exabytes by 2006."   Unfortunately he doesn't give a date for the commodification of computers - it could have been anytime from the launch of the Apple Mac in the early 1980s to the introduction of the Pentium processor in the mid-1990s.

contribution to decision-making, to knowledge, and to management technique would be negative.

It is very likely that much of the data in *big data* will be generated from information on other systems. This would result in more and more data being produced from the same original source leading to an increase in volume without an ultimate increase in value or meaning. Since one of the big problems we have is information overload, this will add to the problem and greatly impair our ability to make decisions.

Luhmann shows how the decision paradox inclines us to keep putting back decisions and we end up making decisions about decisions because we try to have certainty about the future. Our main concern then is to manage risk. But he also showed that the volume of information we generate in trying to manage risk only complicates the situation further and increases rather than decreases the likelihood of a bad decision (pp.53-54 above). He advocates the adoption of March and Simon's idea of "uncertainty absorption." Uncertainty absorption, which manifests itself in 'authority' means that the later decisions "are guided only by the results and no longer by the evidence from which the conclusions [of the previous decisions] were drawn." (Luhmann, 2013, p.224) As a further means of simplifying and rendering the decision making process more efficient, Luhmann advocates an approach to risk management which he says could best be described as "prudence in the face of hazard." (Luhmann, 1996, p.4)

Luhmann's recommendations above would greatly streamline the decision making processes within organisations. But his advocacy of a greater reliance on authority within the organisation would have a negative impact on the growth of regulation and the size of our bureaucracies just as his advocacy of uncertainty absorption would have a negative impact on the development of the big data market.

Human beings do not appear to be capable of matching the speed or memory capacity of computers but, in the real as opposed to the virtual world, they can bring many strands of diverse information together very quickly and they can make successful decisions within their area of responsibility most of the time. Of course they make mistakes sometimes. Machines are seen to be more reliable. But individuals can also make mistakes in programming the machines or in interpreting the results. We saw above how the meltdown on Wall Street in 2008 was at least partly due to the rating agencies taking decisions on the basis of averages without taking account of the spreads. The Irish sugar industry was shut down in 2006 by the European Commission following a WTO investigation of the market and of the sustainability of the industry. The shutdown affected thousands of farmers who between them earned €150 million

annually from beet growing. After the shutdown and the decommissioning of the factory, the EU discovered that they were using out-of-date figures and that the industry had in fact been profitable. In another example, Dermot Gleeson, who was chairman of Allied Irish Banks during the banking crisis in 2008, told the subsequent Oireachtais Banking Enquiry that the Board relied too heavily on sophisticated computerised risk management models rather than on their own sense of what was happening and the risk models were not up to the task.

Big data and the IOT go to the extreme in being all-inclusive. We no longer have to select, to discriminate or to engineer, we just collect all the data available and connect all the systems we have access to. In other words, we can avoid making decisions. One of the most important guidelines in systems development used to be that the greater the investment in terms of time and effort in the early design stages and therefore the earlier that decisions are taken, then the earlier the project will be completed, the less the overall cost and the better the quality of the finished product. This again points back to importance of disciplined design.

5.1.15 A Liberating Technology?

When the word processor was introduced on PCs in the early 1980's, it was regarded by many as a revolutionary technology and a democratic technology. It was available at that time only on standalone computers since the Internet was not yet available to the public. Along with simplifying the production, storage and editing of single copies of documents, the word processor allowed individuals to print multiple copies of posters and circulars. They could make themselves heard in public. It is difficult now to appreciate the impact of this technology which today would seem very rudimentary.

The real revolution, however, came with the widespread availability of the Internet and the World Wide Web. These were set to provide most of the world with greatly enhanced communication facilities, richer social interaction, greater productivity leading to shorter working hours and more leisure time, more participative and active democracy. In short, it would give people more power over their own lives and would allow them develop a better sense of community and to contribute more actively to their communities. Certainly, the Internet has provided much greater access to information generally and this is a significant democratic enhancement to our lives. The abundance of information brings with it, however, the difficulty that when the volume gets too large, the information reverts back to data and requires further processing or filtering to become meaningful again.

The ICT philosophy of 'anywhere, anytime' has undermined the possibility of shorter working hours and more leisure time. In this context, borders and time zones, rather than being barriers to restrict us, are there to protect our freedom. Breaching or ignoring them violates our circadian rhythms of activity and rest and in the long term could be as detrimental to our wellbeing as climate change is to the seasons.

5.1.16 A Clean Technology?

Many thought that ICT would allow for major savings in energy use throughout the world by providing low energy alternatives for many types of communications. It was also expected to provide us with the paperless office and to reduce substantially our dependence on paper overall. Unfortunately neither of these have happened. A recent IEEE report states that:

"the ICT industry today is generating approximately 2 percent of global CO_2 emissions […and] the sharp growth curve forecast for ICT-based emissions is truly alarming and far outpaces aviation. ICT is forecast to account for about 4 percent of global CO_2 emissions in just five years." [66]

According to a 2008 report by Gartner, the CO_2 emissions caused by ICT systems across the globe were the equivalent of the total international air travel or 25% of the emissions produced by passenger cars worldwide and the energy consumption was increasing at a rate of 16% per year. This rate is likely to have increased more recently with the development of large server farms and datacentres around the world and further increases are likely with the development of 'big data' and IOT applications.

According to an Economist report in 2012, paper consumption throughout the world increased by 50% since 1980 (The Economist Online, 2012) which would have been the time when the idea of the paperless office was first promulgated and used as a major marketing slogan for office automation systems. The report shows Belgium as having the highest per capita consumption of paper as a result of the EU headquarters being located in Brussels.

5.1.17 ICT Revolution - the End or the Beginning?

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[66] Elmirghani, Jaafar; *ICT industry tackles growth in CO_2 emissions*; IEEE Study, 2015 http://greenict.ieee.org/blog/201509/ict-industry-tackles-growth-co2-emissions [Accessed 5th September 2016)

According to Perez's model of technological revolutions, the final phase before the next paradigm shift is marked by accumulations of idle capital, saturation of markets, mergers and acquisitions, maturing technologies and shorter product life-cycles. It's a matter of opinion as to how closely they match the state of ICT today but one can certainly see a resemblance. The model also tells us that each revolution lasts approximately fifty years. There are strong indicators, therefore, that the ICT revolution is coming to a close and some other technology, such as biotechnology, is likely to come to the fore.

We can, however, take a different view if we look beyond Perez or Schumpeter in terms of their classification of technologies. The wheel is the most significant technology ever invented. Every machine up to the time of the early computers was dependent on the rotary power of the wheel as was electricity generation and distribution. Electronics is the first innovation to replace the wheel in a range of mechanisms. ICT marks the culmination of the development of electronics. The question is, therefore, are we at the end of a Perez or Schumpeter revolution in ICT or is ICT just part of a much larger revolution to replace a paradigm which has lasted for over six thousand years?

5.2   ANALYSIS – DEMOCRACY

5.2.1   *Politics*

As the art of the possible, politics is the last resort before engaging in physical coercion or violence to obtain a solution to any social problem. It is through politics that compromises are worked out and decisions are reached. If there are protocols, they may have to be bypassed and if there are rules they may have to be broken. The decision, however, will be reported by the participants in terms that will accord with the protocols and rules. It is not that everyone, or even anyone, will believe the full report but the mythical element will be invoked to reconcile them to the decision and they will move on with their lives.

5.2.2 *Democracy*

For Luhmann the political system is "a means of producing collective binding decisions" and democracy is "a structural innovation emerging from this as a result of mere historical chance." (Luhmann, 1990, p.234) He considers the evolution of democracy as an unlikely achievement but one we should celebrate. Politics as a functional system is defined through its binary code of government/opposition and Luhmann questions the ability of this model to be flexible enough to cope with the scale and variety of the major problems that will have to be addressed politically ranging from genetic engineering to climate change, equality and peace (p.239). He is pessimistic about the future of democracy if it tries to accommodate these issues, but he is pessimistic about the future of the world if we don't find some system that can address them.

