THE SEMANTICS OF WORK IN A WORK SYSTEM: A PRAGMATIC PHILOSOPHY OF INFORMATION SYSTEMS

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Declaration

I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person nor material which to a substantial extent has been accepted for the qualification of any other degree or diploma of a university or other institution of higher learning.

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Signature of candidate

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Abstract

The study is a philosophical investigation into the semantics of Work in the Work System. In the field of Information Systems the Work System concept that has been adopted as a model for the understanding, analysis, and improvement of systems in organisations has not been adequately or formally defined despite that the concept is seemingly accepted as *a priori.* This view is challenged by asking the question: *what are the semantics of Work in the Work System?*

Work is fundamentally a human expression and a socio-cultural object. Work serves as a social good through the establishment of relations of various kinds. Further, that throughout human history, people have created technologies to facilitate Work but in the past three centuries, rather than technologies providing the means to facilitate the Work of people, people now provide the means to produce technology to Work. The Work System is regarded as a by-product of an essentially dystopian productionist world but recent technological developments such as Web 2.0 have served to challenge accepted notions of autocracy in the workplace.

The thesis follows a philosophically pragmatist path to address the question, but culminates in a series of semantic statements, that represent a systematic formal description of Work and the Work System as a formal ontology. Several cases are provided as real world counterbalances to theoretical discussions throughout the main body of the thesis. These illustrate uses and applications of Web 2.0 technologies of various kinds and varying degrees of success.

The idea that Work is a central concern in the life of the person, and how the person is affected by the need to Work in a productionist world, is discussed from the standpoint that the dystopian notion of productionism is a product of the industrialisation of the West (and now in the East). It is shown, that the human has become inculcated into the technological system and has become part of the technological system. In that discussion the person is presented as one who enters the system as a powerless being in the face of significant power asymmetries. The state of powerlessness is such that the person may see no other life than

that which is provided by the technological system. However, such power asymmetries are assuaged through the use of modern technologies, here represented by Web 2.0. The effect of the adoption of new technologies on Work appear as a shift in the balance of power and that affects how an enterprise functions. This necessitates a redefinition of roles and the Work that is done and Work is subsequently redefined as an objective concept, wherein the relationship between worker and Work is reframed through the appearance of participatory democratic processes of decision making and socialisation in the workplace. Work is represented as a shift in attitude and intention in the worker. Thus, the technological human is represented as an agent of change both in itself and the worlds it occupies.

Ultimately, the prior discussions lead to the establishment of an objective and representational description of the semantics of Work in the Work System. The descriptions provided are phrased in such a way that they are applicable and can be generalised. They provide a clearer understanding of Work in relation to the field of IS and a foundation upon which theory can be built.

Publications

The Semantics of Work in a Work System: A Pragmatic Philosophy of Information Systems	18th Australasian Conference on Information Systems (ACIS), Doctoral Consortium. University of Southern Queensland, Toowoomba. 5–7 December, 2007
Holistic Pragmatism as a Philosophical Framework in Information Systems Research	15th Americas Conference on Information Systems (AMCIS), San Francisco, California. 6–9 December, 2009
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Arguments for the adoption of a heuristic approach to IS *Research*	32nd International Conference on Information Systems (ICIS), Shanghai 2011. 4–8 December, 2011

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Chapter 1

Introduction

1.1 Introduction

Chapter 1 states the principal concepts that are used throughout the thesis: the premise that underlies this work in §1.3. In §1.4, the human and the person are defined, which leads to the definition of the technological human in §1.5. In §1.6, is defined the productionist view of Work, which is coupled with a view of the Work System in §1.7. Finally, in §1.8, the philosophical schools that guide this thesis are introduced. To assist the reader §1.2 provides an overview of the thesis and how the discussion proceeds, culminating in the formalised semantic ontology described in §10.6.

The objective of the thesis is to answer the question: *What are the semantics of Work in the Work System?* To answer the question, I have taken the position of a holistic pragmatist philosopher, with the principal authors informing the structure and nature of enquiry: Peirce, Dewey, Quine, and White. Supporting philosophers in the thesis include Heidegger, Jünger, Lakatos, Blumer, and James. Influential commentators include Zimmerman, Masaryk, Tannenbaum, and Pateman.[1,2] To address the question, Work has been construed as a property of the human that influences and is influenced by socio-cultural factors. Thus, Work is considered in the context of it as a notion, historically, as a means to production within the industrial complex, and social impacts on and of Work through differing philosophies. Ways that Work may be reconceptualised when influenced by recent trends in technological development are considered.

[1] Throughout the thesis, a referencing system is applied. The reference points to page number and line number as follows: ⟨page number⟩ : ⟨line number⟩.

[2] See also, 67:6–67:13.

Figure 1.1 illustrates the relationship between the overall vision and where the thesis is positioned. The Work System is a case of IS theory development that draws from human and natural phenomena. To test thought experiments, instantiations have been selected. Instantiations are selected case studies and the IT artefact, Web 2.0.

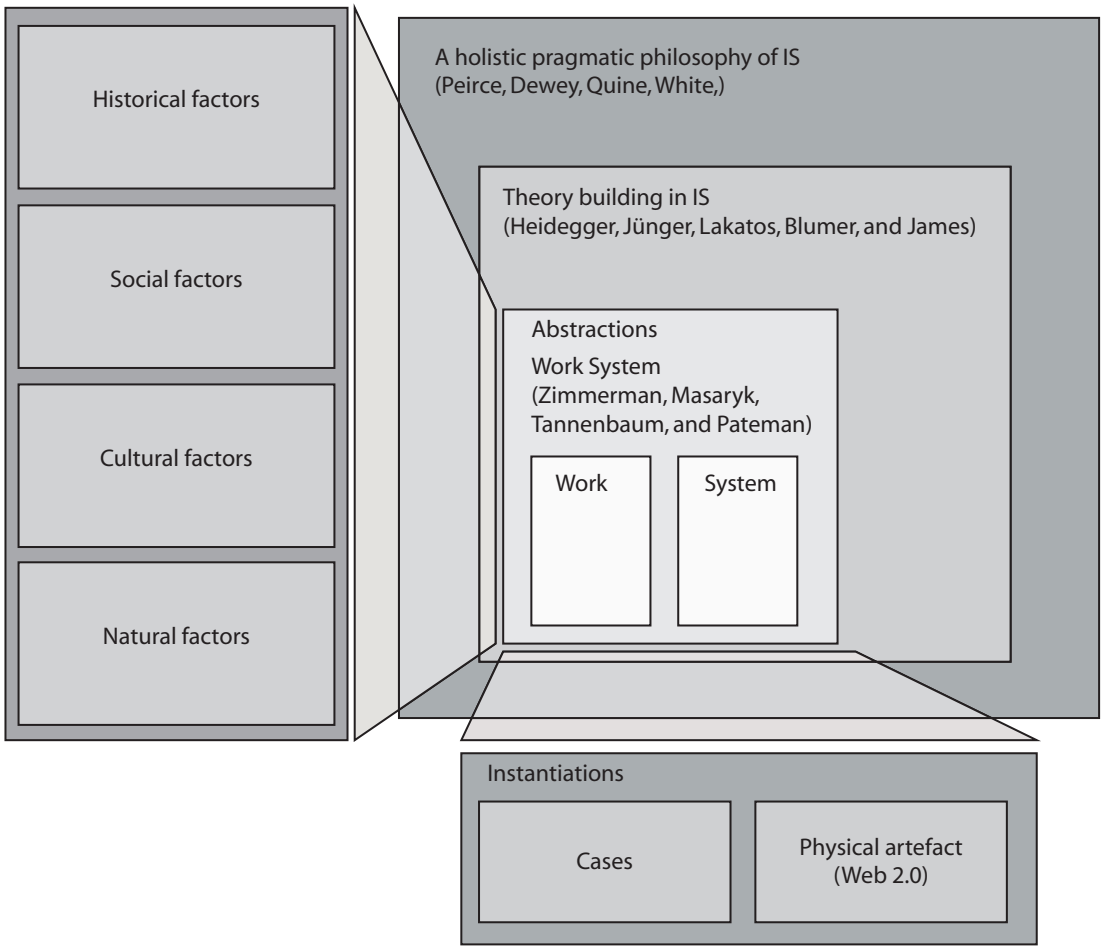

Figure 1.1: Logical structure of the thesis

In chapter 1, I frame the arguments that are presented throughout the thesis. I situate an objective understanding of Work that sees it as both material and immaterial, where the existence of immateriality allows for a subjective interpretation of Work.[3,4] An example of a subjective property of the human is culture: in this thesis I take the position that culture is a property unique to the human, that is, other life forms are not possessed of the property of culture.

[3] 18:28–19:3.

[4] Abstraction of human relations provides a means for modelling common understandings and behaviours. While this allows for economic use of time and resource, it is that which also creates conditions for practitioners to simply take a nearby model or theory and apply that, instead of searching for the irrational (natural phenomena). See 28:11–28:19.

However, it cannot be said that humanity is a property of culture.[5,6] My assertion that Work is a property of the human (in which technology facilitates Work and that Work has enabled the human to extend the capabilities of technology) has sped humanity along its evolutionary path.[7] However, while culture and Work are human properties, technology is not.[8]

The argument that Work serves as a socio-cultural object that provides a social good is presented, and that as culture is a uniquely human property, then Work is a property of the human.[9] To facilitate Work, the human has created technologies and in time, the human has become reliant upon the technologies it created. As dependency has increased, the technologies the human created have begun to dominate the human to the extent that it seemingly no longer displays those other properties that identify humanity.[10] However, the human is not so easily quashed.[11] In recent years, humanity appears to be emerging into a new technological form in which it may be able to retake command of technology and further its own ends, rather than those of technology. That is, conceptions of Work and the Work System are largely founded in industrial processes and I argue that, as the human has begun to regain control of its destiny, understandings of Work and Work Systems need to be redefined[12] and that modern technology provides the means for the human to regain its Dasein.[13,14]

However, I argue that the case of success for any person is not guaranteed and is dependent upon the extent and breadth of their experience and education. This provides the basis upon which a person can construe accurate perception. Thus, a precondition of their ability to judge and critically analyse is having the power to choose and the skills associated need to be developed and honed. Therefore, people who are only ever led or told what to think will, when put to the task, tend towards being told, rather than searching for their own answers.[15]

[5] 19:26–19:28.

[6] Ad hoc approaches to the creation of abstractions become barriers to purposeful or intentional thought. It is when abstractions are investigated that they disclose meaning. The moment of their interaction provides meaning, thus events become abstract objects of knowledge. When abstractions (objects of knowledge) are brought back into the material worlds, they are imbued with new meaning and the person's knowledge of them allows the objects to be controlled. See 28:21–29:4.

[7] 20:6–20:7.

[8] 20:9–20:10.

[9] 17:25–18:6.

[10] See §1.4.

[11] 22:7–22:12.

[12] 18:10–18:15. 22:18–22:20.

[13] 18:17–18:19.

[14] Dasein is a term used widely in German philosophy to mean the "existence" of something. The word is the compound of Dass-sein, "that it is." Adjacent in meaning to Dasein is Was-sein or "essence," and means "what it is." Both terms relate to a thing, state of affairs, person, or God. It is usually used in reference to living creatures, or at least the implication where it is used is that the thing has a life about it. For Heidegger (1993a), Dasein refers to existence in which the thing's Being is disclosed.

[15] 24:23–25:20.

Finally, technology is positioned as a human means to an end, but humanity has become dependent upon its means to the extent that it appears the human is a technological property. This gives rise to the conception of the technological human. The appearance of technological humanity is presented because of the application of productionist ideology; in the sense that it is the product of external forces and internal adaptations to exigency.[16] Subsequently, I shall argue that the human must regain its lost sense of self, but not by fighting against the system that seeks to reframe humanity for its own ends. Rather, that the answer already exists in the qualities that productionism relegates as being irrational and of no account.[17] As an object of knowledge, nature represents those properties the human aspires to. However, the human has exercised its dominance over nature through science, and as nature has changed, so too has humanity's perceptions of it, thus human changes of perception are reflected in nature, as an object.[18]

1.2 Roadmap

Chapter 1, the premise and fundamental concepts that carry throughout the thesis are detailed. Chapter 2, provides a review of literature and background for further discussion of the Work System. Chapter 3, provides an outline of the design of the study and the methodology applied. Chapter 4 details both the case studies that are referenced throughout the study to provide a 'real world' grounding of theoretical discussion and an overview of the technological artefact, Web 2.0. Chapter 5 includes the notion of Work, the place that Work has in the life of the person, and how the person is affected by the need to Work in a productionist world. Chapter 6 then concentrates on the dystopian notion of productionism as the product of the industrialisation of the West, with an emphasis on how the human has become inculcated into the technological system. The idea that the human has become part of the system is carried forward in chapter 7. The person is one who enters the system powerless, in the face of significant power asymmetries, but is provided with the means of rebalancing those asymmetries with modern technologies (in the form of Web 2.0).

Shifting the balance of power in the enterprise may be seen as a significant step in the management of processes and the redistribution of decision making roles, thus in chapter 8,

[16] 21:1–21:3.
[17] 21:25–22:2.
[18] 25:25–26:4.

Work is referenced as an objective notion, in which the relationship between the worker and Work is reframed. The appearance of the socialisation of Work is represented through a shift in attitude and intention. Dealing with the idea that shifting the power to make decisions through the application of technology entails the question of what the agency of change is whether it is technology, society, industry, or the person. Thus in chapter 9, change as a subjective notion is presented wherein the technological human represents the agent of change both in itself and the worlds it occupies.

In chapter 10, the question is answered. The preceding chapters lay the groundwork so that in chapter 10, a series of semantic statements are presented representing a systematic formal description of Work and the Work System as a formal ontology. Leading to that point the System, Work, and the Work System are described in natural language terms in chapter 11. In addition, in chapter 11, areas of possible research are identified and briefly outlined.

1.3 Premise

Dewey (1939) says that much of what is regarded as historical is the product of the imaginings of people such that for humanity, philosophy is a journey of imagination into its own prior achievements. The work of the pragmatic philosopher is to differentiate matter and matters of the material from the values and meanings that they impart because of the interactions, relationships, and connections between them and their participants and observers. As a pragmatist, Dewey would say that philosophy is the gathering up of matters and details of the world into an inclusive whole or a small number of principles so that the philosopher can apprehend truths that may emerge or lay within. So that pragmatically, it is when philosophy is regarded as a serious pursuit, then it achieves a wisdom that may influence action in the lives of people.

This thesis is a philosophical investigation of the semantics of Work in the Work System. Central to the argument is the premise that Work is fundamentally a human expression[19] and that Work, as a socio-cultural object, serves as a social good through the establishment of relations of various kinds. Throughout history humans have created technologies to facilitate Work, until the last three centuries, when industrialisation of the workplace has created a society that facilitates production, resulting in the destruction of social organisations built up

[19]For example, a dog does not do Work because the dog does not engage faculties of conscious determination and mind to order its surroundings.

over millennia. Information systems are examples of the application of industrial technologies where 'users' are relegated to the status of production units. However, recent developments in computing technologies and the extensions of an increasingly networked world, for example Web 2.0 technologies, now provide an opportunity for the democratisation of the workplace, and for workers to exercise greater power in decision-making processes, and for the re-establishment of non-work related social groups that reflect natural human social organisation.

Throughout both the Western and Eastern world, populations are witnessing a period of significant societal change that is being facilitated by knowledge and information sharing, increased power and influence at the micro-scale through access to broadcast technologies, and reshaping or creating new world-views by reordering data. I argue that the meaning of Work in the Work System is redefined under the shadow of world events. While agreeing with Dewey (1938), that human nature itself does not change, I argue also that the roles played by what Heidegger (1954/1993c) termed the technological human and how they organise themselves socially, appears to be undergoing significant shifts as new technologies such as Web 2.0 become increasingly available to populations.

Dewey (1938) says that human beliefs are influenced by many factors and these are provided through social structures, as cultural objects, education, and so on. I add that modern technologies open doors to perceptions that otherwise may have been shut, and belief patterns that populations were not exposed to previously are adopted. Barenberg (1994) says that the weak and dispossessed find they have a voice and are able to express themselves when their access to authority and information are improved, building a more participative democracy but at the same time challenging existing socio-cultural structures.