Many definitions of democracy have been outlined in Sections 2.1 and 2.2 above. There is little or no direct conflict between what is explicitly stated in them but they emphasise different aspects of democracy. There is, however, an ongoing argument between theorists as to whether democracy is of instrumental value or intrinsic value or whether there is any distinction between them and many of the individual arguments themselves are confusing. [67] For example, Schumpeter insists that democracy is merely a method and cannot be an ideal which implies that it is of instrumental value only but he also says that there are ideals such as free speech and justice etc. which are above democracy but which democrats believe will be guaranteed by democracy. Hayek also insists that democracy is simply a method for determining governmental decisions and that it does not prescribe any values but he adds that it is an ideal worth fighting for and he links it through his 'Great Society' with the values of the open market and with peace, freedom and justice. Luhmann's definition is clearly an instrumental one.

The fact that there is no single, clear, and comprehensive definition of democracy is what makes it adaptable to varying situations and is therefore its main strength provided its most essential, clear, and inviolable principle or 'bottom line' is never forgotten. This has been summed up in Gearty's comment (Gearty, 2007) that one of the greatest features of democracy is that every few years, the electorate, "no matter how stupid they are" can get rid of the existing government and replace it with another. Hayek expresses similar sentiments when he says that "as a convention which enables any majority to rid itself of a government it does not like, democracy is of inestimable value." (Hayek, 1978, p.152) This feature, of course, is relevant

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[67] Kant, Weber and Habermas claim there is a sharp distinction while Hegel, Marx, Dewey and Adorno think it a deficiency in any society where the distinction is given too much prominence. (See Geuss (2001), p. 126)

only to representative democracy. Both Hayek and Davies, as mentioned earlier, consider democracy to be the ultimate bulwark against tyranny.

Not alone is it very difficult to be definitive about democracy but democracy, in theory and in practice, presents us with more than a few paradoxes, conflicts, and apparent contradictions. For example, while democracy is seen as a bulwark against tyranny, many liberals fear the tyranny of the majority within democracy. It is to protect against this that Schumpeter insists on democratic self-control where everyone should be reasonable and must not take advantage of situations to press their case without some consideration for others. For Hayek, the problem can be addressed by ensuring that the majority response to any situation is based on abstract and just rules such that it cannot favour any particular situation but applies equally to all and is as likely to affect the majority as the minority.

While in practice liberals will advocate and defend democracy, strictly speaking democracy and liberalism are in direct conflict. Democracy is about community, about consensus on elements of the common good. The primary emphasis of liberalism is on individualism, on 'me' and my rights. It deprives us of "the potential strength of mutuality, cooperation, and common being." (Barber, 1984, p.75) Liberalism started out, and remains to some extent, the "sworn enemy of serious forms of democracy" according to Geuss (Geuss, 2001, p.153) who says its particular objective was as a protection against the tyranny of the majority (p.131). Despite this, liberals generally favour democracy since the only real alternative for them is to push for whatever further freedoms only anarchy would provide.

5.2.3   *Functional Differentiation*

While not recommending a return to a stratified differentiation of society, Luhmann recounts what was lost in the move to functional differentiation where there is no centre or no apex. Previously, "politics and religion competed for primacy" in guiding society and the nobility played a role in representing the outcome of this within society (Luhmann, 1990, pp.31-32). Today, society is "without a spokesman" and one searches "in vain among the social function systems for an *a priori*." (p.32)   Individuals engage with a number of specific functional systems related to their mode of living. Because of the intense focus of attention required by these, anything outside or beyond them is treated with indifference so there is a lack of awareness "of the greater issues or concerns that transcend the self" which, for Taylor, defines individualism (Taylor, 1991, p.14). Luhmann observes a reaction to these developments in the

revival "of political regionalism, […] self-help groups, [and] in returning to relatively simple, natural and local preferences." (Luhmann, 1990, p.33)

Functional differentiation supports democracy since, in theory, it provides each individual with equal access to each function system. It is in accord with liberalism since it allows freedom of choice for the individual but the basic philosophy of liberalism, i.e. individualism, is in conflict with the ideal of community which is one of the hallmarks of democracy. Law and money facilitate the open access across the differentiated systems with law providing the disciplinary function and money providing the distribution function (p.90). For these purposes they have the advantage that they "can be used abstractly – i.e. without a very precise pre-determination of the situations in which they are used concretely."(p.82) This reflects Hayek's vision of the means for providing equality of opportunity.

In theory, the function systems operate independently although they can be structurally coupled so that one system can chose to respond to irritations from another system. But one has to question how this is possible since every system requires resources and is therefore dependent on the economic system just as the biological autopoietic systems have to compete for resources. The economic system can then exercise control over the other systems and dedifferentiation sets in. Despite Luhmann's claim that "our society tries to include the population in all the function systems, e.g. as the democratization of politics",(p.19) a large proportion of the population is barred from *full* access to the economy and as a result from full access to law, education, medicine, etc. The problem starts with the dominant position of the economy and, within that, what Habermas alluded to as the failure to redistribute wealth and disband the class structure of wealth (Habermas, 1989b, p.57). Luhmann appears to contradict himself elsewhere when he states that "function systems became independent of stratification, organizing their own boundaries, their own modes of inclusion and exclusion of persons, their own way to transform equality into inequality and freedom into restraint." (Luhmann, 2002, p.11)

A system, according to Luhmann, endeavours to manage its environment by reducing the complexity of the environment and thereby increasing its internal complexity. (King & Thornhill, 2005, p.50) However, the environment of a system comprises all of the other systems. If each system increases its internal complexity, this contributes to increasing the complexity of the environment overall. This reflects the paradoxical experience of modern life - an unending stream of new services and new technologies, each of which simplifies a particular task but all of which together make life ever more complex. It has to do with

management, management in all areas of life, management of oneself, of the home, in business, the professions, sport etc. Much of the complexity is due to competition within systems.

In Luhmann's theory of autopoietic social systems, each system is fully enclosed. Society is ramified into separate functional systems which protect their boundaries. This rationalisation marks a shift from the generalists to the specialists or experts who protect their knowledge, often with a view to exploiting it in the market. This is in conflict with any democratic objective that functional differentiation might claim to uphold but it is a feature of the professional closed shops that operate within many functional systems. However, as noted earlier, within large organisations the power of the expert is often controlled by the bureaucrat due to the latter's control over the resources required by the former.

Another aspect of specialist knowledge is associated with the phenomenon of the *black box*. The black box is a feature of differentiated systems where the concept allows one system to connect to, or observe, another system without knowledge of the inner workings of that system other than its inputs and outputs. This means that the internal workings of the black box are not transparent. According to Luhmann "an increase in differentiation increases [the] necessity" to create black boxes (Luhmann, 1990, p.52). Familiarity with the black box concept grew with the development of computer programming since programs within one application could be used as subroutines or modules within programs for another application and this allowed for the acceleration of application software development. Use of the concept is widespread today in any field where systems are being connected.

While the use of the black box concept has accelerated systems development, it has diminished inquisitiveness quite considerably. All that matters is the *what*, not the *why*. The acceleration of systems development is due to the fact that it is not being obstructed by people asking 'why?' As we progress the development of the various systems on which we now depend, without having a grasp of the internal mechanisms and their sequence or 'genealogy' from which the systems have emerged, we are being immersed in an increasingly abstract environment. Context is lost and we lose our bearings so we are less clear as to where we are going. Knowledge is relinquished and power is surrendered.

In recent years there have been frequent campaigns attempting to address the perceived lack of interest in science among young people. I would suggest that this is partly due to the influence of the black box approach resulting in a 'dumbing down' of the subject because of a reduced emphasis on first principles. Young people are naturally more inquisitive and are usually open to the challenge of working out the 'why' or the 'how'. It is ironic, therefore, that in teaching

and learning, one of the few areas where the 'means' should take precedence over the 'ends', the greater emphasis is on the 'ends.'

5.2.4   *The Welfare State*

Many, if not most of the political controversies in national democracies can be linked back in one way or another to the relative size of the welfare state. It is their stance in relation to this issue that identifies the Right and Left in political terms and which today provides the major grounds for conflict which, according to Barber, is central to the political process so, ultimately, it is the idea of the welfare state and the issues flowing from it that sustain political debate.

Few theorists disagree with the basic principle of the welfare state, that is that everyone should, in so far as is possible, get an equal start in life and that compensation should be provided for those who are disadvantaged due to negative consequences of their particular situation. Theorists disagree, however, as to how this should be done. Hayek is against the idea of 'social justice' where a specific effort is directed towards specific people to achieve a particular result. This is too much like a socialist planned economy and undermines the spontaneity of society and of the market. He sees a role for the voluntary sector in supporting those suffering severe deprivation and this provides the added benefit that an active voluntary sector ensures a healthier society. Drucker would have a similar view of the voluntary and the non-profit sectors each of which derives its strategy from their very clearly defined mission rather than centring it on financial returns.

Drucker's difficulty with the welfare state is that it is managed by the state bureaucracy. It would be much more efficient and accountable if it were run by a business, a cooperative or even by government administrators once they are given autonomy for this purpose. There isn't convincing evidence, however, of significant improvements in costs and efficiency whenever the delivery of state services are transferred to the private sector.   Bureaucracy is seen as the problem and it is sometimes overlooked that bureaucracy is not confined to the public sector. Every organisation which maintains records or other paperwork is, or has, a bureaucracy and in many cases the private sector bureaucracies will prove to be less effective than the state bureaucracies because of the generations of experience the latter have had to fine tune their operations.

For Luhmann, the problem with the welfare state arises from the functional differentiation of society where each individual ultimately has a right of access to each functional system which gives rise to much more complex arrangements than when each person was assigned to just one

stratum of society. Entitlements are not as clear in the functionally differentiated society. With the development of the welfare state, Luhmann perceived a change in attitude from help to compensation, from benefits to claims. There will always be differences in the economic and social needs of people and at one level the welfare state strives to compensate for these differences. But compensation in one area will frequently create disparities in other areas and these will then be compensated and/or the bureaucracy will attempt to rectify the situation through additional regulation.

Other significant factors identified by Luhmann as giving rise to problems in the welfare state are the principles of political inclusion and universalisation. But for Habermas, the efforts involved in addressing these have been a failure since the welfare state has not achieved any effective redistribution of wealth other than a horizontal reshuffling within the respective bands of poverty and wealth.

The growth of the welfare state is facilitated by the bureaucracy which tries to control it through rationalisation by additional regulation rather than through rationalisation by simplification and refinement. While at the micro level bureaucrats might believe they are streamlining the system, at the macro level they are, unwittingly or otherwise, using the increased internal complexity to expand the bureaucracy.

Hayek, as one of the most influential liberals of modern times, advocates democracy as one of the two cornerstones of his Great Society - the other cornerstone being the open market economic system. In this he was following Aristotle who was not an advocate of democracy but who saw it as providing the best chance of political freedom for the individual. In Hayek's view, the way to provide equality of opportunity for everyone is through the free market with money as the medium of exchange and price and income being the indicators of the direction to take within the economy. The idea is very plausible and attractive. Contrary to what one would expect in practice, however, the 'free market' is not unplanned. It is subject to agreements and regulations. One of the most significant trade agreements was the GATT/WTO Uruguay Round which was negotiated by 123 governments through the period from 1982 to 1994 when it was signed. The agreement is documented in 34 volumes of rules and regulations[68] which were shown subsequently to be very much to the disadvantage of underdeveloped and developing countries, particularly in relation to IPR. For trade to be free, it cannot be regulated. Or perhaps we have to accept the paradox that freedom of any sort must

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[68] World Trade Organisation (GATT); http://gatt.stanford.edu/pdfpublic/00002543_mixed.pdf
[Accessed: 17th September 2016]

be protected by regulation. But the 'enforcement' of regulations is dependent on power - which, in the case of the market, is wealth - and the most effective enforcement will be provided by those with most power which undermines the equality which is necessary for freedom. If the market is to be free, then a single declaration to the effect *that there will be no barriers to free trade* is all that is required. Any addendums are negations of freedom.

There are other problems with the market. For example, does the principle of the free and equitable market still hold when money is virtual and its production can be virtual and when the use of the Earth's resources are not accounted for, at least in the way supply and demand is normally accounted for?

It might have been possible until recently to implement Hayek's model if it were done on a national basis.   However, we are now in the age of globalisation which militates against such a project. States have little power on their own to face the challenges from the global problems facing us in relation to climate change, international finance, terrorism, migration etc., yet paralysis sets in when they try to act collectively.   Globalisation is presenting problems even for the welfare state since there is a belief that migrants choose their destination on the basis of the welfare payments available.   Whether or not this is exaggerated, it arouses fears for the future.   As mentioned already, Castells is concerned about the global bureaucracy that is developing around international and global organisations such as the IMF, WTO, EU, and the UN to name just a few. There is a significant increase in complexity which merely allows the "*de facto* global bureaucracy" to garner more power to itself.   Much of the power is also leaking out to the major multinationals, fifty-one of which are among the top one hundred economies in the world, the other forty-nine are countries.[69]

5.2.5   *Bureaucracy*

Bureaucracy exists in any organisation where there are formal records and documented procedures. It is essential in a democracy as it provides the means for ensuring that government policies are applied fairly and objectively and, in Weber's words, "according to calculable rules and without regard for persons." The bureaucracy is meant to serve all the citizens - a civil service - and serve them equally. As bureaucracy develops, however, the resulting cold objectivity in which the bureaucrat interacts with the citizen very often antagonises the latter

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[69] Cavanagh, John & Anderson, Sarah; *Rise of Corporate Global Power*; Institute for Policy Studies; http://www.ips-dc.org/top_200_the_rise_of_corporate_global_power/ [Accessed: 17th September 2016]

who sometimes looks to the politician to act as intermediary which is a reversal of roles between the politician and the bureaucracy.

As a consequence of its dehumanised or abstract nature, the bureaucracy is often referred to as 'a machine', a description which is validated by the fact that it "is easily made to work for anybody who knows how to gain control over it. [It] continues to function smoothly after the enemy has occupied the territory; he merely needs to change the top officials." (Weber, 1978, pp.988-989) This is why, with the development of bureaucracy, we see more *coups d'état* than actual revolutions. More significantly, the bureaucratic 'machine' allows for the smooth, efficient and peaceful transfer of power during the change of government in a democracy - the government changes but the administrative work continues uninterrupted.

The rational and objective basis of bureaucracy should make it very attractive to liberals. However, liberals would strongly disapprove of other aspects of bureaucracy, particularly the autopoiesis phenomenon which is very evident in it. The more rules and regulations the bureaucracy has to implement, the more additional gaps it identifies so regulation begins to multiply, or grow exponentially, and this results in more resources providing further growth for the bureaucracy. Even when the bureaucracy fails to deliver or under-achieves, it usually pleads a shortage of resources to which, in many cases, it gets a positive response. For example, following the banking crisis in Ireland in 2008, the Central Bank blamed its lack of effective regulation on a staffing shortage and quite quickly it received an additional three hundred staff while resources were being cut in almost all other areas of the economy. Another example was given above where the implementation of freedom of information legislation, which was meant to exercise an element of control over the state bureaucracy, has been used by the bureaucracy to further increase its resources. Bureaucracy is based on rationality. Rationalisation within an organisation normally involves streamlining and a reduction in staffing. Where rationalisation in one part of a bureaucracy results in a reduction in resources, it is likely that resources in another part of the bureaucracy will be increased because it is very difficult to reduce the overall complexity. The bureaucracy finds ways of reproducing itself autopoietically in both good times and bad.