Lakatos (1970) says that in any field of research, terms must be agreed to form a hardened core around which theories can be established, providing a buffer against attack and where weak theories are tested and fail without harming the research itself. As a field of research, Information Systems (IS) can no longer be regarded as a fresh poppy in the domain of scientific research, and the time has passed where IS ought to have built a solid core of theory. There is a range of theories or methods to which IS researchers often refer.[20] I argue that Work constitutes

[20]For example Schneberger and Wade (2010) list some 74 theories that have their roots in human related activities from sociology, economics, and politics, to computer science, engineering, mathematics, and physics. Of these, adaptive structuration theory, cognitive fit theory, the theory of deferred action, Delone and McLean IS success model, Fit-Viability theory, general deterrence theory, media synchronicity theory, process virtualisation theory, socio-technical theory, task closure theory, task technology fit, technology acceptance model, theory of technology dominance, unified theory of acceptance and use of technology, work systems theory, and yield shift theory of satisfaction claim to have their roots specifically in the field of IS.

a core term in IS and that it makes appearance throughout material and immaterial worlds. Thus the semantics of Work and the Work System in IS are presented as a formal description, through a state and event-type reification of temporal logic (Allen, 1984).

1.4 Humanity

The human is said to be a social animal and, unlike other social animals is a member of the genus hominidae that carries the characteristics of superior intelligence, articulate speech, and erect carriage. Strawson (1959) says the individual human, the person, is a substance that is both physical and mental. Ryle (1979) says it is a category mistake to make the assertion: that it is the mind that thinks or the body that walks, but that it is the person of the human that both thinks and walks. James (1907/2007) says it has long been understood that the human has an innate intelligence and a spiritual and soul dimension that sets it apart from the other creatures. It is important to see that the human is a unity and that the human is the embodiment of personality, will, soul, spirit, mind, emotion, intelligence, and so on. Humanity is the essence of the human that carries forward over the whole range of human appearances. A dead human is a corpse and while it looks human, it is absent of those other animating characteristics. A zombie is a corpse that is animated, but lacks humanising characteristics. A cybernetic human[21] is animated and attains most of the characteristics of a human but is not a part of humanity. Zimmerman (1990) draws a parallel between a cybernetic human and a technological human described by Heidegger (1954/1993c), in which an outside system's Will governs the technological human.

Gathering together in social groups allows humans to use their collective strengths and overcome obstacles. Humans form socio-cultural groups in which they co-operate with each other and form bonds. Humanity also includes the range of cultures that have become established in human social groups. Culture as a term is broad and often open to disagreement but a culture includes knowledge and values shared by social groups, religions, laws and legal structures, forms of governance, expressions through the arts, attitudes, behaviours, and the various techniques and modes of development and growth of all of these. A human is not culture but culture is human. Socio-cultural groups that humans form are societies and the socio-cultural group in which a human resides is its society.

[21] *Cybernetics* is taken from the Greek *kubernētēs* meaning steersman, which is from *kubernan* to steer, control (Treffry, Fergusson & Isaacs, 2000).

1.5 The technological human

Technology as it is understood today is the usage and knowledge of tools, techniques, crafts, systems or methods of organisation. The etymological root of technology is found in the Greek *techne* (τέχνη) and *legein* (λέγω), which leads to *logos* (λόγος), meaning to gather or to assemble. *Techne* means both art and handicraft so technology relates to the disclosure of something and its being revealed. Technology is used to effect changes on the environment, and having the ability to use technology has enabled the human to advance its evolution. It is a characteristic of the human that it uses technology to forward its aims and intentions over the environment and to effect changes on its society (Winner, 1986). Technology is not humanity although humanity uses technology as part of its cultural domain.

Heidegger (1954/1993c) says the human cannot master the essence of technology. Instead, technological humanity has created a society in which it has developed disciplines designed to create mastery over itself. That is, the purpose of the disciplines is to ensure that humans, the technological humans, are amenable to the demands of technology in society. C. S. Lewis (1943/2002) agrees, saying that in its quest to gain mastery over nature, humanity forgets what it means to be human and humanity becomes subject to technological domination. Toffler (1972) sees that technological innovation is occurring at an alarming rate and that this is transforming the socio-political landscape. His fear is that humanity's ability to evolve its social and cultural practices to cope with changes wrought by technological change is being outpaced.

To address these fears, Jünger (1932/2007) defines a new form of human that is both hard and courageous: the overman (influenced by Nietzsche, 1883–1885/1978). He says the human must embrace technology with a Will being akin to that who caused primitive humans to be great and powerful. Zimmerman (1990) says that to embrace technology, it is necessary for humanity to fully surrender to technology's Will to Will and, as the soldier-worker, do whatever is required to fulfill planetary domination. Thus is humanity compelled to be the Gestalt of the worker, to produce ever more technological devices to meet its imperative. For Jünger, the soldier-worker is the Gestalt of the worker and is the highest meaningful reality for the human. The Gestalt of the worker embodies the totality of what a worker may be. The technological human is the expression of the Gestalt of the worker who has embraced technology and surrendered to its Will.

I contend that the technological human is a natural human response to a productionist technological age where Work, if it is to be engaged with at all, must be meaningful, fulfilling, and if not of benefit to society, then not destructive of it or the environment. Jünger (1977/1994) foresaw the Millennial when he described the 'anarch.'[22] The technological human is well represented by that generation born into the technological age. Various characterisations have been attributed to those who were born in the latter half of the twentieth century, for example Gen X, Gen Y, and so on. In this thesis one group are selected because this group is the first to have grown up with the Internet. Strauss and Howe (2000) say Millennials are those who are born some time between 1980 and 2000. Millennials are characterised as those who have been doted upon by their parents, whose lives have been structured from birth, and have had exposure to many different types of people. Millennials expect to have their views heard and respected, enjoy a challenge, with the expectation that they will complete them well. They tend towards philanthropy and support valued causes. They do not suffer boredom well and expect to be able to schedule work commitments around those of their lives. They are connected via technology and if there are no local challenges for them then they will search to find a new one. This means Millennials may be viewed as having no work ethic but instead, their ethics are anarchic. Their tendency to move from job to job may suggest an absence of loyalty but loyalty is a quality that must be earned and when it is, then it is fiercely contested.

1.6 Productionist view of Work

A view towards understanding production is via systematic planning of work practices that were provided by Scientific Management at the end of the nineteenth century (Taylor, 1911). The Work System was employed as a means of maximising production from the least amount of input of resources: the human is but one. This effectively stripped the human from its natural state within the workplace (Tannenbaum, 1952).

The Work System is rooted in industrial plants, placing information systems that refer to it into a productionist role, where the person is subservient to the system and the machine, whereas those systems ought to be subservient to human intention and purpose. Information systems have emerged from industrialised processes but the evolutionary path of development

[22] The anarch is discussed in detail on pp. 199–201. For further commentary, see pp. 106, 119, 183, and 202.

has been influenced by factors other than those of pure Marxist materialism, economic and industrial theory, and other ideologies.

The work of military and academic researchers has created a networked system, providing opportunities for relations to be built between participants, based on more than just economic or production oriented motivations. Human participants are then taking advantage of those opportunities to build a new and more participatively democratic society, of which the workplace is one part. Despite attempts by organisations and governments to control the emergence of apparent dissension, the voice of the person who will not be quelled is not silenced. Unable to silence their voices, the powerful are obliged to trust the motivations of their people and that, even though they may be self-interested rather than nihilistic, they can act in ways that are of benefit to the organisation or society. Organisations willing to accept the truth of this thus provide greater opportunities for workers to act autonomously.

Autocratic management practices that emerged from productionism are challenged in the twenty-first century in organisations that have adopted modern networked technologies (for example, Tenenbaum, 2006). Web 2.0 introduces the opportunity for the organisation to adopt democratic functions such as deliberation and collaboration into decision making processes, and this shifts power asymmetries between management and workers (Lammers, 1967; Massa-Wirth, 2006; Pateman, 1970). The result being, that perceptions of Work and how Work is understood and undertaken, changes as a result of the changes that have occurred in the working environment. The effects are transitive.

1.7 Work System in context

Since its inception, the Work System has had significant effects on those who have had to work in them, from improving how Work is done to comparisons between workers and machines in the area of cybernetics. Over time, the conception of the Work System has changed and in IS publications, the Work System has been referred to periodically since the 1970s, mainly in relation to systems development and design.[23] In discussions about the advance of technology and its apparent effects on society, Heidegger provides a strong

[23] See page 35.

voice (for example, Heidegger, 1954/1993c, 1972/1993b, 1931/1981). Countering this is Zimmerman (1990) in his critique of Heidegger's work and comparisons against other German philosophers such as Jünger, Marx, and others.

The term, Work System, stems from Taylor's (1911) Scientific Management as activities that can be clearly defined within bounded organisational units. Taylor describes how piece-work can be performed by a typical semi- or unskilled worker whose Work exists purely for the purposes of generating goods and services for sale or distribution to customers. Taylor sought to improve the efficiency and productivity of work by encouraging the selection, training, and development of workers and the equal division of work between workers and management through the application of scientific principles. The strength of the Scientific Management method was that science could be put to use to increase profit margins without recourse to humanity. While Taylor's stance has since been condemned as callous, the core principles he proposed exist today. That is, the division of labour and the creation of the assembly line approach for the manufacture of products, and the use of standardised processes and parts to cater for the needs of a mass market through low prices.

The Work System, as Taylor and others have described it, implies a hierarchical structure.[24] That in turn, implies a need for an autocratic style of management relying on the creative powers of those who wield power to make decisions for those who exist below in the chain of command. However, Zimmerman (1990) says the human has within it the need to express and those expressions can be surprising. This tendency has the potential to provide the organisation with valuable opportunities, but to foster it requires variations to organisational structures and socio-political environments. For example, Majchrzak, Cherbakov and Ives (2009) describe how social networking technologies transcend hierarchies and perceptions of age/experience to promote the development of innovative technologies at IBM while Trist and Bamforth (1951/2000) discuss in detail how a team-based organisation can be supportive at operational levels.

The flatter organisational structure, through the team-based approach, described by Trist and Bamforth (1951/2000), provides an environment in which creative solutions to problems

[24]Taylor (1911) says: "This paper was originally prepared for presentation to The American Society of Mechanical Engineers. The illustrations chosen are such as, it is believed, will especially appeal to engineers and to managers of industrial and manufacturing establishments, and also quite as much to all of the men who are working in these establishments. It is hoped, however, that it will be clear to other readers that the same principles can be applied with equal force to all social activities: to the management of our homes; the management of our farms; the management of the business of our tradesmen, large and small; of our churches, our philanthropic institutions, our universities, and our governmental departments."

that affect staff directly are found through discussion, experience, and collaboration. This approach creates an internal team hierarchy with a team leader who also acts as an interface with administrative and managerial staff. Analysis of applications of this approach led to the concept of the 'socio-technical system,' which comes out from the body of work referred to as 'sociotechnical theory.'[25] In 'sociotechnical theory,' there is a shift in emphasis away from the analysis of an individual's performance in a Work System towards teams or groups providing a strategy for breaking down the traditional hierarchical organisational structure. Such teams have a high level of local awareness and can react flexibly and adaptively. Over time, their experience grows through the completion of additional tasks, so that lessons learned can be applied to new situations (Rice, 1958). Effective teams in a Work System need little monitoring to produce outputs required of them. For example, see Majchrzak et al. (2009).

1.8 Philosophical approach

The critical function of philosophy is "discriminating judgement, careful appraisal, and judgement is appropriately termed criticism wherever the subject-matter of discrimination concerns goods or values" (Dewey, 1939, p. 260). Criticism is a process in which one may have something at hand and where proximity to an object quite naturally engages the individual in a process of appraisal. At the most superficial level one seeks enjoyment, but through reflection the point at which one engages with the object becomes the point of departure into the conditions and consequences of a value-object (1939). A person accepts an object as a representation of an idea, a property, an entity, a material substance, or anything else that may be conceived to exist such that an object can be described and defined and therefore becomes available in light of its effect on other objects, and vice versa. The object is perceptibly exterior to the person. Thus, the person may "consider what effects, that might conceivably have practical bearings, [the person] conceive the object of [their] conception to have. Then, [the person's] conception of these effects is the whole of [their] conception of the object" (Peirce, 1878/1992–98, p. 293).

Strawson (1959) says that perception takes place in a spatiotemporal framework. Particular objects can be perceived to exist provided they have a place in a spatiotemporal conceptual scheme. For Peirce (1878/1992–98), an object must be conceived before perceptions about it can be appreciated. Thus, an object may be located spatiotemporally with basic object statements

[25] See in particular Bostrom and Heinen (1979b), Cherns (1987), Mumford and Weir (1979), Mumford (1983), and Land (2000).

and are construed, through those statements, without reference to any other object. Strawson (1959) goes on to say that an object must then be relocatable over some period, using the same basic statements and for that to be the case, basic statements must be quantitative. He draws the distinction with qualitative statements by saying they are attributive, meaning they are applied to an object only once it has been described through a basic statement. For example, one may say that a person is wise only because the object of the person has already been identified. Saying the person is wise attributes to that person the quality of wisdom and that can only be the case when an observer perceives that to be the case.

Perceptions supply judgement and therefore criticism (which are rooted together, etymologically) with its material and the quality of judgements that ensue are the result of the depth and quality of perception. How one is able to perceive, is dependent upon the breadth and depth of their experience and education. Thus, how well one is able to judge is equally dependent upon the level of their education, what and how much they have experienced of life, and how able they are to perceive of the world that surrounds them.

Having accurate or correct perception that leads to equally good judgement is difficult to achieve. There is no one right way to judge: there are right and wrong ways, learned through experience and matured through wide contacts. Correct judgement requires discipline and a rich background, so it is often easier to simply tell people what they should believe than to discriminate and unify. Moreover, people who have the habit of being told what to do instead of having been taught how to think, rather prefer to be told what to do.

For the ancient Greek philosophers, nature did not conform to any particular definition, stating nature exists as a universal and how objects and substances relate to it, defining them and their purposes (Peirce, 1998b). This gives rise to the pragmatic position that humans are intrinsically part of nature and to know nature is to be intelligent about it and understand it. Then, when nature is turned to human purposes it becomes an object of knowledge, meaning that nature is irrational. It is irrational in much the same way that the overman is not a super–man but a representation of human as an ideal, its values, morals, motivations, and that to which the everyday person aspires to, while still firmly fixed in its this-worldliness. But when nature is presented as an object of knowledge the person begins to know of the effects of change that have been wrought upon it, or its relations with it. As a person's perceptions of nature change, those changes reflected in objects of knowledge.

Extending the metaphor of nature, over time knowledge changes, grows and gathers attachments, like lichens and moss. To be able to change the objects means to also scrape it clean of those impediments and return concentration each time to the agencies that effected the attainment of knowledge originally. The traditional view that nature is inherently rational, and that it is incumbent upon the human to come to understand that rationality, Dewey (1939) says, was costly.

To illustrate the accrual of knowledge, consider a machine that produces ball bearings. When the object of knowledge is representative of a substance such as a machine, then clarity and knowledge of the machine comes when perceptions about the relationships between forms and operations are made when these are related to the work done by it. Such perceptions may be made in isolation, but the machine itself can only be known when these are brought in connection with one another. In the thoughts, motions, and individual parts are the means by which the elements link: the physical effects of the means are the consequences. The relation of means-consequence points, then, towards the ideal.

The ideal machine exists as a concept only, and efforts to repair or otherwise maintain the machine are attempts to bring it closer to its ideal. Its ideal is the relation between the machine as an object of means and as an object with consequences. The value placed in the machine becomes the standard by which it can perform its designated function. The more accurately its functional relations are defined, the better the engineer is able to find problem areas in the physical form of the machine, or to propose improvements. Thus, a relationship exists between value and the amount of work a person puts into an endeavour. This increased value provides the basis for the accrual of meaning.

Meaning is not something that automatically accrues or comes in-place when an object is first defined. It adds to the object when it comes under the scrutiny of an observer who investigates its possibilities by examining its relations and operations, then the observer comes to know the object better. When ideas are considered from the standpoint of action, then action becomes the core of ideas. As processes of thinking, knowing, action, and experience begin to cycle, meaning is attributed to objects.

The question arises: what objects of knowledge shall pass as true? Dewey (1939) identifies four types. (1) Of the most primitive kind are immediate sense data, observations made from the immediate senses a person possesses; (2) Objects of everyday experience are the concrete things of the world where a person lives and exists. When referring to common-sense items, it

is to these that reference is made. (3) Objects of physical science are products that have been identified through the application of elaborate techniques and technologies. (4) Mathematical and logical objects may never have a physical bearing. They only only ever remain in the abstract world. In this thesis, the first three are put in place to derive the fourth.

There is a relation that exists between operations and their consequences, defined by the conditions connecting them. Complex conditions result in fuller and richer consequences, with more significant resulting knowledge. This does not mean there is any truth in the results, just that they are more significant. Physical knowledge, immediate sense data, depends on there being fewer conditions, having a narrow and isolated scope, and operations that are precise and technical. While there is no difference in principle between knowledge of the physical world and that of social or cultural affairs, there is a practical difference. Being an object of physical knowledge is equivalent to being an object of operations that "discriminate definitely fundamental relations of the experienced world from others, and that deal with them in their discriminated character" (Dewey, 1939, p. 190). Consequential objects of knowledge are not finalities until they are used as societal factors during enquiry into social and cultural phenomena, when they become instrumental. That is, they no longer operate upon the objects and their relations, but instead, they become part of a method for understanding phenomena that are more complex.

The special results of science find ways to enter the social and physical environment, but this does not equate to them becoming known objects of science. Mathematical or logical objects are determined from a systematic progress of enquiry, in which the metrics of physical properties are collected from sense data. The formal objects created are the objects of physical science and are known symbolically. It is through the interactions of the symbols that operations are planned and are able to solve problems. For example, physical science has effected significant change in social conditions, which has resulted in an increase in intelligent understanding. Flynn (2008) says that "detaching logic from the concrete has made it a powerful instrument for dealing with the hypothetical and without this, much moral argument could not get off the ground." Illustrating his point, it was through the spread of the language and categories of science that culminated in the liberation of reason from the concrete.

There exist differences between forms of knowledge, which is the difference in the range or fullness with which conditions are addressed in the subject matter concerned. While there are subjects that amaze, such as investigations into sub-atomic interactions, much is omitted

from the studies conducted. The conclusions and the results that are presented stand in stark clarity when compared to the apparent messiness that surrounds understanding of the human condition, even though more is known about how people conduct their lives. Much that is understood about particle physics is wrapped in layers of selective abstraction. It is through the process of eliminating the superfluous, the not immediately relevant, that knowledge can be gained and more found, but when the abstraction process is applied to social and cultural objects, then one must also selectively remove distinctively human factors. *"Artificial simplification or abstraction is a necessary precondition of securing ability to deal with affairs which are complex, in which there are many more variables and where strict isolation destroys the special characteristics of the subject-matter"* (Dewey, 1939, p. 207, emphasis is Dewey's).[26]

In human relations, the use of abstraction may be applied as a means for establishing a common ground or for creating a channel for communication. At the same time that a common ground is created, so too is there a means for building mutual comprehension of experience as it is gained by the individuals interactively engaged. Abstraction is an instance of economy and efficiency involved in intelligent practice. In so saying, one deals first with those things that are effectively handled and then uses the results and what has been learned in the execution of more complex affairs. However, abstraction creates a comfortable illusion in which practitioners become dependent upon the method with the probability that they may short-circuit the process.

1.9 Conclusion

In the world of everyday experience, abstract objects are formed of things that are casual, ad hoc, unregulated by imposed purpose, and are barriers to thought. By treating them as abstractions and generalisations, basic relationships are defined that disclose their meanings when they occur. Treating them as events or changes brought about in a system of relationships, their individualised qualities are disregarded even though they remain intact. Since these qualities are somewhat relegated they are not included during the formation of objects of knowledge. The abstracted objects, representing the loose details in everyday experience but absent of those qualities that identify each instantiation, become the objects of thought.

[26]This provides the means by which social and cultural objects are effectively dehumanised and ideologies built, and where extremes of political and social engineering include Scientific Management and Marxist ideologies.

When one returns from abstractive thought to everyday experience then qualities are reattached, but with new meaning from the knowledge object and with greater power over one's ability to control their relationships with them. The ability to control relations comes from processes of reflection and as such, reflective knowledge is the only means of regulation. There is in this process, a word of caution.

Dewey (1939) says the assumption that knowledge is ubiquitous across modes of experience is an intellectual fallacy, that it is made mockery of by common sense, those qualities that were stripped out during the process of abstraction: everyday qualitative, practical experience, and recognition of the aesthetic and the moral. This doctrine calls any object of experience that cannot be reduced to the properties of the objects of knowledge merely subjective and phenomenal. But it is through them, the things that are experienced through love, desire, hope, fear, purpose, and the myriad traits that identify the individual, that one can put those abstract objects of knowledge that have the appearance of nothing more than instruments to some practical use. It is through reflection that one can apply intelligent faculties, wherein modes of experience are no different one from another.

In chapter 1 the premise was presented in §1.3 with definitions for the following terms: §1.4 the human, §1.5 the technological human, §1.6 the productionist view of Work, §1.7 a view of the Work System, and in §1.8 the philosophical approach being taken in this thesis.

In chapter 2, these concepts are applied through a review of IS literature relating to the Work System.

Chapter 2

Literature Review

2.1 Introduction

Chapter 2 presents a review of literature in which the Work System conception is described, discussed, how it has changed, leading to the research question for this thesis. In §2.2 the concept of the Work System is defined and its origination in the field of Scientific Management. In this section, the history of change over time is outlined as understandings of the workplace evolved to become more socially acceptable, for example through the adoption of sociotechnical theory.

In §2.3, Alter's use of the term, Work System is presented. He defined the Work System as an IS theory and described it as a means of analysing an enterprise's current system to identify areas of possible improvement. Alter has made more use of the term than any other IS researcher and has done the most to define the Work System in IS. In §2.4, an ontological conception of the Work System is presented. This section demonstrates that the way in which the actual world is classified determines what kind of information system might be developed. In §2.5 the effects of new technologies, and in this instance Web 2.0, are described such that Work becomes increasingly participatory and provides an environment in which the human can regain a sense of its lost social self. Finally, in §2.6, the arguments that are presented in this chapter are brought together as a conclusion leading to the research question.

In chapter 1, the argument that Work exists in both material and immaterial manifestations was made. Such an approach provides opportunity for Work to be regarded both physically and as an abstraction. In chapter 2, this approach is extended, through an analysis of literature, to present instances of where and how the conceptions of Work and the Work

System have been addressed. I present the argument that there exists a presumption in IS, that the meaning of 'Work System' is *a priori*: that there exists an assumption that the meaning is adequately transposed from its originating usage in the industrial setting.[1] However, modern information systems are held to be abstractions of the material worlds that blur the lines between the social, moral, ethical, psychic, and motive. The perception is strengthened by contrasting the Taylorist conception that is built upon a physical reality that is rational and predictable, and the reality of modern computing (in this instance, Web 2.0) that is based upon abstractions of the physical.[2]

Thus, an argument that an objective understanding of reality requires that the material worlds be viewed as an abstraction is made.[3] For example, in §2.4, the Work System, as an ontological conception, is regarded as an abstraction of a physical reality. Such an abstraction permits the identification of features as constants, and the removal of instantiations that might otherwise obfuscate understanding. A researcher, who works with an abstraction of the physical worlds, may then apply the constants to make sense of phenomena.[4] In this case, instantiations from the material world are selectively applied to abstractions to see (in the Peircean sense) what, if any, the effect that practical application of theory will have.

The IT artefact, Web 2.0, presents a unique opportunity to observe the effects of change, both socially and technologically. As an artefact, Web 2.0 comprises extant technologies that have been reapplied for various purposes, but as a social phenomenon, I assert that Web 2.0 provides the means for social and cultural alteration and change. I further argue that changes may be effected through political, social, economic, and technological means.[5]

When change is perceived, it is situated according to context. For example, there exist subtly differing conceptions of ontology, depending upon whether the context of use is in computer science or philosophy. In this thesis, both conceptions are used, but within each context.[6] In §2.4.1, the context is philosophical and related to building theory, rather than taxonomy. To build an ontological perspective requires the identification and description of the relationships between elements. Since elements must be considered non-static, their relationships are too.[7]

[1] 37:3–37:10.
[2] See commentary on the approach: 28:11–28:19.
[3] 45:25–45:29.
[4] 45:30–46:3.
[5] 49:29–49:31. 50:17–50:21. 51:11–51:14. 52:14–52:17.
[6] 46:10–46:12.
[7] 46:14–46:17. 57:25–57:29.

In §2.4.2, two authors with differing views on the Work System are pitched against each other to highlight the issue of change in development environments.[8]

A further argument presented in chapter 2 posits that Taylorism is representative of the worst kind of application of science. The scientific method has been used as a justification for the most heinous of social crimes, where 'progress' is the catch phrase that masks true intent.[9] Appropriation of science has allowed for a reconceptualisation or reframing of what it means to be natural and human. The positivistic scientific method provides justification for holding humanity as an advanced animal to be tamed and controlled, rather than as an entity that comprises those properties outlined in §1.4, and in particular the metaphysical.[10]

It is argued that attempts at rationalisation of natural phenomena has resulted in anything construed as being natural is therefore branded as irrational. Thus, human qualities such as socialisation through family affiliations, attachment to people or places, creative expression such as the work of the artisan or the artist, are irrational and therefore of no account and uneconomic. When such phenomena obstruct the progression of rational production, then they must either be eliminated or reframed and made useful. The highest form of rationalisation is systematic progress. The classification of systems that use technology to enable production are referred to in the singular, as the technological system.

However, those who would wield power and dominion over others in rational production are no less consumed by the same system as that used in their domination over others. This creates the conditions for the barber's paradox.[11] I argue that the current attitude maintains that the only solution to the barber's paradox is for the technological system to be the perpetrator, where all of humanity is the victim.[12,13] However, my argument proceeds: that humanity maintains the attribute of creativity[14] and it is printed on the human and cannot be eliminated, despite efforts to the contrary. Creativity is expressed both as the urge to reproduce, and as the need for expression. Attempts suppress the creativity that exists in the person may be successful for a time, but eventually those urges break free violently.[15]

[8] 48:2–49:27.
[9] 54:20–54:23.
[10] 55:31–56:2.
[11] 54:26–55:1.
[12] 55:4–55:11. 55:25–55:30.
[13] This is Heidegger's position and one that I shall argue against.
[14] 57:1–57:8.
[15] 178:10–178:17.

The barber's paradox can be seen in the juggernaut[16] and becomes a core theme in the thesis. In the popular Western understanding of the word, the juggernaut conjures a vision of an out of control behemoth, bent on destruction. The sense here is one of control over the mass of humanity, where all are assimilated into the body of the whole and where individual identities are lost.[17] The juggernaut becomes the vehicle, as the material form of the cybernetic world[18] and humanity is compelled to submit to the juggernaut to satisfy humanity's need for security. However, while the price of admittance to security is humanity's sense of self (Dasein), I argue that the essence of humanity remains, untouched.[19]

2.2 The Work System Concept

In §2.2, over time the parts, purposes, and organisation of the Work System have changed. The reason why changes are made vary and range from the impact of practical exigencies that manifest in the working environment (for example, Trist & Bamforth, 1951/2000) to the effect that new understandings of social organisation have on the workplace (for example, Mumford, 1983).

The term, Work System, stems from Scientific Management that featured in the rapid industrialisation of North America at the end of the nineteenth century and early twentieth century, where it applies to piece-work performed by semi- or unskilled workers (Taylor, 1911). In the Work System conception, Work exists for the purposes of generating goods and services for sale or distribution to customers. The aim is to improve the efficiency and productivity of work and encourages the scientific selection, training, and development of workers and the equal division of work between workers and management (Wertheim, 2007).

Rasmussen (1992) says Work within the Work System depends on the purposeful transformation of items found in the working environment, where the transformation may or may not be made directly by the workers themselves. The act of Work performed by workers creates boundary conditions, inside of which active forces bring about intended and purposeful change.

Trist and Bamforth (1951/2000) redefine aspects of the Work System so it relates more closely to the Longwall Method. In a study of the coal industry they make the observation that despite

[16] 59:22–59:27.
[17] 59:10–59:12.
[18] 60:12–60:18.
[19] 61:19–61:28.

workers utilising improved technology, and receiving better pay and conditions, productivity fell, while absenteeism increased. In their study, the cause was determined to be the adoption of a new form of production technology creating the need for an excessively bureaucratic form of organisation, which in turn, introduced a retrograde step in how the workers perceived their part in the process of task completion. The excessive requirement to document task steps and seek management approval for activities that were previously undertaken with a degree of autonomy, were seen as an imposition by sufficient numbers of workers, causing productivity to fall. In the proposed solution, the Work System becomes part of the socio-technical system (which comes out from sociotechnical theory[20]).

In their proposed solution, Trist and Bamforth (1951/2000) assert that it is the purposeful transformation of items within the Work System that becomes the task assigned, so a whole task encompasses those attributes that define a task's activities, outcomes, participants, inputs, work allocations, timing, and effort. Trist and Bamforth say that assigning a whole task to a group of workers means the group accepts responsibility for the task's success and the group's members experience all aspects of the task's operations.[21] The key factor is the group's acceptance of autonomy and to make decisions, based on local conditions, about how best to undertake their assigned task in a flexible and adaptive manner. As the group is assigned new tasks, the members gain experience and can apply what they have learned to new situations. Thus, the group's management can be less prescriptive about tasks (Rice, 1958).

The variations to the Work System conception described by Trist and Bamforth introduce social and human factors into the design of tasks.[22] This marks a significant shift in how Work in an industrial environment may be successfully undertaken. J. R. Wilson and Whittington (2001) take this further by saying that the objective of organisational design should be to provide a good quality of work life for team members alongside achieving performance outcomes. Ways this can be achieved are for jobs to be varied and demanding, have the element of 'on

[20] See footnote 22, on page 34.

[21] The assignation of a task to a group of workers in the manner described introduces the notion of 'minimal critical specification:' that it is important the group knows *what* is to be done, but rarely is it important to define *how* it is to be done.

[22] For example Cherns (1987) lists principles that guide sociotechnical theory. These include: (1) That the design process must be compatible with its objectives; (2) that no more about a task should be specified than is absolutely essential and that what needs to be done in the task is stated but not how to do it; (3) organisation and function boundaries should be drawn with care to allow the sharing of information, knowledge and learning; (4) information needed to take action should be provided when and where it is required; (5) groups should exercise the degree of power and authority needed in order to accept responsibility for their performance (6) it is beneficial for an organisation to have employees with knowledge of a wide range of tasks; (7) systems of social support should reinforce required behaviour and be consistent with the work design philosophy; (8) planning and design are required for the transition from a traditional to a new organisation; and (9) systems design is an interactive and continuous process.

the job' learning, provide for decision making, offer social support and recognition, relate to work and social lives, and give the feeling that the job leads to a desirable future. They define the 'self-managed work team' which differs from the traditional concept of a 'work group' in that planning, organisation, prioritising and staffing are undertaken by the team rather than by a supervisor. The team will usually take responsibility for an area of work and the level of autonomy may vary. Activities are normally interdependent and team members may be multi-skilled to enable interchangeability between them. As well as having those attributes previously mentioned, the team is identifiable in that it has defined boundaries within a larger social system and the member roles are differentiated (Hackman, 1990).