The above examples illustrate the operationally closed nature of the state bureaucracy. This is further exemplified by the safeguards provided to ensure that the bureaucracy maintains its objectivity and therefore its independence from political interference. But as Drucker noted above, these safeguards also protect the bureaucrats themselves from the demands of performance.

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Bureaucracy is organised hierarchically and tends towards centralisation, two attributes which are at variance with the principles of democracy of which, it must be emphasised, bureaucracy is an essential element. Bureaucracy gets its power through its manner of organisation, its control of information and its expertise. These, together with its clearly specified regulations and procedures, make it ideal for the deployment of ICT to further enhance its dominance. The rational process and the logic machine provide virtually limitless power to one another to maintain an enormous rate of growth. Luhmann illustrates the phenomenon, particularly as it occurs within the welfare state. In introducing computerisation "we cannot always foresee what will happen; and when something does, it is usually too late to withdraw the innovation. Still, we can always invest in dealing with the resulting problems." (Luhmann, 2012, p.295) In addition, Luhmann notes that the goals of bureaucracy are often focused on the bureaucracy itself. He quotes an example of the "improvement of the working conditions of the [internal] personnel" as an indicator of success (Luhmann, 1990, p.86)[70]

5.2.6   *Technocracy*

At the centre of the bureaucracy is the technocracy where the high-level technical expertise is concentrated and protected. At one end of the bureaucracy spectrum we have democracy since the purpose of bureaucracy within the political system is to enable democracy. At the other end of the spectrum we have the technocracy which monopolises power and subverts democracy. There is a tendency for "all those intangible things [e.g. privacy] which augment purely formal freedoms […] to disappear."(Wilson, 2009, p.337) We live in what is called the information age or the knowledge economy but while there is far more information available, much of it is accessible only to the expert or the technocrat and knowledge is not free in the sense of Hayek's open market.

Democracy is about opening up participation in decision-making. The technocracy, whether in the public or the private sector, seeks to confine decision-making as much as possible to itself and generally people lack the confidence to question or challenge the expert. The media, part of whose role is to observe and explain the actions of the technocrats, tend more to glorify than to challenge them so that they're looked on with awe by the public. This was exemplified by the attempted overlap of democracy with technocracy in the appointment in 2011 of Mario Monti as Prime Minister in Italy and Lucas Papademos as Prime Minister in Greece. Both were economists and were appointed - neither was elected to public office. They were appointed *as* technocrats - this wasn't incidental. Papademos was out of office after approximately six

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[70] Luhmann is quoting Richard Rose; *Managing Presidential Objectives*; London 1977 pp. 90 ff.

months and Monti was gone after approximately eighteen months. They had been appointed on the basis they would have the expertise to rescue their respective countries from the debt crisis. But it wasn't economic expertise that was primarily required. There wasn't any great mystery about what the problem was. It was a political problem rather than an economic one. It was a matter of getting a binding decision as to what section or sections of society or the citizenry should pay the debt.

5.2.7   *Dedifferentiation*

Because of the fluidity of the market which developed with the consumer society through the last century, the economy has penetrated most of the other social systems and this has led to significant dedifferentiation between systems. This means that the benefits of differentiation, i.e. democracy and equality, are being gradually eroded and the semblance of a class system is reappearing as differentiation by wealth begins to take over from differentiation by function. Services such as education, medicine, and law are no longer as freely available to everyone or certainly the same level of service is not provided for everyone. What is even more evident is the extent to which the welfare state has already effected a significant level of dedifferentiation between the political and economic systems due to the large share of the economy that is now influenced by the level of state expenditure. Because of this dedifferentiation, the government often shows more concern about the economic impact of its services than it shows about their intrinsic effectiveness.

While money is the medium of the economic system, truth is the medium of science and this has been reasonably well protected by the independence afforded most scientists because they worked in the universities and research institutes which were, by and large, non-profit institutions. While technology belonged to the economic system and was to be found in the market, science had its own system and was found in these institutions. The work of the scientists was assessed mainly on the basis of their publications. Today there is an increasing tendency to assess them on the basis of the research funds they bring to their institutions. Taking Luhmann's biological analogy of autopoietic systems, it is as though the economy has developed into a parasite on the other systems. Müller compares it to a virus which in human cells substitutes its "own genetic instructions for those of the cell" and she asks if "economic considerations [could] be seen as a virus that changes the programmes of other subsystems?" (Müller, Anne Friederike; *Some Observations on Social Anthropology and Niklas Luhmann's Concept of Society* in King & Thornhill, 2006, p.180)

5.2.8 *Participation in Democracy*

Luhmann is very concerned about why, today, we have so many decisions to make. He has argued, contrary to what many people would believe, that the planning process provides too much information which complicates and delays the decision making process. He also illustrates, as outlined above, the difficulty if not the futility in making decisions due to the decision paradox. But the planning and decision making proceeds and enables the bureaucracy to grow autopoietically, and this, together with the bureaucracy's expertise and its possession of official information allows it to extend its control and power. To keep this power in check requires an opening up of the decision making processes to allow more participation by the public but increasing participation has the potential to cause other problems. It would increase the complexity of the decision making process resulting in a requirement for more time and resources and, while the resulting decisions should have greater democratic legitimacy, they are likely to be less effective as a decisions.

There is much concern about the lack of engagement of people generally in the democratic process. There is a perception that the level of apathy has been increasing over the last three or four decades and evidence of this can be seen in the voting trends over that period. The decrease in voter turnout figures for Irish general elections between 1973 and 2002 was approximately 15%, almost double the average European drop for the same period. There are many likely causes for the lack of engagement or even lack of interest in politics. There is the feeling of powerlessness of the individual among the masses within the state and this has increased as the European Union strengthens its influence over national governments and is increasing further as globalisation develops. Athenian democracy is held up as the ideal to be emulated but less attention is paid to the very different circumstances between the Athens of over two millennia ago and the world of today. As noted earlier, Constant highlighted some of the major differences in 1816 which are still relevant today. These included the abolition of slavery; the replacement generally of war, which tends to be intermittent and involves the authorities, by commerce which is continuous and does not require the intervention of the authorities. This allows the individual greater independence. Here, already, we see the traits of liberalism developing.

The mass media are partly responsible for the disenchantment with politicians and the democratic system among citizens. As first-order observers of the political system, the mass media have a significant role in ensuring the accountability of politicians. But the almost exclusively adversarial approach adopted when undertaking this role puts politicians on the

defensive so this is how we usually see them and hence the negative overall impression of them and of the political system. Also, driven by consumer demand, sensational headlines, soundbytes and superficial coverage with high-level, and sometimes biased, statistics rather than rigorous analysis, tend to dominate political reporting as discussed in the example of the Irish health services above.

There is a widespread belief that ICT will facilitate the regeneration of democratic politics by providing the means for greater participation by all citizens through electronic and perhaps online voting and for enhanced access to information, and facilities for online discussion and deliberation. To accept this belief is to disregard, or to misunderstand, the subtleties and intricacies of the democratic system. It might be that politics and democracy will be utterly transformed, will undergo a paradigm shift, to align them in terms of methods and values with the transformations taking place in other areas of life due to the electronic revolution. However, the Athenian model has survived wars, as well as cultural, political, and industrial revolutions, and while many of its practices may have changed, its principles are still valued almost two and a half millennia after they were first articulated by Pericles.