Since the 1970s, the Work System has received mention in the field of IS, for example Alter (2001, 2002a, 2002b, 2003, 2004a, 2004b, 2004c, 2005, 2006); Alter and Dennis (2002); Bostrom and Heinen (1979b, 1979a); Martin and Sommerville (2004); Mitchell and Zmud (1999); Mumford (1983); Mumford and Weir (1979); Orlikowski and Iacono (2001); Rasmussen (1992); Ryan and Bock (1991); Sutcliffe (2000), plus others. Bostrom and Heinen (1979b, 1979a) refer to the Work System in an attempt to understand why so many Management Information Systems (MIS) have failed and to propose a new method of systems design, the Socio-Technical System (STS), which is distinct from sociotechnical theory. STS arose from the recognition that new systems implementation projects in the mid-twentieth century were being confounded by workers who mistrusted the motives of company managers, and by cost and time overruns during development. A solution that binds the technical and social subsystems within the organisation is proposed, where the technical subsystem comprises the devices and tools that add economic value to the organisation and the social subsystem comprises organisational hierarchy, employees (at all levels), their knowledge, skills, attitudes, values, and needs. Later, the environmental subsystem was incorporated to include external organisational factors. The key to STS is the application of a design process that ensures all the systems are working in harmony. This can only be achieved when the interdependency between subsystems is explicitly recognised. Thus, the design of any system is required to take into account the effect of impact between subsystems.

Bostrom and Heinen (1979b, 1979a) refer to the Work System in its broadest sense: as a means for allocating work tasks to workers in a defined sub-system within an organisation or as an example, a department. In the same year Mumford and Weir (1979) use the term in reference to design principles, and Davis and Taylor (1979) extend its meaning somewhat to

include elements of social systems. They make the assumption that Work Systems exist within social systems rather than in a strictly organisational context and that a person has the power to create or otherwise organise those social systems. Later, Trist (1981) offers a definition that reflects Taylor's own conception when writing about the evolution of Mumford and Weir's STS and extends it with the view that "the primary work system... may include more than one face-to-face group along with others in matrix and network clusters" (1981, p. 35). Ryan and Bock (1991) define it as one that does work, that is any purposeful activity specified to be done in an organisation. The work to be done might require the efforts of one or more people, using one or more tools, to complete one or more tasks.

By the end of the twentieth century the meaning of the Work System had changed significantly, such that it bore little resemblance to Taylor's originating conception: (1) The scientific selection of workers; (2) the equal division of labour; and, (3) the training and development of workers. Taylor's precepts for an effective Work System are: (1) A system can be created and designed, such that the worker exercises no power in its management; (2) workers are taught a sequence of simple and repetitive tasks; and, (3) that the worker is therefore entirely expendable. Now the Work System has come to mean: a set of activities contributing to an integrated whole, not as a set of individual jobs and that Work should be regulated by its members and not by external supervisors (Mumford, 1983). Land (2000) takes the socially aware approach still further by saying that redefining the Work System ought to lead to the improvement of the quality of working life.

Taking a more technical approach, Sumner and Ryan (1994) discuss possible reasons for the difficulty in implementing CASE tools in some development projects. They claim that one of the principal causes is that CASE tools do not fit with an existing Work System. In their discussion, they address the Work System conception identified by Bostrom and Heinen (1979b, 1979a) as a means of allocating work tasks to workers in a defined subsystem. Whereas, Mitchell and Zmud (1999) use the Work System as an undefined, generic concept. They appear to assume that the Work System is nothing more than an organisational construct.

Rasmussen (1992) takes a pragmatic stance against the tendency to pass off the responsibility for identifying changes that are required to those who are, arguably, the least likely to know. Rasmussen says the human-work interface needs to be designed to match user needs and requirements and that adaptations to the interface ought to reflect any new Work System,

however the design cannot be based on existing work practice, nor can users be asked to judge the quality of a design they have not yet adapted their Work System to.

As the Work System has changed, so too have the worlds in which the term has been used. The measure of change can be seen in new or different technologies that emerge through time, and the emergence of new technologies has not been constant or consistent. Even during the period of development of new systems, the world in which the development is taking place can have changes effected from external and internal causes. In the process of development of an information system, it is often necessary to build an abstraction of reality and model processes so that phenomena and events that occur in various worlds can be appropriately translated into the virtualised environment of the computer system. Ryan and Bock (1991) say that systems are designed in relatively unstable environments and change is difficult, if not impossible, to predict. Thus, models, by necessity, tend to be based on a snapshot of a perceived reality rather than a transitive pattern of events because of the difficulty associated with modelling a dynamic environment. Alter (2006, p. 311) says "a different definition of Work System leads to a different model." To appreciate the effect of change Alter (2003) says that the Work System terminology he created ought to be inherited by IS projects, value chains, and supply chains. In his assertion, IT is increasingly being applied to automate work practices or support and control them in real time. Thus, the IS field needs to grow and encompass the wider concept of the Work System, rather than concentrating on the IT artefact that is espoused by Orlikowski and Iacono (2001).

2.3 Alter's description of the Work System

On the subject of the Work System in IS, Alter has had more to say than any other author. In this section is a brief summary of principal theories presented by Alter in the past eleven years.

Alter (2002b) defines the Work System as a view of Work, which occurs within a purposeful system, whose goals are to produce desired results and perform Work efficiently, where Work is the effort applied to accomplish something. In order to understand a Work System, Alter has created the Work System Framework (Figure 2.1), a model that is used to organise an initial understanding of how a Work System operates and what it is required to accomplish. Alter's Work System refers not only to technological IT artefacts, it may also include any kind of technology that allows a system to achieve its goals.

Work Systems exist in an organisation, and an organisation can be defined as multiple Work Systems coordinated to reach goals that an individual Work System cannot achieve. To achieve

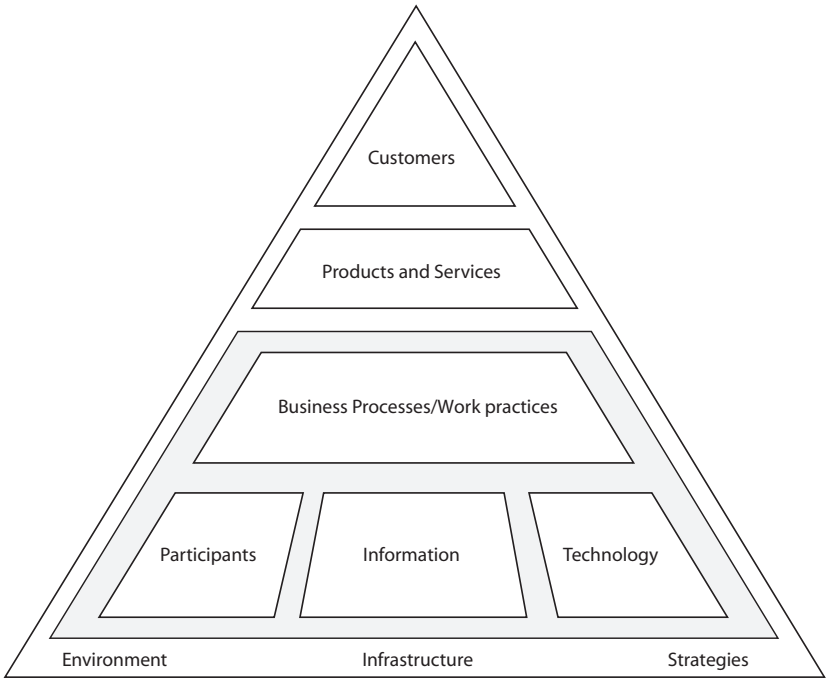

Figure 2.1: Work System Framework: *Source, Alter, 2002b, p. 93.*

these goals, a Work System is generally comprised of a series of steps (a business process or work practice). Alter (2002a) defines two states for a Work System: static and dynamic. The static view describes a Work System in which there is no variance in its environment, whereas the dynamic view illustrates how a Work System adjusts to environmental changes that may be planned or not. To understand these changes Alter refers to the Work System Lifecycle.

In Figure 2.1, the Work System is that part of the figure that is shaded, the rest is included to create the context in which the Work System is active and identifies external factors that may influence it. The figure contains elements that comprise the framework and which have been defined in Table 2.1. The framework allows a person to understand the relations that exist within and without the Work System and to derive possible changes.

Table 2.1: Elements of the Work System Framework.
Source, Alter, 2002a

Work System Element	**Description of Element**
Customers	Beneficiaries, or recipients of products and services produced by the Work System. There are internal customers (those who exist within the organisational environment) and external customers (those who exist outside the organisation).

Continued over page

Table 2.1: Work System elements... *(continued)*

Work System Element	Description of Element
Products & Services	Outputs of the Work System (physical products, information, services, and any other secondary output) and which are typically offered to customers.
Business Process/ work practice	Prescribed work steps carried out in the Work System.
Participants	Those who utilise information to perform some or all of the steps prescribed for the business processes and who normally use some form of technology to accomplish the assigned task(s).
Information	Is codified or not and is produced as part of the participants work, there is no distinction made between data and information in Alter's descriptions.
Technology	Any tool or technique used by the participants in the exercising of their work. The tools may not be IT related.
Environment	The organisation and its related cultural attachments, competitive forces, technology, regulatory environment, and statutory obligations.
Infrastructure	Support structures that the Work System relies on to function which may include humans, information, and technical resources.
Strategy	Work System and organisational strategies that provide the rationale for the existence of the system.

The Work System Lifecycle in Figure 2.2 on the next page has undergone changes since it was published in the first edition of Alter (2002a). A revised version appeared in Alter (2001) that added *iterations*, then in (2002b) *unanticipated opportunities* and *adaptations* were added. The net result, Alter says, is that the model conforms to a range of models referred to in IS literature and deals with innovation, experimentation, adaptation, emergent change, path dependence, opportunities and assimilation gaps. Figure 2.2 on the following page illustrates that when a project *initiation* is granted, a new or revised Work System has been envisaged. That is, operational goals will need to have been set such that resources (including time) can be allocated and the planned system satisfies feasibility tests (at least economic, operational, and technical). When these criteria met, the project may be allowed to go into the *development* phase. The steps in this process include: (1) The writing of detailed requirements for the new or revised information system and Work System; (2) either or both for acquiring an existing software system and possibly modifying it or producing the code for a new system; (3) selecting, acquiring, and installing hardware as required; (4) creating documentation as required from the outset, and producing training materials; (5) testing of all the previous and where necessary, debugging it.

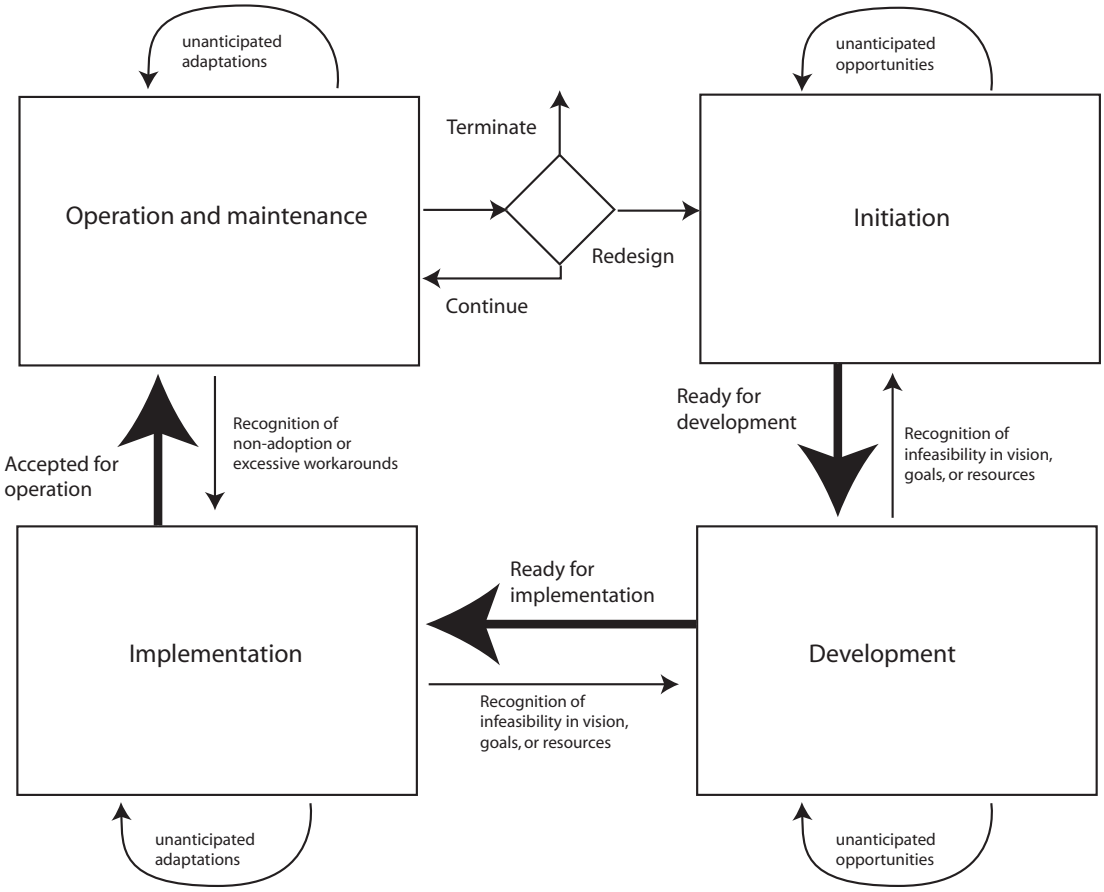

Figure 2.2: Work System Lifecycle: *Source, adapted from Alter, 2002b, p. 95*.

If, during the development phase, evidence is presented that demonstrates the project is not feasible, then the project is referred back to the initiation phase.

When the development phase is complete, the project can move onto the *implementation* phase and sets out to implement the system that was planned. The major processes include: (1) The selection of which type of implementation approach to take, (2) plan for change management issues and take steps to deal with positive and negative impacts of change, (3) manage and provide training for participants in the new or changed information system and Work System, (4) transition to the new information system or Work System, (5) manage acceptance testing before the system is fully rolled out. If there are any issues preventing the effective roll out of the new system, then it is referred back to the development phase. If acceptance testing provides sufficient evidence that the system is ready for full deployment, the system goes into the *operation and maintenance* phase. This phase requires the Work System to be monitored for performance to ensure it is delivering on its promised goals: Any minor flaws in the information

system and/or Work System are addressed and corrected as a normal part of their maintenance, for example, on-going improvement of work practices through analysis, experimentation, and adaptation. At some, point the revised Work System will come under *review* when a decision is made to continue unchanged, with modification, or the project terminated. If the choice is made to continue with modification, the cycle starts over at the *initiation* phase.

In any of these four phases, a project may be hijacked by *unanticipated opportunities* or *adaptations.* These may take the form of IT innovations arising and then acquired by the organisation but may only be sparsely deployed: (1) experimentation by any participant in the development process, (2) adaptation of current or proposed technology, (3) emergent change that may affect the Work System or the technology it uses, (4) pre-existing organisational path dependencies which both constrain its choices and shape its actions, (5) forming limited windows of opportunity, and (6) assimilation gaps (the apparent gap that appears as IT artefacts are acquired but not actually deployed).

Table 2.2: Principle-Based Method of Systems Analysis Method *Source, Alter, 2002a*

Systems analysis step	**Steps in PBMSA**
1. Define the problem	Define the problem and Work System together
2. Design potential improvements	Use each Work Principle in turn as a lens for summarising the current situation and search for possible improvements. **Principle 1** Please the Customers **Principle 2** Perform the work efficiently **Principle 3** Serve the Participants **Principle 4** Create value from information **Principle 5** Minimise effort absorbed by technology **Principle 6** Take full advantage of infrastructure **Principle 7** Minimise unintended conflicts and risks **Principle 8** Support organisational strategy **Principle 9** Maintain balance between Work System elements
3. Decide what to do	Make a recommendation that addresses the problem while supporting the organisation's priorities.

In application, Alter (2002a) defines three generic steps (listed in Table 2.2) in the Principle Based Method of Systems Analysis (PBMSA): (1) Define the Work System and the problem

or opportunity; (2) use the nine principles to explore the Work System elements in turn to identify possible improvements (this may reveal additional problems not considered initially); (3) after identifying the possibilities, decide how to address the problem or opportunity without worsening perceived problems and make recommendations based on fundamental concepts used in IS and systems engineering practice.