In a drive for greater democracy, an inchoate Irish political party made a demand for full transparency of decision making in the Cabinet.[71] This would seriously restrain, if not inhibit, decision making at cabinet level. No minister would wish to be associated with negative decisions. It would be starting at the wrong end. Democracy must be built from the ground up. To be successful it should follow the principle of subsidiarity which is summed up by Mill where he says "that those who have any interest in common which they do not share with the general body of their countrymen, may manage that joint interest by themselves."(Mill, 1998, p.415) Barber's model, which suggests starting with local assemblies at community level, is useful. These assemblies would be confined initially to discussing and deliberating on local and national issues, a process which would engender civic competence. They could then develop over time through more active engagement in local issues, keeping a watching brief, for example, on the accountability of public officials etc. They could also take on board Hind's proposals for public commissioning of public journalism. What is most significant about Barber's proposals, however, is his assertion that conflict is central to politics. Politics is a process which transforms conflict into cooperation by enabling the building of mutual respect, trust and eventually cooperation and consensus. Conflict is the motivator which provides the citizen with Schumpeter's 'pungent sense of reality' and 'effective volition'. Involvement in political deliberations and decisions at local, national or any other level requires a significant

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[71]Eddie Hobbs of Renua in a television interview on RTE1; 13th April 2015

commitment and engagement from the citizen. The rhetoric from politicians in support of such involvement is rarely matched in practice since the natural tendency of government is to reduce complexity in the environment and this is best achieved through rationalisation and centralisation as has been happening in Ireland since 1977.[72]

The more focused type of participation by citizens is in voting in elections and there has been much concern in the media and more generally in the perceived falloff in such participation over the years.   The turnout figures have shown a downward trend as indicated above but it is significant that there have been a number of occasions when the figures have gone against the trend. The highest turnout recorded in an Irish election was 81% in the 1933 general election. The turnout fell gradually with the figure for 1951 at 75% but thirty years later, in 1981, it was 76% before falling to one of its lowest figures, 63%, in 2002 and at the election in 2011 it was 70%. The elections of 1981 and 2011 took place during a period of severe recession while the 2002 election coincided with the strongest economic boom the country has experienced. Caution is required when interpreting turnout figures because so many factors come into play. Nevertheless, the figures do provide some evidence that more voters are motivated, or provoked, to vote in times of recession or when things are bad but are quite happy to forego the opportunity when things are good.

There is a somewhat similar pattern with referendums of which there have been 38 since the Irish Constitution was adopted in 1937 by referendum with a voter turnout of 76%. Other high turnouts included 71% for the 1972 referendum on joining the EEC; 68% for the 1992 referendum on abortion; 66% for the 1968 poll on abolishing the PR system of election; and 62% for the 1995 referendum on divorce. At the other end of the scale, there was a 29% turnout for a referendum to regularise the position of the Adoption Board and another to change the university representation in the Seanad, both of which were held on the same day.   In 1996 a referendum to change the bail laws had a turnout of 29%.

It is no surprise that, as the figures above show, the turnout is high when significant, contentious or what are perceived as moral issues, are proposed and turnout is low when the issues are such that most people feel very removed from their possible impact.   This was probably best represented by the referendum on Scottish independence in 2014. While the turnout in Scotland for the 2010 UK general election was 64% and for the general election to the Scottish

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[72] Following the general election in 1977, the incoming government abolished rates on private property and car tax as promised in its election manifesto. These were the main funding sources for local government for which subventions from central government were now substituted.

Parliament in 2011 was 50%, the turnout for the independence referendum was 85%.[73] This followed what is widely regarded as one of the best, most intensive and cleanest political contests.

The relatively high turnout for the Irish referendum on abolishing the PR system was also significant. The proposal was defeated with a 61% vote against it.   There was another referendum on the same day on a proposal to change the rules governing the formation of constituencies and the vote against it was almost exactly the same as for the PR proposal. This would indicate that there are a lot of people who will not tolerate any tampering with the electoral system despite the fact that they themselves do not use it regularly.

Democratic elections, in practically all cases, produce definitive results of equal value regardless of turnout. The method works and considering the complexities, confusions and paradoxes that are encountered in democratic politics, it is important that the overall system is underpinned by such a simple and effective method. It is adequate to satisfy the positions of Luhmann and Schumpeter on the electoral process.

Democracy is valued because of the freedom and relative stability it has provided which, in turn, has resulted in significant economic development as both Luhmann and Sen have observed. Democracy is about power - about the citizens having political power both individually and collectively. If the citizens don't protect it and use it through active participation, they can lose the power. It will be readily appropriated by others at the centre such as the technocracy and then democracy will fade away. If, on the other hand, they are over-protective and fanatical in their use of it, they could destroy it and, as Held has argued, anarchy or totalitarianism can take its place. ICT could well be the vehicle through which such fanaticism could evolve.

It is worth noting here that the federal election in Germany in March 1933 had a turnout of 89%. The election was won by the Nazi Party which got 44% of the vote and although they did not get an overall majority, their closest rivals were the Social Democratic Party with only 18% of the vote.[74]   Again, caution is needed in interpreting these figures since, among other factors, there was widespread intimidation in the period before the election.   Nevertheless, participation was very high and totalitarianism won with over 17 million people voting for the Nazi Party.

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[73] www.ukpolitical.info/turnout45.htm [Accessed: 17th September, 2016]
[74] www.gonschior.de/weimar/Deutschland/RT8.html [Accessed: 17th September, 2016]

Pericles set out the principles and Athens provided the model for democracy. Constant explained how many of the conditions facing Athenian citizens in the 5th century BC no longer applied in Britain at the time he was writing in 1816 as is the case in most democracies today. We are too busy to partake in politics to any great extent and our main preoccupation is commerce which requires our continuous attention. The main preoccupation for Athenian citizens was war which was sporadic leaving long intervals during which the citizens had little else to do other than attending the Assembly. Commerce, according to Constant, also supplies our needs and gives us the freedom which today's liberals espouse. In addition to commerce, we have other tasks to undertake for which the Athenians retained slaves which allowed them to attend the Assembly whereas today we elect people to represent us. Compared to the modern state, particularly in the age of globalisation, Athens was compact and manageable and citizens could identify closely with the issues on which they were deliberating which, of course, could still apply to regional and local politics today. What Constant does not mention is that the Athenian citizens were paid for carrying out their various duties such as attendance at the Assembly, jury duty, various administrative duties etc. "Political pay […] was a key means of enabling many thousands of Athenians to be active politically when they wouldn't have been otherwise."(Cartledge, see Portillo, 'Democracy on Trial')

Another side of democracy, although not exclusive to democracy, is taxation. A reasonably equitable or democratic taxation system provokes "citizens into demanding accountability." (Collier, see Portillo, 'Democracy on Trial') In some smaller, less developed countries which receive large revenues for oil and other natural resources as well as foreign aid, there is less, if any, requirement for taxation and patronage takes the place of accountability with leaders holding onto power "just through personal patronage networks." (Collier) India is a rare example of a democracy which is poor. It has been a successful democracy because of its size - it is the largest democracy in the world. It is too big to cultivate personal power based on widespread patronage networks (Collier).

For today's citizens, political participation is not as critical nor as rewarding as it was for the minority comprising the Athenian citizens. In general, they have a better standard of living, they have more work and leisure interests and they can partake in many more functional systems than just the political system. As indicated above, they are protective of the electoral system and once affairs of state are being managed and the provision of services is being maintained, a substantial proportion of the electorate has no strong wish to get involved in political deliberations or even in elections. Although not active, it could be argued that they are not totally passive regarding political affairs since the mass media is keeping them up to date with

information round the clock on political developments should they wish to receive it and if they do they will respond on relatively rare occasions when they sense some cause for alarm.