In Alter's (2002a) view, an analysis of a Work System includes decisions that are made on where to focus development or change. Such choices place emphasis on particular elements, potentially at the cost of others. If the bias is towards pleasing the customers then the emphasis will be on the elements *please the customer,* and *products and services.* With a bias on satisfying the needs of the participant, the emphasis will be placed on the *participant* first, then *business processes* and *information.* Putting the bias on technological development first places emphasis on *technology,* then *business processes* and *information.* In each case, some elements will not be fully addressed. What the decision making processes also indicate is that in an analysis of a Work System choices need to be made about how much to invest and in what sector. Alter says that there are limited resources for development and not all elements can be given all that they are due.

When the Work System has been described, issues identified, and possible solutions put forward, recommendations can be made. Not all recommendations are feasible and those that are considered would need to pass tests of economic, operational, and technical feasibility. Each recommendation would be required to address proposed changes in each element of the work system. Any other related systems, provide rationale for changes, list alternatives and why they were not considered as options, identification of at least all primary and secondary stake holders and how the changes will affect them (positive and negative influences), and a project plan that includes a preliminary timetable of deliverables (Alter, 2002b).

In the first step, the business professional or analyst is likely to find that the problem or system they need to assess has not been well defined. Alter (2002b) says there seems to be a common misinterpretation of what constitutes a system. Whether it refers to those elements that comprise a Work System as a view of Work which occurs within a purposeful system, and whose goals are to produce desired results and perform Work efficiently, including human or technological participants, information or data, technology as required, and business processes; or the combination of software and hardware that comprise an information system to which users and applications of it, are incidental. The corollary to this is that the scope of the

analysis is dependent upon how the system being analysed is understood and therefore, any improvements to be made may be applied to the Work System or the information system, and so debate may emerge as to what it is that actually requires change.

In relation to the scope of an analysis, it is necessary for the investigation to quickly identify those areas where change is required and focus on what needs improvement (Alter, 2002a). To facilitate this, Alter has devised his Work System Snapshot which should not require more than one page. The Snapshot lists customers (internal and external), products and services produced by the Work System under investigation, a limited number of business processes (to keep the analysis manageable), human and technological participants, information used, technology required to facilitate the Work System, a short description or list of items that constitute the context or business environment, technological applications that link the Work System with others, and the strategic position of this Work System and the organisation as a whole.

In the second, step the Work System has been positively identified and any issues arising should start to present themselves. The step is largely exploratory, and so it is likely that there will be alternative solutions presented to resolve problems or take advantage of opportunities as they are presented. Alter (2002a) points out that it is altogether too easy to jump from problem to solution in this phase, especially when those engaged in the process have their favourite technological or computerised solution that can be applied to all similar problems, regardless of what the problem is. Alter suggests that, from his experience, if groups exist who oppose each other with their own favoured solutions to any/all problems, a factionalised situation may rapidly emerge. People will begin to argue why their solution isbest and the problems that need to be solved are quickly forgotten. The situation can worsen if the only solution that is then recommended is technological or computerised when the argument focussed on the choice of this information system or that, not whether an information system is required or if there were alternatives such as a redesign of the business processes. The PBMSA is intended to prevent this kind of situation from occurring.

Depending on which version of the PBMSA one is referring to, there may be 9 or 21 principles used to guide the analyst. Table 2.2 on page 41 represents Alter's vision in 2002 and his updated view is illustrated in Table 2.3 on the next page. In the intervening period between 2002 and 2004 omissions in Alter's method became apparent.

Table 2.3: Extended version of Work System Principles
Source: Adapted from Alter, 2004a, Table 2, pp. 1607–8

	Work system principle	**Related Work System element**
	1: Please the customers.	Customers and products & services
†[23]	**2:** Balance priorities of different customers.	Customers and products
†	**3:** Match process flexibility with product variability.	Product and work practices[24]
	4: Perform the work efficiently.	Work practices
†	**5:** Encourage appropriate use of judgement.	Work practices
†	**6:** Control variances (problems) at their source.	Work practices
†	**7:** Monitor the quality of both inputs and outputs.	Work practices
†	**8:** Boundaries between business process steps should facilitate control	Work practices
†	**9:** Match the work practices with the participants.	Work practices and participants
	10: Serve the participants	Participants
†	**11:** Align participant incentives with system goals	Participants
†	**12:** Provide information where it will affect action	Information and work practices
†	**13:** Protect information from inappropriate use	Information
†	**14:** Use appropriate technology	Technology and work practices
	15: Minimise effort consumed by technology	Technology
	16: Take full advantage of infrastructure	Infrastructure
	17: Minimise unnecessary conflict with the external environment	Environment[25]
	18: Support the firm's strategy	Strategy
	19: Minimise unnecessary risks	System as a whole
	20: Maintain balance between work system elements	System as a whole
†	**21:** Maintain the ability to adapt, change, and grow.	System as a whole

The initial method arose from Alter's own experience at Consilium. He says (2004a) the approach is directed at business professionals and not necessarily software engineers. The approach should provide an overview of a current system so that recommendations can be posited. The whole process needs to exist at the conceptual development phase and does not

[23]Those principles that have been added in Alter's revision are indicated with a † symbol.

[24]Previously referred to as Business Processes, Alter has changed term to "work practices."

[25]Previously referred to as Context, Environment is distinct from Infrastructure and Technology whereas Context could be confused with both.

necessarily have a place beyond that. The requirement in the PBMSA for widespread and at times in-depth information may lead to a paralysing effect on the analysis.

Weaknesses in the early version (see examples in, Alter, 2004a, 2004b, 2004c, 2006; Alter & Dennis, 2002) have drawn comparisons with, for example socio-technical systems. The result is that the new version of the PBMSA borrows liberally from socio-technical principles. These are well founded from both a practical and theoretical perspective but creating a force-fit with the PBMSA produces conflicts and lacks coherence in parts.

Alter (2002a) says the level at which a Work System exists may be well below the organisational level. If the Work System is operational in emphasis, the analyst may not be able to adequately interpret organisational strategies so that the Work System supports organisational goals. He says that if strategic goals and forecasts are documented in, for example, an annual report or are represented in the organisation's mission statement strategies may not be easily translated for application in the Work System. An example that illustrates the apparent break in awareness described is a Work System that provides accounts payable authentication. An accounting system is required to ensure payment requests, creditor invoices, match purchase orders and that the necessary information for the creditor exist. At an operational level, the participant is far removed from overarching organisational strategies. More generalised Work Systems that exist at a strategic level may be influenced by such concerns, but it may also be argued that at such a high level the scope for them is too broad to be considered feasible. Alter's PBMSA does not scale well, neither adequately providing required detail for operational activities (for example it could be said that accounts processes tend to be standardised as a statutory requirement rather than because they fit corporate mission statements), nor offering a procedural approach to the establishment of corporate strategies.

2.4 The Work System in IS

In §2.4.1, I argue that how an ontological conception of a Work System is built is dependent upon how the world is classified. This will determine the kind of information system that can be developed. That is, the actual world presents limitations to how abstracted conceptions can be created, thus information systems designed to conduct Work represent attempts at building the actual in other worlds. Here, reference to 'worlds' is in the sense that Heidegger (1972/1993b) uses the term. The disclosure of the 'world' for the researcher is their attempt at making sense of phenomena and so their conception of a disclosed world is dependent upon

the context in which they find the actual world the researcher is concerned about. Thus, the researcher categorises their knowledge of the disclosed world based upon their experiences and held understandings of the actual world.

In §2.4.2, conceptions of Work Systems from Ryan and Bock (1991) and Alter (2003) result in methodological approaches that make the design of information systems a complex and somewhat arbitrary exercise. These authors have been selected in particular because of their special reference to the Work System and their attempts at describing methodologies for designing information systems that reflect phenomena found in the organisation.

2.4.1 Ontology considerations

Ontology is defined here as a representation of knowledge by a set of concepts within a natural domain. Ontology is concerned with the nature of being and existence, and the categorisation of objects and establishing relations between them.[26] Peirce (1878/1992–98) says if one is able to conceive of the existence of objects through experimentation and experience, one is then able to classify them according to predefined criteria. Through including relationships between concepts, ontology is used to reason about the domain's properties. The ontology may be used to describe objects. How ontology is conceived varies, being dependent upon the environment into which systems thus implemented and ontologies are situational.

In any IS development or design project, understanding of both the organisation, and the system under investigation need to be shared (Checkland, 1997). For example, those systems designed for the accounting focussed business environment are designed with transaction control and processing in mind, that reflect the company's business processes, and often utilise the double entry approach to financial, management, and cost accounts. The Accounting Information System (AIS) is clearly definable by its sets of processes and flows of data and the faith instilled in its predictability is observable in its widespread use. This is not necessarily true of all other types of system, for example the Judicial Decision Support System (JDSS) is not so well conceived, partly because the way in which laws are enacted, makes it difficult to define processes that may be applied across implementations.

Henham (2000) says the approach applied to information systems for handling legal sentencing decisions, or sentencing law, in which the rules to be followed may not be based solely on precedents. Each case is assessed on its own merits, judges have a reasonably broad discretion

[26] Compare this with the definition in footnote 27 on page 53.

to include mitigating factors, and sentences may be changed because of guidelines that have been passed down from the Court of Appeal. A dilemma is created in which those who are tasked with making correct decisions about cases are hampered by the vast number of cases that need to be addressed and how to make decisions when faced with seemingly similar cases and the guidelines from the Court of Appeal. To resolve this dilemma, some researchers have considered addressing sociological aspects in the development of sets of rules or heuristics (for example, Hutton, 1995), whereas others have considered a more positivist approach (for example, Zeleznikow & Hunter, 1994). The same problems can be observed in other IS design and development projects that incorporate semi- or unstructured problems.

Library Information Science (LIS) has adopted a pragmatist view of knowledge (Hjørland & Nicolaisen, 2006) despite evidence that positivism still dominates the thinking of researchers (Hjørland, 2005). The pragmatist approach is concurrent with the societal role of institutions, regardless of whether the libraries are private or public (Sundin & Johannisson, 2005). Dewey has influenced the evolution of library classification where, for example, identifying that a single object can be understood to have meanings that are related to several real world occurrences and that these are detached from any organisational structure.

> [T]here is a genuine objective standard for the goodness of special classifications… The teleological theory of classification does not therefore commit us to the notion that classes are purely verbal or purely mental. Organisation is no more merely nominal or mental in any art, including the art of inquiry, than it is in a department store or railway system. The necessity of execution supplies objective criteria. Things have to be sorted out and arranged so that their grouping will promote successful action for ends. Convenience, economy and efficiency are the bases of classification, but these things are not restricted to verbal communication with others nor to inner consciousness; they concern objective action. They must take effect in the world. Dewey (1948, p. 151)

Therefore, differing conceptions of what constitutes Work Systems, or at least the Work done in them, has resulted in a more or less two-pronged approach to systems design and implementation; to provide physical access to material objects, and to direct users to certain thoughts and ideas (Huang, 2006).

2.4.2 Methodological considerations

Ryan and Bock (1991) identify the Work System as a basic unit of analysis in sociotechnical systems theory. Citing Trist, they say that work organisations exist to do work and that such work must involve people using technological artefacts to complete tasks that are intended to meet organisational goals and that such organisations can be studied at various levels. The levels at which an organisation can be studied include the macro-social or societal level, the organisation as a whole, or at the primary Work System level and below. The Work System is the bounded sub-system of an organisation, its task is to carry out activities that have been set for it. Components of a Work System can be added or removed, as required which may cause linkages within or between Work Systems to break. They say that breakages can also occur as the environment in which a Work System exists changes, leading to incompatibilities between it and other Work Systems such that the facilities provided by the system become unavailable, incompatible, non-functioning, or lost.

In addressing the expectation of unplanned change Alter (2003) accepts that change exists within the environment when he says that Work Systems exist in a particular form during a particular interval of time and that changes in a Work System's state may occur during that interval, without significantly changing the Work System's form. This begs the question: will not those same incremental changes amount to significant variations within a Work System? The Work System is subject to both planned and unplanned individual, departmental, and organisational variations in process and in this regard the environment is dynamic, but the model is limited in forecasting power and brings into question the viability of it as a model for system-wide development.

In a hypothetical comparison between three generalised approaches, Alter (2004c) compares a range from ethnographic qualitative methods: Interpretative Workplace Studies (IWPS), positivist quantitative methods termed Traditional Information System Design (TISD), and his own WSM. The former method has a strong emphasis on human factors in systems design and is possibly better suited as a guide for developers in making decisions about design problems, whereas TISD tends towards technological solutions and produces specific, prescriptive requirements for systems design. Alter says WSM inhabits the middle ground between the two and while it is less detail oriented, it is more prescriptive than, say, Soft Systems Methodology (Checkland, 1999). However, since WSM bases its assumptions on a snapshot of a system, organisation, or process, it may fail to represent changes in the resulting system. To counter this,

Alter created the Work System Lifecycle model that is supposed to address issues of change through the application of a simplified iterative development cycle.

Alter's admission that the Work System Method (WSM) is useful at the early stage of a project and that the approach has only been applied by researchers rather than on real live applications that involve developing or modifying systems in organisations adds further weight to the doubt.

Work Systems exist in dynamic environments but consider a situation in which a stable Work System exists in a static environment. In order for a Work System to function it needs to interface with its nearest neighbours and Ryan and Bock (1991) cite a Work System with seven components; two people using two tools to perform three tasks. They say the number of possible interfaces for a single Work System can amount to $(\frac{n!}{2}) - 1$ where n is the number of distinct components in the Work System. The systems designer may have to discount up to 2519 potentially meaningful interfaces. There is the possibility that a quantity of these interfaces may be sufficiently similar for them to be aggregated, but such a choice can only be made once they have been identified and classified. The number of interfaces has the potential to get very large very quickly, and for even a simple Work System this would be unwieldy. However, the environment in which Work Systems exist is not static, it is dynamic and Ryan and Bock suggest building a degree of flexibility into the Work System to deal with the complexity, to make more use of individual interfaces.

The Work System Lifecycle model Alter (2003) illustrates, shows how a Work System's state may change through various iterations of a development project. The model identifies the steps involved for planned changes with sufficient flexibility for unplanned changes. Alter's model provides an allowance that deviates from highly structured approaches, referring to such variations as 'requirements creep' or 'non-conformance' and generally seeks to prevent such activities. In a more controlled manner Ryan and Bock (1991) propose a method for determining the degree of flexibility present in a Work System through its internal linkages (people, tools, and tasks).

2.5 Impact of new technologies on Work

Web 2.0 presents a distinct era in the history of the Internet where Work may become more participatory, with applications that allow a person to create and publish their own content without having to concern themselves with building and maintaining a web presence. The

uptake of new technologies in the social and business context suggests some impact on how work is thought about or achieved. Common examples are forums, wikis, and blogs that enable naïve users to publish content through applications of templates and preset options whereas knowledgeable users are able to develop sophisticated applications that reuse existing data and to build new information sources.

Sometimes referred to as the Semantic Web, Web 2.0 stems from the efforts of the grassroots of the programming community and has evolved to fill the immediate needs of developers and users by creating artefacts that are programmable, lightweight, and directly usable despite inherent flaws (Wilde, 2007). The term is attributed to O'Reilly (2005/2009) but was actually coined by DiNucci (1999). Web 2.0 allows for immediate application by technologically advanced users who can bypass the IT department with its perceived restrictions and time delays, to build mash-ups that create new information or get an instant view of who has published what inside the enterprise (Milojicic, 2007). The Semantic Web on the other hand, is a concept that has its roots in Artificial Intelligence and academia (see, for example Dietrich & Jones, 2007): perhaps a reason why the uptake has been relatively limited compared with Web 2.0 technologies (Maximilien & Ranabahu, 2007).

In the organisational context, Web 2.0 is something of a solution looking for a problem and as such, businesses have the opportunity to demonstrate business intelligence and generate value from information using Services Oriented Architectures (SOA) and Web 2.0 (for example, Castro-Leon, Jackson & Chang, 2007; Evans-Greenwood, 2007; Lin, 2006; Sur, Arsanjani & Ramanthan, 2007; R. B. White, 2006).