Most theorists, as discussed above, are not in favour of maximising participation in democracy. They even regard it as dangerous due to the possibility that it could develop into totalitarianism with which participation was identified by many until a few decades ago.   Luhmann is concerned about the difficulty in making decisions when too many people are involved but he exaggerates the difficulty and his argument overlooks the fact that, as Barber emphasises, conflict, and conflict resolution through collective binding decisions, are the essence of politics. Taking Luhmann's view to the extreme would take one towards dictatorship.   Generally in politics, the more complex the decision, the better the learning process for all involved and the greater the political achievement.   It must be accepted, however, that this has to be counterbalanced by the effectiveness of the process in arriving at any decision at all.

Berelson (p.18 above) says that the democratic system requires both stability and flexibility with political traditions and loyalties in families and other groups providing stability while the floating voters among the less committed provide the flexibility. Pateman adds that the apathy among the majority maintains the stability of the system, presumably by not partaking in deliberations or voting. There is also a view that a significant proportion of those who do not participate tend to hold anti-democratic views.   But making differentiations like this undermines at least the theory of democracy since inclusiveness, as an element of equality, is the essence of democracy. Add to this the idea that the effectiveness of the democratic system diminishes as participation increases, then we are dealing with a very significant paradox.

Voting is compulsory by law in twenty-three countries although the law is strictly enforced in only ten.[75]   In Australia, which has mandatory voting laws, there was a 94% turnout in the 2010 federal election although opponents of the system claim that this figure misrepresents the overall commitment of eligible voters since 10% are not registered. Liberals tend to be strongly opposed to compulsory voting because, they say, it is anti-democratic. Some argue that compulsory voting is in conflict with the principle of free speech since free speech entitles one to refuse to speak. One of the main arguments of those supporting compulsory voting is that the people least likely to vote are the poor and the marginalised and there is a critical need for these to be represented.

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[75] http://www.bbc.com/news/world-asia-23810381 [Accessed: 15th September 2016]

5.3   The Mutual Dependency between Democracy and ICT

Democracy, as a method of politics, involves communication, deliberation, and decision-making and all three of these can be greatly enhanced through the application of ICT but, as a medium, ICT can also be used to undermine democracy. Since democracy is a balance between anarchy and totalitarianism, it can be destroyed by pushing it to either extreme. It is a particularly delicate balance if we take Barber's assertion that conflict is a central feature of strong democracy so it can also be damaged by those who are over-zealous in their support for, and protection of, the system and who might not be as close to the centre of balance as they assume. In many instances they are people, or institutions such as governments, that have received their power through the democratic system.

The negative or antidemocratic potential of ICT is usually exercised through the clandestine gathering of information while the positive potential tends to be exercised to disseminate information. State authorities and criminals are usually the ones responsible for hostile use but while the latter tend to be targeted in their use, the state authorities tend towards blanket coverage although in most cases they would claim to be doing this in defence of democracy. Businesses, like state agencies, have an interest in building profiles of their customers so they can market a personalised service although, as with ICT, the rationale behind personalised services is to streamline the business operations so that staff resources can be reduced leaving less people to serve the customers. There are benefits for customers but they might not regard them as worthwhile if they were fully aware of the detailed shopping patterns, and indeed life patterns, that the shops and other businesses have been able to construct from details of their transactions. (Duhigg, 2012)[76]

Many people would view the market and consumerism as strong manifestations of democracy and this would be supported by Hayek. It would be true if the market was free but, as I have shown (p.182 above), it is not. Also, the type of marketing just mentioned and the manner in which the ICT industry creates the demand for its products through the teenage market undermines the argument.

Data collection is a relatively easy task for state agencies since they have the power to demand certain information from citizens and to identify each citizen with a Personal Public Service Number (PPSN) or similar identity code which allows them to link various different databases and, if necessary, build profiles of citizens. In some cases the databases may include DNA records. State agencies also engage in covert data collection operations relating, for example, to telephone records, email records and mobile

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[76] Duhigg reports on how stores determine the date of arrival of babies to customers, based on their shopping patterns so they can send the expectant mothers 'special offers' during their second trimester of pregnancy. In one case, a father became aware of his daughter's pregnancy through the unsolicited offers arriving in the post to her from the store.

phone tracking. It is very likely that we will soon see data collection extended to tracking our movements and spying on us generally via drone technology, somewhat similar to what Google are doing already and they are making the information available to everyone on the Web. The problem for the state agencies is coping with the volumes of information collected, particularly in the larger states such as the US where the surveillance activities of the National Security Agency were exposed by Edward Snowden in 2013. The greater the volume of information, the greater the security problem. Also, as the volume increases beyond a certain point it begins to lose meaning and it must be processed using some analytics to provide information that is of practical use. What was information reverts to being data before being reprocessed to produce information again.

Bureaucracy and ICT have a relationship whereby they feed off one another in a manner which provides for exponential growth in the volumes of information and the spread of ICT. Bureaucracy is essential to protect the equal rights of all citizens in a democracy but when taken to the extreme, it becomes just as essential for the preservation of dictatorships.

Democracy is about the distribution of power. Activities which concentrate power are antidemocratic although they have to be accommodated to some extent provided they do not upset the balance by veering too much from the centre towards anarchy or totalitarianism. Information is power but the citizens are virtually powerless when faced with the manner in which the state and private organisations can utilise ICT to collate information about them. In many cases the activities outlined above extend themselves far beyond the democratic centre of balance. The philosophy behind the separation of powers should be applied also to the separation of information. Data protection and freedom of information legislation exists in many countries but it falls far short of addressing the scale of the problems outlined here and the difficulties with security mentioned above are unlikely to be addressed without a major transformation in our approach to ICT. It is also unlikely that such a transformation will take place anytime soon.

Electronic voting, or e-voting has been introduced in many countries. There are various different types of e-voting methods ranging from machines within polling stations to online voting. The pilot project using voting machines in three constituencies in the 2002 Irish general election was regarded as a failure and the proposal to roll out the system to all constituencies was abandoned. E-voting is a very efficient process with results available almost instantly once polls close. It should also have a much higher level of accuracy than paper-based voting. However, the transparency of the system was questioned since it would have been regarded as a 'black box' replacement for tallymen. But the instant production of results was seen as the greatest disadvantage since it replaced the manual counts which lasted for one, or in some cases, two or more days and it is during this period that the engagement of the electorate is at its most intense as a very high proportion of the people follow the results. In the process, they become

more familiar with the politicians, the parties, and the policies and political practicalities of forming a government. This engagement is sacrificed for e-voting.

On the positive side, ICT has made information on state services and activities readily available to citizens and it also allows for business with government agencies to be conducted online which makes transactions much easier.   Official information is usually provided by all government agencies via the web and this distribution of information is a distribution of power to citizens and is, therefore, a most significant democratic development. Very important also is the availability of unofficial information about state services, the conduct of government and other political topics, from discussion forums, blogs and newsfeeds etc. on the web.

ICT is seen as a means for developing participative democracy. As shown already, many theorists including Luhmann, Schumpeter and Pateman would not necessarily subscribe to this since, in their view, too high a level of participation by citizens would be detrimental to democracy as it would make decision-making more complicated if not impossible in many cases.   It would be extremely difficult to conduct what is often now referred to as e-consultation with even a small proportion of the population of most democratic states.   If the Irish government were to receive submissions from just 5% of the voters, this would result in approximately 100,000 submissions which would be very difficult to process without an expansion of the bureaucracy.