There has been some resistance to the implementation of Web 2.0 technologies in the enterprise (Fojt, 2009; "Advocates Overcoming IT Resistance To Web 2.0", 2007). Sporadic attempts at making applications acceptable to IT departments, for example using Web 2.0 technologies in local and central government to disseminate planning information to stakeholders and giving organisations, companies, the public or individuals the opportunity to make comment directly (Steins & Stephens, 2008) have been made.

In business, predominant issues often concern cost cutting, resource maximisation, or product or service differentiation as a counter to perceived competitive forces. To achieve these goals, applications of Web 2.0 technologies used in, for example, increasing efficiencies in the supply chain by integrating disparate systems and improving information interchange (He, Tan, Goh, Lee & Lee, 2007). A seemingly popular option is to apply the principles of Software

as a Service (SaaS) to Web 2.0 technologies (Goh, Lee, He & Tan, 2007). But Virtue (2009) says there needs to be a balance between risk and opportunity to mitigate the possible effects of security attacks, a decline in employee productivity, and Human Resource, and legal problems while Santos (n.d.) says participants must at some point deal with the ethical issues associated with these.

While there is an increasing volume of published research on the technological aspects of Web 2.0 and how applications can be implemented, there is relatively little research undertaken on the impact of newer technologies on Work or Work Systems. Significant company mergers have taken place, major marketing campaigns that involve social networking applications, political battles conducted on public forums, and militant organisations that gain international support by distributing recordings of their messages (Constantinides & Fountain, 2008). There is thus, the suggestion that events in the world are outstripping the efforts of researchers to form new theories of understanding of how new technologies affect social, managerial, and operational factors in Work.

There has been experimentation with Web 2.0 technologies in the business context (for example, Koch, Richter & Schlosser, 2007; Rowe & Drew, 2006; Yi, Wang, Liu & Wen, 2006) but as with anything new, anecdotal concerns from businesses have been raised. Some concerns expressed include security, return on investment, and staff skills in implementing and integrating new technologies with legacy systems (Hoover, 2007). In a perfect world, Web 2.0 would be represented by a consistent level of semantic interoperability. Applications would share services or, where necessary, update themselves and universally applied standards would be implemented (Berners-Lee, 1998). Given this perfect state of being, historical problems associated with the integration of heterogeneous environments would be somewhat alleviated (Kobielus, 2007). Despite this, it is becoming a predominant paradigm in the development of distributed software systems because web services provide the potential for software to be modularised in a way that functionality can be described, discovered and deployed in a platform independent manner over a network (Bell, Ludwig & Lycett, 2007).

Butler (2003) says that users of Internet- and Intranet-based information systems interact with them in ways that are often different or new. He says there is a rising expectation among some users that they can add, change, or update content in real time and it seems a prime requirement is to be able to have direct access to the latest data or content and as such, direct access to components of an organisations value chain. Having a high level of access is

seen as a given along with the ability to make changes to or reconfigure internal processes. McKellar (2008) says there is a new generation of business professionals who are arriving with expectations that Web 2.0 applications are already available. To support these users, there has been research on Service Discovery Protocols (SDPs) to provide functionality for establishing ad hoc associations between service providers and service requesters (Ben Mokhtar, Preuveneers, Georgantas, Issarny & Berbers, 2008). The problem with this system is that different people will not agree on exactly how to define all concepts. Any computer application that tries to standardise its ontology will necessarily distort what at least some people are trying to express (Jones, 2008). An additional risk facing IT departments is having information that falls into the wrong hands due to a lack of careful governance of user activity (McKellar, 2008).

Decision making within organisations takes various forms but are typically classified according the traditional hierarchy of $strategy \Leftrightarrow tactical \Leftrightarrow operations$ that became popular after the Second World War. This organisational structure relies on a flow of information from the operational level up so that decisions can be made and passed down. The productionist chain of command comes under threat when operational staff arrive with the belief that they have the intellectual capacity and sufficient access to information with which to make decisions collectively. Web 2.0 may represent a collective intelligence, but it is more likely seen as a set of tools that allow for collective bargaining, argument, and decision-making (Gruber, 2008). The use of new technologies on the Web has created a field of some intellectual freedom in which opinions and argument can be presented in discussion forums, blogs, news sites, wikis and has enabled the application of large-scale argumentation, where different views are presented, challenged, and evaluated by contributors and readers (Rahwan, 2008). In the classic organisational context where decisions and corporate information are essentially top-down and information flow is upward, wikis that employ a social networking approach have begun to change how people perceive information and knowledge (C. White, 2007).

As a platform for supporting various kinds of argumentation, the influence of Web 2.0 on the enterprise has begun to be felt by IT departments and managerial decision makers (Yukihiro, 2007) and to challenge traditional institutional boundaries by drawing the decision making power down from higher levels of management and giving greater autonomy to teams who can communicate openly. Open communication can occur if close linkages between a variety of communication tools and job systems exist (Shimazu & Koike, 2007) and where frameworks are in place to support their development.

It has become apparent in IT departments that users are accessing consumer sites and even sharing corporate digital assets with those outside accepted corporate margins or boundaries. Therefore, organisations must reassess their management strategies in relation to digital assets (Swisher, 2007). Problems that can occur include loss of intellectual capital, breaches of copyright, and possession of others' intellectual capital without the rights to have it. Such risks turn to threats when the enterprise can be liable for the actions of employees, even though it may have been through ignorance (Garland & Haymes, 2008).

Other growth restrictions exist too, for example, there is still much work required in the development of ontologies,[27] for example the modelling of business domains, authoring of software to implement the models, and the identification of best practises and guidelines to ensure consistent quality and performance (Léger et al., 2006). However, some work can be alleviated through the re-use of existing ontologies. Knowledge extraction remains an ongoing and complex problem, that is, when ontologies have been identified or created having them populated with knowledge extracted from legacy data is at best difficult without an appropriate tool set. One solution to the problem is through mapping to overcome heterogeneity but that assumes a static, non-changing environment and is only usable when transferring data and does not suit the dynamic Web 2.0 situation. Léger et al. state that at this time, most applications that use Web 2.0 to cross-link data to create new or different data suffers from a lack of scalability, and that limits its potential and performance.

It is the norm that in an enterprise, information is stored in structured databases and as unstructured files that often have no meaningful relationships either with other files or the structured databases. Meaning attributed to a range of unstructured files may be held by users who interact with them, and a difficulty arises when that link is lost through the departure of a key person from the file's relative context (they may leave the organisation, the department, or the project or job). The social networking nature of Web 2.0 permits the collection of metadata for files and instantiations of data, so when a person vacates their relationship with a file, they leave a trace of their knowledge about the information the file contains, which adds substantially to the file's meaning. The downside is that the application of metadata suffers from the peculiarities of the individual user, who may be the person who created the information

[27] Similar to the prior definition of ontology on page 46, the term here is defined to mean the representation of knowledge as a set of concepts within a domain, and the relationships between those concepts. Ontology in this context can be used to describe a domain and thus reason about the entities within it.

or a subsequent visitor who adds metadata for their own purposes (also referred to as folksonomy, see G. Smith, 2004).

In smaller development projects, what may be seen as a limitation (that of scalability) may in fact be an advantage. For example Auer, Jungmann and Schönefeld (2007) make the claim that wikis are capable of handling vast amounts of information, in many cases ad hoc ontologies can be created by users, and the increased interlinking possibilities means that greater value can be extracted from the stored information. Downscaling the concept may also have other benefits, for example, in a team based Work System where there are limited participants and the content is highly focussed. Clustering is another approach that can bring the volume of potential relationships down significantly, especially with the use of Artificial Intelligence concepts (Tenenbaum, 2006).

2.6 Explication of Work in the Work System

Previously, it has been said that by the end of the twentieth century, the meaning of the Work System has changed significantly. The Work System bears little resemblance to Taylor's originating conception[28] Now it has come to mean a set of activities contributing to an integrated whole, and not as a set of individual jobs, and borrowing from Trist and Bamforth (1951/2000), that it should be regulated by its members, not by external supervisors (Mumford, 1983).

Taylor's conception of the Work System[29] was sufficient to envisage workers as no more than economic units that needed to be exploited in the most efficient manner, to get the best level of productivity out of them. The strength of the Scientific Management method is that this thing called 'science' could be put to use to increase profit margins with no requirement to display affinity or empathy for fellow creatures. Moral and ethical issues are left for those with time on their hands, because in industry they present an impediment to profit.

The statement: "[The] victory of science is not what distinguishes our nineteenth century, but instead the victory of scientific method over science" (Nietzsche, 1968, p. 148) serves to highlight Taylor's callous stance. In Nietzsche's paradox, those who would wield power and reduce the worker to little more than a machine, are themselves no less caught up in the same machine. The acquisition of power creates a demand for more power, so that the owners and managers of iron works and mills of the Industrial Revolution maintain the Will to Power: the struggle to

[28] See page 36.
[29] See page 23.

gather power, and then to use it to get more power. In the twentieth century, the "technological disclosure of entities mobilizes everything including people into the project of increasing the power of the technological system itself, all under the guise of improving the human estate" (Zimmerman, 1990, p. 199). The inevitable path that the Will to Power must take is the creation of the cybernetic system: a system devoid of humanity, whose aim is the further attribution of power which can steer itself towards that goal by assimilating information and using it to achieve its aim. In the cybernetic world, total control over the living and the lifeless world means that even humanity is trained. It is as though humanity were no more than a stupid machine, so that, in the Hegelian sense, "work becomes thus absolutely more and more dead, it becomes machine-labour, the individual's own skill becomes infinitely limited, and the consciousness of the factory worker is degraded to the utmost level of dullness" (Avineri, 1974, p. 93).

Marx and Engels (1998) say machines are no more than what they are as the complex means of production created to fulfil the goals of the capitalist system. In their view, the technological means for production is not of itself degrading of the worker. Therefore, to change the ownership of machines from the capitalist bosses to the workers, creates propitious conditions for the development of authentic social relations of production. Heidegger (1972/1993b) argues that, contrary to what Marx may have said, degradation is not the result of any particular economic system (the same degraded status of workers can be observed in both capitalist and communist economies), but that it is a systemic result of production in the technological era.

It is important to put machines into context: they are not autonomous (Heidegger, 1972/1993b). Machines, a class of entity that goes beyond any single instance, are no longer owned by any person or socio-political class, but that humanity is itself subservient to the technological system. This is expressed through all parts of a person's life and can be extrapolated to incorporate the rest of society and in particular, language. Language has become an instrument serving the universal production process where local dialects are becoming overrun, for example, by Mid-Atlantic Anglo-American that is now the de-facto universal language of modern technology. This results in alienation at a local level and the loss of cultural identity It may also restrict further evolutionary development because, "instead of letting entities show themselves appropriately through language, people in the technological era are compelled to use language to disclose things one-dimensionally" (Zimmerman, 1990, p. 215).

Physics has made it possible for theorists like those proponents of Scientific Management to conceive of Work in a new way. Social and cultural conceptions are reframed as the relations

of force, distance, and time, which in turn mean that for the worker, Work is their only reality, and their "reality is nothing but the quantity of working" (Heidegger, 1931/1981, p. 148), so "Work has become work for the sake of more work" (Zimmerman, 1990, p. 215). While the functionalisation of time and Work depends on the purposeful transformation of items found in the work environment, the transformation may not be made directly by the workers.[30]

Zimmerman (1990) refers to the binding of the worker to the time clock in an industrial plant and how there are relatively few who are adequately able to alter their lives to fit in with an abstracted timeframe imposed on them, where others never learn to adapt and depart to do other things. Following Taylor's principles, he says, work in industrial plants is organised according to functional processes and workers are either slotted into a production line and engage in repetitive processes or organised into production units that may be semi-autonomous. The role of the worker allows for total redundancy, the worker is entirely expendable and their function can be passed off to some other worker who is quickly trained to take their place. The reduction of the worker to a production unit is reflected in the unit being reduced to a cog in the wheels of the plant, the plant a production unit for the company, the company a production unit for the corporation, and as a throughout result, work is itself reduced and degraded. The truth of this is unpalatable and the perception not new, for example Chaplin's (1936) representation of a factory worker who is drawn inexorably into the workings of the machine, only to be spat out at the other end.

Heidegger counsels that resolution of the apparent problem posed by the technological era cannot be made by "furious actions and schemes produced by the rational ego" (Zimmerman, 1990, p. 220). Instead, humanity needs to realise that there is no escape. To resolve the problem or escape from the technological system suggests humanity has mastery over technology, which is not the case. "We can be released from its grip only to the extent that we 'recognise' that we are in its grip: this is the paradox" (1990, p. 220). He says we need to "learn to live with the realisation that artificiality is the nature of man, and that technology in all its uncommonly diverse forms, is the realised, cosmic mode of being peculiar to our nature and which must be further perfected" (1990, p. 220–221). "Artificiality" referring not to a level of shallowness in the human condition but that it is a 'maker of symbols.'

As 'makers of symbols' and other abstract forms, humans have the tendency to bring to their presence "unexpected insights, novel variations, new possibilities which reveal that it is

[30]See page 33.

by no means fixed but instead is open to disrupture" (Zimmerman, 1990, p. 228). The results are often unexpected and at times, are of benefit to more than the individual concerned and any return is thus not localised. Certain socio-political environments have the capacity to nurture this tendency in the way that they foster self-expression and provide the conditions where such expression can bear fruit. The traditional command and control management structure does not foster the capacity for self-expression or innovation from operational levels within the enterprise, relying instead on the creative powers of management and where operational staff await orders. Team based organisations, where local autonomy has a place, allow for creative solutions to problems that affect staff directly. Such solutions tend to be more effective when viewed as a socio-technical system (Trist & Bamforth, 1951/2000). In sociotechnical theory, there is a shift in emphasis away from the analysis of an individual's performance in a Work System towards teams or groups, providing a strategy for breaking down the traditional hierarchical organisational structure.

From sociotechnical theory, teams or individuals in organisations that foster creative solutions to problems and the achievement of goals, demonstrate the concept of *minimal critical specification* (Trist & Bamforth, 1951/2000). Team members know what they need to achieve but are not told how they are to do it. The approach is successful because each of the teams' members have the opportunity to experience the tasks' operations, and since they experience a high level of autonomy with a high level of awareness of local conditions, they are able to react in a flexible and adaptive manner. As their experience grows through the completion of additional tasks, lessons learned are applied to new situations (Rice, 1958). Teams in a Work System that are effective need little monitoring, provided they produce the required outputs. Therefore, it stands that teams that have a higher level of visibility may not be functioning as well, or they have become less reliable.

Even though a Work System team may be functioning adequately, that is no guarantee that this will continue to be the case, since Work Systems exist in an environment that is dynamic and includes elements that are subject to spatiotemporal variations. Work Systems, like tools, only become highly visible when they are not functioning correctly or they have become unreliable, their output diminishes, or they conflict with other teams. The analysis and treatment of Work Systems that have become dysfunctional or need improvement is what Alter has proposed in his PBMSA. Checkland (1997) says that in any instance of an information systems development or design project demands there needs to be a shared understanding of both the organisation

and the system under investigation, which is what an experienced analyst can bring to bear on a project.

It has been shown that over time, what is understood to be a 'Work System' has changed to in response to exigencies in the current era. Work System was seen first as a way for industrialists to get more from their workers for less. It was used to create for the worker a repetitive working environment that ensured planned obsolescence and was endlessly mundane. After its introduction, it was seen that such an existence is intolerable and efforts were made to change the lot of workers via the union movement. Now the Work System is considered as a collection of tasks performed by workers within an organisational unit, giving those workers the right to choose what they do and how. Nevertheless, the Work System is a specific idea that applies to a specific type of environment. The Taylorist Work System describes Work undertaken in a production environment in which there are defined targets that must be achieved on a regular basis.

IT has wrought significant changes on the Work System since it was first conceived. The knowledge that change is taking place has led to arguments over how to deal with it without actually considering what the nature of that change is and the meaning of Work as it relates to the person. Work Systems exist within organisations, such that organisations can be defined as multiple Work Systems that are coordinated to reach goals that an individual Work System cannot achieve. In creating IT artefacts, the different kinds of environment into which systems are implemented will have situational ontologies.

In IS the Work System has its place in batch processing in transaction processing systems, data gathering on production lines, call centre management systems, and so on, where the principal output are data that are stored in various ways and may be applied to various purposes. As the range and complexity of systems advance, so too does the volume of data that are being captured. This creates for the organisation a two-fold problem: how to store the data securely, and how to make sense of it in order to make coherent decisions.

Since the 1970s information systems projects have led to sophisticated technologies with the purpose of extracting information from data. Large organisations are becoming successful because they can manage and extract greater value from the data they store in their various systems. Where early on the aim of information systems was simple, as automated accounting systems to facilitate the sale of more products and services to the same customers or to more customers in new and existing markets, now the goals of data use have become as complex

as the systems used to store them. In organisations, there is a growing awareness that social networking sites and technologies are playing an increasing role. Web 2.0 technologies like web services provision, blogs, forums, and wikis increasingly find a place in situations where people feel the need to interact, connect, share information, and add business intelligence to data. It is incumbent upon the enterprise to decide what level or degree of access to grant to its data repositories within the technological system and how they must be managed.

The technological system, as it has become, threatens to overwhelm humanity through its size, extent, pervasiveness, and complexity. The technological system has become, in the manner of Nietzsche (1968), an ever increasing demand to satisfy the Will to Will, to produce for the sake of more production. The system has developed an apparent life of its own, and as a cybernetic system, it has become a juggernaut,[31] where the person is lost and all are nameless, faceless actors in a nihilistic black comedy. Proponents of technological development claim that changes wrought, herald an age of freedom from the forces of nature, but Heidegger argues that humanity is instead slave to the power that governs all technological producing. He says that freedom is a state of subjection to the power that has reduced the former objective nature of objects to those of mere disposability, where 'power' is the 'being' of entities in the technological age.

The urge to produce is the power that fuels the emergence of entities, the presencing that compels humanity to attempt to organise everything in an endless quest for power for its own sake. Thus, humanity is drawn towards its final appearance and eventual cybernetic disclosure. Zimmerman (1990) describes the character of cybernetic systems in modern technology and how they differ from the machines of the Machine Age. The iron works and mills of the Industrial Revolution were owned and managed by self interested human subjects and it was them that maintained the Will to Power but in the twentieth century the technological disclosure of entities mobilises everything, natural and synthetic, into increasing the power of the technological system itself. This done under the guise of improving the human condition, and it is through this that the cybernetic form of the human is disclosed, but to itself at the end.

During his trip to Greece in 1967, Heidegger expanded upon the cybernetic character of modern technology citing Nietzsche's remark from *The Will to Power* (1968), that it is the scientific method rather than the philosophy or spirit of science that is the victor over humanity.

[31] The Juggernaut is not a physical manifestation of some technological horror but the sum of the collective Will of those who participate. The reference to the juggernaut is to the colloquial English use of the term as a metaphorical force that is unstoppable and mercilessly destructive.

Through the positivist method, Nietzsche says, the world is seen as something that can only be counted and calculated mathematically, thus the method itself has won over the philosophical foundations of science (to find the meaning of things through the use of test and experiment) and that this would result in a total revaluation of the world and its values.

The transformation of the cybernetic human that the victorious method achieves is its goal of steering processes in a desired course. "According to the cybernetic world projection, the basic trait of all calculable world processes is steering. Information provides the mediation necessary for one process to be steered through another. To the extent that the steered process provides information which affects the steering process, steering has the character of informational feedback" (Zimmerman, 1990, p. 200). Thus, information is passed through the cybernetic system. This facilitates processes in control systems in electronic and mechanical devices. Comparisons between devices and biological systems provide the ground work for advanced cybernetic systems to have the facility to be self ordering, or to steer their own course, and perhaps to be sentient. The cybernetic system, having gained that ability, the distinction between machine and humanity is blurred and eventually disappears because in the cybernetic world, victory of method makes it possible for total control over the living and the lifeless world. In the uniformity of the cybernetic world, where the human has been trained, the juggernaut becomes the vehicle.

> In the technological era, the Will to Will mobilizes humanity to transform the planet into a titanic factory for no other end than to magnify power. The usual "means-end" interpretation of instruments, then, makes no sense when applied to the technological era: humanity has become the "means" for an end that lies beyond human control or ken. The technological system may be likened to an organic process moving in a circle, but the difference is that there are self-limiting factors in organic cycles that are not discernible in the infinitely expanding spiral of the technological system. Once again calling on Nietzsche, Heidegger asked: "What is the essence of the modern power-machine other than *one* expression [*Ausformung*] of the eternal return of the same? But the essence of that machine is not anything machine-like or even mechanical." [VA I: 118/431] Zimmerman (1990, p. 201)

The inevitable path that the Will to Power must take is the creation of the cybernetic system. A system devoid of humanity, whose aim is the further attribution of power and that can steer

itself towards that goal by assimilating information and using that to achieve its aim. But in the cybernetic world, total control over the living and the lifeless world means that even the human gets trained as though it were no more than a dumb machine. In the Hegelian sense, Work provides none of the stuff of life and the human becomes nothing more than a unit in the vast incorporated machine.

In the years before 1933, Heidegger completed his analysis of the productive/disclosive character of the human understanding of being. That reflected his concern about the nature of working and producing, and that concern manifested itself in his analysis of the workshop in *Being and Time* (Heidegger, 1972/1993b). At the time, his focus was on the manner of production afforded by the handicraft of the artisan and its comparison with industrialised modes of production. His analysis of equipment and the workshop has three purposes: (1) It creates a datum for understanding of human existence as being-in-the-world; (2) it discloses the importance of the usefulness of the being of entities compared with an objective-scientific understanding; and (3) it provides foundational arguments that there is a unifying meaning to the being of entities and that the meaning is temporal. Heidegger argues that one must choose a particular entity in order to investigate its mode of being. In his own analysis he selected *Dasein*, the human entity, and applied his version of phenomenology which he defined as the kind of interpretation that allows an entity to disclose itself in the way that is for that entity, the truth.

Visions of the dismemberment of humanity from Work manifest in the mind of the person as doubts about who or what it is that steers the human to its future.[32] On the one hand, the person fears a loss of control over their being but on the other, satisfies the craving in the person to be led to a place of certainty and safety. The modern human lives on the knife's edge of surety that the civilisation it has created for itself will provide for life's exigencies, that the civilised life ensures the person will be protected: morally, ethically, emotionally, and psychologically. The trade-off for the person is that they must pay their dues by presenting themselves to the juggernaut and submitting to its demands. To do so is an agreement and a choice that the person makes, willingly. To choose to submit then, does not remove from the mind of the person the tendency to reach beyond the barriers of what exists, into what is possible.

[32]Jünger (1932/2007) describes a variation of the Overman (Nietzsche, 1883–1885/1978) as an organic construction combining the passion of humanity with technological precision, where hot flesh and cold steel meet. The Overman is portrayed as the cybernetic future, it is rational but lacks those frail human properties that led the West to its current nihilistic state. His vision is portrayed eloquently in movies such as *Metropolis* (Lang, Pommer, & Harbou, 1926/1984) and *The Terminator* (Cameron & Hurd, 1984).

2.7 Conclusion

In chapter 2, the argument has been presented such that efforts to control what can be done with systems at times produce contrary or unexpected results. To control and to steer the person[33] have been part of the human psyche for millennia, but those attempts have inevitably been thwarted because it is not in the core nature of the human to be thus, controlled. People experiment and expand on what is possible as technologies enable the development of more sophisticated applications, and people want to do this in their Work. The assumption has been that the meaning of Work in Work Systems is *a priori*. That the Work System is a notion that can be bent to whatever purpose required, resulting in various and contradictory uses of the term, which gives rise to the question: What are the semantics of Work? Therefore; *What are the semantics of Work in the Work System?*

In chapter 3, it is argued that since the earliest recorded times Work has defined the person and their status defined the Work they undertook. There occurred changes in society, for example from the period of the Renaissance and Enlightenment to the Industrial Revolution, during which social structures were challenged. While at the same time, advances in technology permitted redefinitions of Work as industries were created and populations were displaced.

It is further argued that subsequent changes in technology sped the rate of change in society and therefore Work. For IS the rate of change has been such that technology has evolved faster than the effects of change have been understood. Therefore the argument that IS is in need of a core basis on which theory may be built is made. To create a hard core of theory requires that attention be focussed on where the presentation of knowledge can be described as formalism. Thus, a method for the formal definition of Work and the Work System that takes into account both spatial and temporal considerations are described.

[33] And to create the cybernetic human.

Chapter 3

Design of the Study

> "Each man is given a scientific heritage plus a continuing barrage of sensory stimulation; and the considerations which guide him in warping his scientific heritage to fit his continuing sensory promptings are, where rational, pragmatic."
>
> Quine (1953, p 46)

3.1 Introduction

In chapter 3, the approach taken throughout the thesis to derive a series of semantic statements describing Work in the Work System is presented. §3.2 advances the outline of the study, concentrating on the main arguments that lead to the generation of key points addressed in this thesis. In §3.3, the argument is presented as the notion that IS is in need of core theory, giving rise to a progressive problem-shift. Further, §3.4 continues in this vein with arguments for the development of theory, starting with the pragmatist views of James. It is asserted that IS lacks a hard core of theory, around which auxiliary theories may be proposed with the result that the field lacks heuristic power. Attempts to remedy this have emerged, such as Materialist Pragmatism, however that is also shown to lack coherence (that the notions of Materialism and Pragmatism cannot co-exist). Thus, what is required is a presentation of knowledge as a formalism, from which new theory can be abducted. Then in §3.5, a method for the formal definition of Work and the Work System taking into account both spatial and temporal properties are outlined.

The structure of the thesis presented in chapter 1, and the rationale for selecting Web 2.0 is provided.[1] In chapter 3, Web 2.0, as a collective example of an Internet based technology, is presented in which opportunities for social change are provided.[2] The premise in §1.3 is restated in chapter 3: that Work is expressed through all parts of the human and this defines, for the person, some aspect of their humanity, whether that is purpose, destiny, status, or as some sense of fulfilment or satisfaction.[3] In human terms, Work is a persistent conception, and I contend that technology is a factor in how the conception is situated.[4] In the current context, I argue that the emergence of modern communication technologies has sped the rate of change in Work and blurred the lines between Work and non-Work occurrences in the post-productionist world.[5]

A core argument presented in chapter 2 is that Work has been regarded as *a priori*. In chapter 3 I state that this has resulted in a range of theories that are inconsistent and may produce inconsistent results when applied in practice, leading to invalidated theory.[6,7] Therefore, I assert that it is necessary to reposition the basis of knowledge of Work and the Work System in IS and provide a formal definition of the term.[8] In chapter 1, reference is made to the formal definition of terms as a component of a pragmatist philosophy of IS. Peirce says one of the core features that differentiate pragmatism from other philosophies is its acceptance of metaphysical properties in phenomena. In pragmatism, and other philosophies, formalisms provide the means for expressing concepts and beliefs. Therefore, the research question that underlies this thesis can only be answered in its entirety, formally.[9]

To express complex theories as formalisms, it is necessary to obtain of an understanding of the domain and to be able to apply understandings to different realities. I make the argument that Work is spatiotemporally defined[10] and therefore a formal language that can address occurrences and states in Work is required. There exists between objects, various types of relationship. Where alteration or change has been caused to one object, then some other object must have been the agency of alteration or change. To identify such a relationship is often

[1] See in particular, Figure 1.1.
[2] 66:25–66:31.
[3] 65:5–65:11. 65:15–65:19.
[4] 65:15–65:19. 65:26–65:28.
[5] 66:5–66:11. 66:12–66:25.
[6] To illustrate how inconsistent theory has been applied, I relate the case of Materialist Pragmatism. In chapter 3, I argue that for materialist philosophies, only rational theories are acceptable. Rational theories are those whose phenomena have properties that are observable and measurable by devices. All other theories are therefore, irrational and of no account. The conception of a philosophy in which materialism and pragmatism can coexist (Materialist Pragmatism) is therefore, anathema to both.
[7] 31:1–31:1. 67:24–67:27. 69:6–69:9. 70:14–70:21. 70:22–71:2.
[8] 68:1–68:17.
[9] 71:3–71:11.
[10] 74:18–74:25.

difficult, but in the abstract notion represented by temporal logic, a causal relationship can be identified.[11] The application of the state and event-type reification of temporal logic provides those statements that may be tested against their truth value.[12]

3.2 Outline of the study

The semantics of Work is a study that covers the full range of the beingness of living a human life. I argue that from the time that the species hominid was first able to identify specific roles for the individual person, Work has become a factor that defines not only what people do but who they are, the content of their lives, their fortunes and destinies (should such a thing exist). Work is a medium inside which the human gains expression and support for its life. It is my contention that Work is a container for the lingering patterns of social and societal norms, carried on day after day, life after life, in a regular procession down through the ages.

Dewey tells us that, for the ancient Greeks, Work was a fixed element, and the Work undertaken by the person was determined at the time and nature of their birth. Dewey (1938, p. 9) says "Aristotle spoke for an entire social order as well as for himself when he said that slavery existed by nature." While such social structures persist, for example in the Indian caste system, in other societies these have tended to dissolve under the influence of political intervention such as the institution of the Welfare State in New Zealand in the 1930s (see for example, Gustafson, 1986). For the reasonable person, there can be no doubt that over time the Work of a worker has changed since the advent of machines.

Societies worldwide underwent significant change during the period of the Industrial Revolution. From the late eighteenth to the early twentieth centuries, the world was in a state of turmoil after tens of thousands of years of relatively regular societal development. There was a sudden spurt of change brought about in a way that is somewhat similar to the discovery that with tools one could do more than poke and prod, club and cut. In the period following the Industrial Revolution, steam powered machines gave way to more advanced technologies that more closely resemble human functions. I argue that as progress has been made in the advancement of technology, so to have the means by which Work is defined. That now it is through technology that Work is largely identified.

[11] 75:21–75:27.
[12] 75:12–75:15.

I am concerned with the semantics of Work in the Work System and to that end it is necessary to define both Work and the Work System. In the previous chapter, a number of the issues with regard to the Work System concept and how it has changed in use were addressed. These will be explicated in later chapters.

IS technologies are in a state of rapid change, but their fundamental conceptions have not changed and are in effect little more than reengineered tools devised to perform specific roles. That being said, important shifts in the way that people engage with systems and what people expect of them have been observed and recorded. These are related to how information is seen and understood, and how a collective intelligence is emerging, in which the old hierarchies appear to be falling away and the person has an expectation of equal access to information sources. One way that this is expressed in the work place is through information sharing systems, regardless of whether or not it is condoned by organisational management. In this thesis, those technologies that permit people to share information either in closed circles of acquaintances or in more open spaces and use Internet enabled applications are referred to collectively as Web 2.0, thus I am concerned with the ways that Web 2.0 has impacted on Work Systems by reflecting on 7 areas:

1. The notion of Work and what it means to the human
2. The effects of productionism on Work and the human participant
3. The effect of modern networked technologies on the productionist environment
4. The democratisation of Work through the redistribution of power under the influence of modern networked technologies
5. The socialisation of Work in a post-productionist environment
6. Changes to Work in the enterprise with the human as agency
7. A formal definition of Work in the Work System

Modern networked technologies, in this case Web 2.0, may be conceived as a distinct occurrence in the morphology of systems development but observers will have differing conceptions about what the impact of Web 2.0 will be. While much can be said about the implementation of such technologies, for example, from the barefaced financial impact of the use of Web 2.0, to the impact on support services within an organisation. The focus of this study considers social aspects that become apparent through applications of this apparently intrusive technology. The intention is to take a common sense approach after James (1907/2007). For

James, his approach was to test ideas by their consequences and in the context of this knotty issue, we are referring to consequences to people that introduce Web 2.0 technologies to their work place. How does that affect the conception of the Work System?