As discussed earlier, participation could be developed on the basis of subsidiarity where issues are discussed by those most affected by them.   It is only through such issues that people will engage seriously in political deliberations which can be filtered upwards, or mediated, through the subsidiarity model. Once people are engaged in the process and meet face-to-face regularly, then they can complement their work very effectively via ICT. If the deliberations are solely via ICT, then there are likely to be many more participants but with far less commitment overall and there is the risk of individuals using false identities to mislead or act irresponsibly in some other way. Another problem with the web, although it applies also to the mass media to a lesser extent, is that we search out material that reinforces our already strongly held views which leads to polarisation and does not help political discussion.

As shown above in the Castells et al. case study, mobile technology is very effective in mobilising even very large groups to respond, perhaps spontaneously as a flash mob, to some political development. While it is not very suitable for deliberating, mobile technology can be very useful for micro-coordination of meetings and other political activities. Mobile communications tend to be horizontal rather than top-down and are more reliable since there is less likelihood of spoofing than on email. The technology is also very effective in counteracting misinformation very promptly.

We saw in the case study also, how groups of mobile users in underdeveloped countries as well as migrants throughout the world are very innovative in leveraging the mobile systems to develop new services and businesses.

Macintosh mentions some tools that can help to support active participation in e-democracy. They include "Issue Based Information Systems (IBIS), a language and graphical representation scheme for visualizing argumentation."[77] This type of tool can be very useful provided one maintains an awareness that in trying to fit such activities into system models, one can be restricting the political scope or reducing the perspectives of political discussion.

Having considered how ICT can influence or impact on democracy, I will now consider the impact democracy can have on ICT. If the development of ICT can be influenced by democracy, then it cannot be fully deterministic or autonomous. Yet, we feel we have little or no control over the direction of technological development generally. This is because, unlike the standalone tools of earlier times, modern technology comprises systems of interconnected machines and instruments and the systems themselves are also interconnected. Systems are sets of dependencies. Dependency is a negation of freedom, particularly structural freedom. In theory, we are free to reject modern technology and live as people did prior to the Industrial Revolution but it would be difficult to find anywhere that one could survive independently of the infrastructural 'shadow systems' of roads, electric lighting, the noise of airplanes, processed food, etc. In most, if not all, cases where people opt for the simple life close to nature, they are still dependent either directly or indirectly on the products of modern technology somewhere back along the supply chain.

Heidegger's assertion that technology is a way of revealing; that it is something deep within our common psyche, is a theory which, instinctively, I find very difficult to accept but since it accommodates all the evidence, it is even more difficult to refute and he was particularly prescient with regard to our focus on the exploitation of energy resources. What Heidegger was saying is effectively that technology is autonomous although it was Ellul, who came after him, that is most associated with the term. Kelly's theory about the technium also supports the idea of autonomous technology but his theory is so general that it would be difficult to provide a falsification test. The same might be said about Heidegger's theory but his claim about energy exploitation goes some way towards providing such a test. When considering the development of autonomous technology, we could bear in mind

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[77] Macintosh, Ann; *Characterizing E-Participation in Policy-Making*; Proceedings of the 37th International Conference on System Sciences; 2004; http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.98.6150&rep=rep1&type=pdf

Steiner's comment who, on questioning the direction of some scientific research and using the analogy of Bluebeard's Castle, suggests that "It may be […] that the coming door opens on to realities ontologically opposed to our sanity and limited moral reserves." (Steiner, 1971, p.104)

If technology is completely autonomous and deterministic, then we have no choices and democracy becomes an irrelevant ideal. But we have choices. It is not essential that we have a car; we could adjust our lifestyle so that all our needs can be provided for within walking distance but we would have to tolerate the noise, pollution and dangers of other people's cars. Similarly with ICT. We could decide to live without it but we would be missing out on many services some of which, such as online banking, are becoming more and more essential. We have freedom of action in that we can live without having to use any ICT systems or services but as individuals we cannot prevent or inhibit the widespread deployment of ICT applications which eventually affects our lifestyle - for example, it is becoming increasingly difficult to get personal service in a bank or from many other services.

Amish communities have proved that it is possible, when acting together, to control the deployment of ICT and other technologies within their own districts. Most Amish today employ some technologies to a very limited extent. What cannot be achieved easily by individuals can be done by communities as the Amish have shown, but they have a non-consumerist culture so it's a moot point whether it's an example of democracy or of culture/religion in action. Whichever it is, Feenberg's synthesis approach and Hill's dialectical[78] approach to the development of technology and culture are very relevant. Hill sees culture and technology influencing one another and developing in tandem while Feenberg accepts the determinist view of technology but advocates modification through 'subversive rationalisation' by the community to bring about a synthesis.

We have freedom of action, or surface freedom, with regard to our use of ICT on a daily basis but we do not have the deeper, or structural, freedom to prevent it, should we so wish, from influencing, or indeed controlling, in the long term the environment in which we live. The compatibilist view between free will and determinism best sums up the situation. It is similar to Hirsch's concept of "the tyranny of small decisions" (Hirsch, 1987, p.37) or Schumpeter's view that history "consists of a succession of short-run situations that may alter the course of events for good." (Schumpeter, 1987, p.264) It also explains consumerism.

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[78] The description 'dialectical' is mine as I deem it appropriate here. To my knowledge, Hill does not use it.

Chapter 6   Conclusions

6.1   Discussion

We live in the 'Information Age'.   The value of information and the benefits of information technology constitute the zeitgeist.   Critical comment or misgivings about any innovations in ICT are reduced to whispers by the chorus of praise in the media, government and business sectors welcoming such innovations. In this environment, success from a business perspective, comes easily to the ICT sector.

In this thesis I have challenged much of the conventional wisdom regarding the development of ICT. The most significant factor, I have argued, is the primacy given to means over ends.   In many cases there is a greater emphasis on the technology than on the applications and this bears out Heidegger's enframement theory.   It also demonstrates a failure generally to stand back and observe the overall context within which the technology operates.   For this reason, and taking a lead from Luhmann, I have endeavoured, in the thesis, to adopt the role of a second or higher-order observer so as to get a more complete understanding of how we relate to ICT.

'Ends' in the context of this discussion correspond with needs.   Using Castells' case study, I have outlined how people with minimal resources in underdeveloped countries have exploited mobile technology in truly innovative ways.   They are more innovative because their needs are greater.   With the mobile phone they identified not just one but many needs or ends.   If the development and use of ICT were based on needs, then the technology would no longer be deterministic.

The emphasis on means, or more specifically, the lack of emphasis on ends arose from the tendency of the ICT industry and many of the ICT practitioners to characterise the technology as disruptive. This emphasised the negative nature of the ICT revolution and was influenced, to some extent, by the counterculture of the 1960's hippie revolution near what later became known as Silicon Valley. Existing practises and processes are disrupted without full consideration being given to the needs of users or to the fact that the disruption could destroy existing businesses and industries.

It often happens that criticism of the ICT sector is misdirected. To illustrate this I have provided the example of the PPARS project for the Health Services Executive (HSE) which is regarded as a classic ICT project failure whose budget overran by 25 times the initial budget.   But what was regarded as an ICT project was, in fact, part of a major and very complex change management programme. If the nature of the project had been understood correctly at the start, the outcome would probably have been regarded as a success or at least not as such a huge failure. What happened in this case is not an uncommon occurrence and I believe there is scope for further research in this area.

I have highlighted the tendency among the user community to accept substandard products and service from the ICT industry. The poor quality of such products manifests itself in the need for regular software patches and updates and is usually an indication of poor software engineering. The fact that these updates and patches, though unsolicited, are installed by the software supplier on the user's computer means that the industry never yields full control of the machines to the customers who pay for them.

The provision of virtually countless 'personalisation' options on many ICT products is evidence of a failure or a reluctance to engage in anything other than minimal user interface design and many suppliers fail to conform to standard design principles of restraint and simplicity. I have shown how poor quality or poor performance in some products and applications can increase the demand for more ICT products. These examples, and the fact that the suppliers of online services such as Google and Facebook, among others, are freeloaders on the networks of the telecommunications industry, demonstrate that the ICT industry is not subject to all of the normal constraints of the market. As a result, the motivation for improved quality in the industry is diminished. Enchanted by the technology or confused by its complexity, many users fail to recognise the shortcomings in many of the products and services provided by the ICT industry.

Rarely, if ever, are these quality issues questioned. Much of the time they appear to be welcomed as a challenge by users more concerned about the technology than its applications. This illustrates the point that the ICT industry has always put more effort into forcing users to adapt to the technology than adapting the technology to the needs of users.

Among the latest innovations in ICT are Big Data and the Internet of Things (IOT). These, I have argued, are not in response to user needs. They are crude 'cover all' concepts which will accelerate the demand for more technology to process large volumes of data derived possibly from several generations of other data and therefore far removed from the source. This leads to greater complexity and abstraction. Data abstraction implies a loss of context and this can lead to problems, particularly in areas such as the humanities.

Most, if not all, data is used for decision making in one way or another, if it is used at all. An excess of data or information can impede the process by making it over-complex. Luhmann favours the use of trust and uncertainty absorption as a means of simplifying the decision making process. His work focuses mainly on social systems but much of it is relevant to organisation and management and it could provide a valuable source for further research on management.

I have highlighted in the thesis how governments support the ICT industry principally because of the employment it provides. Considering how robots are likely to be commonplace in factories and other areas of business and manufacturing within a few decades or sooner, ICT will be instrumental in

increasing unemployment very significantly. Fighting against this trend would have little effect. I would argue that one of the most pressing issues now is to define or redefine the role of work and leisure with regard to meaning, identity and self-fulfilment.

Regarding democracy, and its relationship to ICT, the most significant finding from the literature was that while it was necessary to have a reasonable level of participation in the democratic process, too high a level of participation in elections, for example, could prove counterproductive and even damaging to the political system overall. Democracy is a balance between anarchy and totalitarianism and for that reason it is essential to maintain that balance. Not unrelated is the necessity to maintain a balance with regard to participation in deliberative politics, that is a balance between apathy and obsessive zeal. I have also demonstrated the role of myth which is often used, knowingly or unknowingly, as a cloak to protect our political and democratic systems.

Bureaucracy is an essential element of democracy and in recent decades it has become very dependent on ICT. While it is no surprise that bureaucracies wield great power, the sheer scale of that power, which I have tried to illustrate in the thesis, is far beyond most expectations. Bureaucracies keep regenerating themselves to garner more and more power and it is difficult to see how this can be controlled. A major part of their task is regulation but the answer to the question 'who regulates the regulators?' is not as obvious as it may seem.

In these conclusions and the preceding analysis I have provided the evidence to prove the two theses below and which, to my knowledge, have not been proposed before:

- The development of ICT is one of the two most significant and transformative technological revolutions since the invention of the wheel six thousand years ago (the other being the development of electricity distribution networks on which ICT is dependent). But in this development the ICT industry has adopted a disingenuous business model which leaves no room for democratic input from users.

- There are negative attributes of ICT which are anti-democratic. The positive attributes can contribute much to the peripheral aspects of democracy but achieving consensus in situations of conflict in order to steer a middle course between anarchy at one extreme and totalitarianism at the other, which is the essence of democracy, requires sagacity which only humans, rather than the cold rationality of ICT, can provide.

6.2   Contributions

The following is a list of issues discussed in the thesis and which, based on my literature review and over four decades experience working in the ICT sector, I believe are new contributions to knowledge.

- The answer to the question whether or not ICT is deterministic, is that it's compatibilist. We have a certain amount of freedom in relation to the less significant decisions relating to our ICT use on a daily basis but we do not have the deeper structural freedom to prevent it from influencing, or indeed controlling, in the long term the environment in which we live.   This does not conflict with the view, that ICT is determinist, that it drives the course of history.

- The primacy of means over ends (or the technology over the application) tends to be a feature of ICT projects and tasks, large and small, although it is likely to be much more pronounced in the smaller tasks such as those using a mobile phone. However, if the use of ICT were based on actual needs, then the technology would no longer be deterministic and the outcomes would be much more successful.

- The standard of software engineering in the ICT industry is very poor since there can be no other reason for the software updates, patches and fixes which the suppliers issue on a frequent basis. The updates are unsolicited.   There is unlikely to be any other business where the supplier regularly modifies the product which they sold to a customer, without the customer's permission.

- The ICT industry uses a business model in which there is an inverse relation between the profit from a product and the quality of the product.   For example, if a system is updated frequently its performance is likely to deteriorate as the updates monopolise the memory.   Eventually the owner may have to purchase a new computer because of the updates and the supplier makes a profit due to the inferior software on the previous machine.   Some of the ICT companies (e.g. Google and Facebook) also make huge savings by refusing to pay towards the cost of the traffic their applications generate on the telecommunications networks.

- The ICT industry benefits significantly from the extensive free publicity in the mass media covering the launch of new products.

- Practitioners in the ICT industry and in the wider sector often speak of ICT in positive terms as a disruptive technology and of applying it as such without having a clear, or any, idea of the outcome. It suggests a move from order to chaos which could be categorised with protest or war.   This is another example of means taking precedence over ends and it is an irresponsible approach which is

at variance with the rigid standards the same practitioners insist on for individual applications development.

- I have highlighted the use of self-justifying circular arguments by the industry, governments and the education sector to promote ICT. These include demands, for example, that we should invest in more digital technology and have everyone equipped to overcome the problems caused by it. Also, claims about productivity improvements were undermined by revelations in the U.S. that a major portion of the improvement was within the ICT industry itself which because of its size, contributed hugely to the overall productivity improvement figures for the U.S.

- I have shown the concepts of the *Cloud* and the *Internet of Things* to be anti-definitions.

6.3   Implications for Research

The following are topics which I have considered in the thesis and which, I believe, warrant further research.

- The concept of the 'black box' came into use in the early days of computing and I have suggested that the concept is, to some extent, responsible for the increasing lack of interest in science among young people and the 'dumbing down' of the school curriculum because of a reduced emphasis on first principles.   Somewhat ironically, education is an area where means should take precedence over ends but the 'black box' puts the emphasis on ends.   There is scope in the philosophy of education or philosophy of science area for research on this and it might also enlighten us on our relationship with, and our understanding of, technology

- Bureaucracy is a baffling phenomenon. It is an essential element of any political democracy, yet it is seen to be very autocratic.   It survives under every regime whether democratic, autocratic or military and it survives changes of regime.   It can benefit from its successes and its failures - the latter usually being attributed to a shortage of resources, which can be quickly addressed.   It regenerates itself autopoietically and protects itself under the 'separation of powers' principle. Bureaucracy is not confined to the public service.   Most large organisations in the private sector generate bureaucracies and much of their effort involves the application of the procedures and

regulations of the state bureaucracies so they form an overall complex system which in many instances extends itself to the global bureaucracy.   Research by a political philosopher that would provide some insights to help in regulating the growth of bureaucracy without undermining its service to the public would be very valuable.

- There is scope for some management research based on Luhmann's ideas, especially those directed at simplifying organisation management and decision-making and it would also provide for a more constructive assessment of 'big data'.

- I have criticised the business model used in the ICT industry where, in my opinion, there is an inverse relationship between product quality and profit.   Empirical research on this by a business or financial analyst would be worthwhile.

- There is a need for empirical research by an IS practitioner on the reasons behind having so many frequent unsolicited software updates on our computer systems.

- I suggested that one of the most pressing issues now is to define or redefine the role of work and leisure with regard to meaning, identity and self-fulfilment as we head towards the next stage of automation and robotics.   Research on this should also consider how governments view work primarily as a source of employment rather than for production.

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