Throughout the discussion, the practical consequences of that which is postulated and the necessity to work within some kind of framework to establish a series of interconnected nodes, has been taken into consideration. The nodes, while somewhat abstract, provide anchor points that theory can be built upon. Peirce (1998a) offers a philosophical system that not only simplifies the process of determining what objects exist and how they relate, but identifies the complexity of issues that emerge when objects are brought together, in relation. Quine provides a series of thorough tests that can be applied to theoretical statements (these are not applied in this thesis, they are part of the next phase in this study). It is from Dewey, through his logic of what is abstract and what is not, and how they are determined one from the other, that I draw the greatest clarity.

3.3 Explication of the problem

The content and structure of theories in IS are strongly influenced by theories from a diverse range of fields. Influences affect not just the broader issues of the nature of theory, but also relations between theory and practice, such as the design of systems that meet organisational goals on the one hand but user wants, needs, and requirements on the other (Evers & Lakomski, 1996). Attempts by practitioners such as Alter[13] to create solutions to perceived problems, rather than a holistic framework that can be used in all situations effectively, has resulted in an inelegant hybrid of various inconsistent theories that contain anomalies and internal conflicts.

The Work System concept has been applied in a number of different contexts, to provide solutions to perceived problems that arise in light of local, current events. The result is that the term is now inconsistent in its use.[14] As they are presented, some theories are contradictory and inconsistent and that provides conditions for degenerative heuristics in IS as a field for scientific research study insofar that in this area it lacks a hard core of theory around the idea of Work, from which both a positive and negative heuristic can be formed (Lakatos, 1970).

Lakatos (1970) says that for a research programme to demonstrate a progressive problem-shift it is important that fundamental concepts are agreed. They must be reasonably well

[13] Refer to page 37.
[14] See page 2.2.

defined, while there is always some scope for argument. It stands that the semantics of Work, as a fundamental human appearance, ought to have a solid basis, both theoretically and practically (observable and measurable). Work in IS is *a priori* with definitions that contradict each other, and are incongruent, inconsistent, and presumptuous.

If the concept of Work is not well defined, then it stands that conceptions of it lead to ad hoc theories. Some may turn out to be inappropriate and such systems that are designed with inappropriate conceptions may then lead to other unplanned or undesirable consequences. Lakatos (1970) asserts that this results in a process where theories are tested and patched endlessly but do not lead to any substantive result, whereas a semantic definition of Work provides a theoretical foundation on which positive and negative heuristics for the development of methodological rules may subsequently be built.

IS research lacks a hard core of theory that differentiates it from other research programmes. As such the field is subject to the development of ad hoc theories and theories adopted from other fields. Adopted theories, themselves protected by a protective belt of auxiliary theories from their own domain, and tested by experiments relevant to that domain, are not necessarily relevant within the context of IS. This study forms part of a larger body of work that sets out to establish a hard core of theory that is built upon, and builds up, IS epistemology.

3.4 Development of theory

For James (1909), pragmatism is a...

- philosophical temperament,
- theory of truth,
- theory of meaning,
- holistic account of knowledge,
- metaphysical view,
- method of resolving philosophical disputes.

When faced with a problem, theories help us bring into focus ideas, provide grounds on which to select ideas, generate propositions, and create objects. Traditional western knowledge, the classical empiricist approach, assumes that certainty, or unchangeable provability, is the necessary feature of any epistemic item (Dewey, 1939; Walker, 1985). Such claims to knowledge are justified if they can be shown to follow some procedure of rational inference from the

epistemic foundations or to be foundational themselves. The result of this line of thought is that knowledge produced by natural science is superior, real, or hard. In an effort to address the apparent shortcomings of theories where validation through classical empiricism is not appropriate, Walker (1985) proposes Materialistic Pragmatism, which has five features: it is holist (or coherentist), physicalist, monist, historical, and pragmatist.

It may be said that at this time IS does not present itself as a mature field of scientific research in which there are research programmes that reveal novel facts and auxiliary theories. IS needs to establish a progressive building of knowledge to anticipate these events, which is what is referred to as 'heuristic power.' In the positive heuristic of a powerful study, there is at the start, a general outline of how to build the protective belts: this heuristic power generates the autonomy of theoretical science (Lakatos, 1970).

The practice of theory building must cohere with the findings of other practices in which one is engaged, such that theory coherence demonstrates evidenced predictive power and problem-solving capacity (Walker, 1985). Materialistic Pragmatism side steps problems with foundationalist theories in which there are competing knowledge claims by taking the opposite stance, of benign relativism. This assumes that, "with or without foundations, there may be commitments common to competing theories in which the knowledge claims are embedded, and that the epistemological task is to identify them and use them as instruments for identifying the theory with the most coherence and algorithmic facility" (1985, p. 67). This forms the basis of 'touchstone theory.'

A touchstone is generated by commitments that are shared. Shared commitments are tenets and features that are common to internal and competing theories. Touchstone theory is most powerful when "the coherentist imperative is applied to the relation between competitors and a further body of theory — 'evidence,' or findings produced through the application of touchstone methods" (Walker, 1985, p. 68).

Walker (1985) outlines the steps involved in the application of touchstone theory in general. (1) Determine whether and in what respects theories are competing. It is necessary to check that they are not simply using alternative languages or conceptual schemes to say the same thing about the world. Competing theories must differ over or about something. (2) Find out where the theories have features in common. (3) From these, the agreed problem-identification on which the competition is based is projected onto an external object, typically a problematic set of circumstances in the world or another theory. This step involves some investigative

methodology, such as experiment and observation. The result of experimentation is the critical factor in judging between theories because that is where evidence is made apparent and thus a problem can be rejected which leads to rejection of the theory.

Opposing Materialist Pragmatism, Maddock (1994) says the criteria selected for coherence provided by Materialist Pragmatists lacks coherence and that therefore there is no way to choose between theories in the way they suggest; that arguments against the separation between factual and evaluative realms are unconvincing; and, claims that foundationalism is avoided by providing a non-positivist theory of science is questionable. Of his criticisms it is this last that is most convincing. The Materialist Pragmatist approach that supposedly avoids positivist approaches does, in effect allow for the application of positivist methods. However, contrary to Maddock's criticism, Pragmatism is not averse to reductionist and empirical methods per se. The argument that Pragmatism has against positivism is its denial of all but material (that is, non-metaphysical) evidence in the testing of a hypothesis. Walker (1985) does not make the claim that Maddock (1994) objects to however, and the idea that materialism and pragmatism can co-exist is unlikely as they are founded on two extremes of belief. Under materialism there is the rejection of all, except that which presents itself as matter, but pragmatism accepts that anything which may be conceived and sensed by a person (without the aid of external contrivances) may also be regarded as objects and therefore the subject of experimentation and finds its extreme interpretations in, for example, in Stirner's (1845/1907) nihilism. In epistemology, such fundamental concerns as metaphysical properties are important and not so easily rejected.

Where epistemology is the study of knowledge, justified belief becomes central to epistemology. For example, a person, John, may say that it is important that those who will use a system are happy using it. Thus, it is necessary to include those who will be users in all development phases. Whereas, another person, Annabel, rejects that view because so far as she is concerned, the only really important outcome is a system that works. In each case argued, one is pragmatist and the other materialist. Presentation of knowledge is important as all knowledge lends itself to particular styles of representation: materialist or holistic, positivist or pragmatist. The question arises too: does knowledge require formal or informal presentation?

At times, this is confused with arguments that refer to other aspects of philosophical debate such as the materialist/supra-materialist divide.

The portrayal of knowledge as a formalism is based upon the argument about natures of belief and how to answer questions. For example, questions can be asked about belief or the degree of belief and those questions may be asked both formally and informally. However, none of those questions may be asked or answered informally, exclusively, and it is logically impossible to exclude any formal questions or answers. As an illustration, if one were asked to offer a counter example to a claim that some questions can only be asked or answered informally then in reply one would compile lists of objects, their properties, and perhaps relations between them and all at once there is a formal model describing the situation. However, some epistemological questions that can only be answered formally.

Belief and degrees of belief can be treated as objects (Huber, 2008) and so it stands that relations must exist too. It is a common assumption that it is belief that is a relation between an epistemic-agent, at a particular time to the object of their belief. The degree of belief then is the relation between a numerical value (the degree), the epistemic agent, and the object of their belief. Objects of belief are propositions of the sets of possible worlds or truth conditions and these are centred on the individual for any given time, thus they are temporal.

In considering the concept of Work, and while belief plays an important role in that, I concentrate on Work as a human act of necessity, from which there is the possibility that something will be produced and thus, modal logic becomes a feature, where the purpose of logic is to represent the difference between valid and invalid arguments. "A modal is an expression (like 'necessarily' or 'possibly') that is used to qualify the truth of a judgement. Modal logic is, strictly speaking, the study of the deductive behaviour of the expressions 'it is necessary that' and 'it is possible that' " (Garson, 2009). However, a modal may also be used for other related terms and can be used for logics of belief, tense, and other temporal issues. Where arguments are complex and spatiotemporally dependent then modal expressions are common, albeit confusing. Modal logic also features in computer science and artificial intelligence.

In the standard Kripke (1963) semantics for modal logic, the truth value of a sentence is relative to the points in a set operation. This means that a propositional symbol may have different truth values at each point in the set. To accept them as valid it is necessary to take them as different worlds, times, spaces, epistemic objects, states in a computer, states of mind,

and so on. That then allows one to formalise natural language sentences whose truth value is relative to accepted predicates.

Hybrid logic (Braüner, 2006/2008) adds further expressive power to modal logic by adding 'nominals,' so that the truth value of a proposition is valid relative to exactly one point of a statement. For example, the nominal a can be used to represent the statement "it is 12 minutes past 10 on 19 January, 2011." This cannot be expressed formally with standard Kripke semantics, although the statement "it is windy" can be. In this case a can be used as a term referring to the time and date specified and thus in hybrid logic a term is a specific sort of propositional symbol whereas in first-order logic, it is an argument to a predicate.

Take the sentence:

> It is 12 minutes past 10 on 19 January, 2011, it is windy.

For a statement in hybrid logic to be considered true at a particular time, in a specific world, or something else, then a 'satisfaction operator' is used. This draws the nominal and the operator together in the form $a : p$ where a is the satisfaction operator, "it is 12 minutes past 10 on 19 January, 2011" and p is an ordinary propositional symbol that represents "it is windy." If a were a nominal and φ were an arbitrary formula, then a 'satisfaction statement' can be built in the form $a : \varphi$. This means that the formula φ is true to exactly one that is represented by a. Informally, the nominal a has the truth-condition

a is true relative to a point w

if and only if

the reference of a is identical to w

and the satisfaction statement $a : \varphi$ has the truth-condition

$a : \varphi$ is true relative to a point w

if and only if

φ is true relative to the reference of a

Hybrid logic has valid formulas for reflexivity, symmetry, transitivity, and replacement:

$a : a$

$a : b \rightarrow b : a$

$(a : b \,\&\, b : c) \rightarrow a : c$

$(a : b \,\&\, a : \varphi) \rightarrow b : \varphi$

Temporal logic (Galton, 1999/2008) covers issues related to the representation of temporal information within a logical framework. Specifically, it refers to modal logic as 'tense logic' although it has been developed to incorporate uses in clarifying philosophical issues about time, as a framework for defining the semantics of temporal expressions in natural language, for encoding temporal knowledge in Artificial Intelligence (AI), and to test computer programming languages.

Tense logic introduces a number of 'strong tense operators' and 'weak tense operators' which are identified as the P, F, H, G[15] operators. Tense logic is obtained through incorporation with an existing logic like predicate logic, so that operators can be added to first order predicate calculus. This allows for the expression of spatiotemporal distinctions. For example, the statement "A philosopher will be a king" can be interpreted in several different ways:

$\exists x(\text{Philosopher}(x)\ \&\ F\ \text{King}(x))$

Someone who is now a philosopher will be a king at some future time.

$\exists x F(\text{Philosopher}(x)\ \&\ \text{King}(x))$

There now exists someone who will at some future time be both a philosopher and a king.

$F\exists x(\text{Philosopher}(x)\ \&\ F\ \text{King}(x))$

There will exist someone who is a philosopher and later will be a king.

$F\exists x(\text{Philosopher}(x)\ \&\ \text{King}(x))$

There will exist someone who is at the same time both a philosopher and a king.

Temporal logic, while providing the ability to address spatiotemporal distinctions, has difficulties with the distinctions between states, events, and processes. For example, while specific points in time are adequately provided for it is when periods are covered that prove to be barriers for formalisms. While one can express a sentence "it is 12 minutes past 10 on

[15] That is:

P It was the case that...
F It will be the case that...
H It has always been the case that...
G It will always be the case that...

19 January, 2011, it is windy" using hybrid or temporal logic forms, to express the sentences "it is windy for half the day on 19 January, 2011" and "on 19 January, 2011 the wind blew all day" becomes problematic without having to express every point. That is, hybrid and temporal logics do not express intervals of time in which there may be some occurrence, a change of state, or the retention of a state. These kinds of issues are of special importance in AI and computer science.

Allen (1984) describes how state and event types are defined in first-order theory and introduces relational predicates HOLDS [16] and OCCUR. For example:

$\text{HOLDS}(\text{Asleep}(\text{Mary}), (1\text{pm}, 6\text{pm}))$

$\text{OCCUR}(\text{Walk-to}(\text{John}, \text{Station}), (1\text{pm}, 1.15\text{pm}))$

Proofs for the homogeneity of states and in-homogeneity of events are provided and secured by axioms:

$\forall s, i, i'(\text{HOLDS}(s, i)\ \&\ \in (i', i) \Rightarrow \text{HOLDS}(s, i'))$

> For all states that are constant over some interval, they may also exist in multiple intervals. This implies that a state holds in some other interval.

$\forall e, i, i'(\text{OCCUR}(e, i)\ \&\ \in (i', i) \Rightarrow \neg\text{OCCUR}(e, i'))$

> For all events that occur during some interval, they occur because there is an interval. This implies that an event did not occur in another interval.

Allen (1984) calls his logics a "general theory of action and time" while Galton (1999/2008) calls it a "state and event-type reification" of temporal logic. Either way this is applied to the argument established in §10.3: where Work and technology are the product of human endeavours, in which there are changing factors that effect change on human society over a period that result in observable phenomena such as changes to Work patterns, then as Work has changed so too has technology. Thus, changes in Work have effected technological development and technological development has effected changes to conceptions of Work. Therefore, Work is spatiotemporally dependent and Allen's approach is appropriate to be applied as a method for expressing formalisms for predicates and propositions.

[16] The proof for this is in p. 152, Allen, 1984, Appendix.

3.5 Method

This study is a philosophical enquiry that:

1. Identifies factors relevant to considerations of the semantics of Work.
2. Establishes a hard core of theory that builds IS epistemology.
3. Investigates the semantics of Work in the Work System.
4. Investigates changing perceptions of the Work System, from Taylor to Alter.
5. Leads to the building of a formal description of Work in the Work System as a formally described representation of a systemic ontology.

To arrive at a formal epistemology (Hendricks, 2006) to describe the semantics of Work that conforms to Quine's five principles (Consistency, Coherence, Comprehensiveness, Simplicity, and Potency) formal representations of knowledge that employ tools from logic and mathematics to portray both qualitative and quantitative theories are applied. The logical system offered provides predicates and propositions, as sentences, where the propositions are supported by their predicates. The logical system ensures the truth value of the predicates and validity of the propositions.

Allen (1984) says the world is described by a set of temporally qualified assertions of what is known about the past, present and future and those descriptions may be either static or dynamic. Static objects have 'properties' that hold over a period whereas dynamic objects have 'occurrences' in which there are changes registered over some period. These distinctions operate in conjunction with temporal logic since time plays a central role.

An action is defined with an animate agent who performs some action. Some actions are processes ("see Spot run") and others are events ("Spot caught the ball"). The difficulty is in describing a causal relationship between the action and the agent. For example, "Spot caught the ball" can be interpreted variously as an action of Spot, or as the result of an act of Tommy throwing the ball at Spot in a rage. To clarify the distinction a predicate is added as an agentive cause and is in the form $\text{ACAUSE}(\text{agent}, \text{occurrence})$. This represents that type of action in which the agent is the cause of the action and not the object of it. Conventions used in the building of propositions are listed in Table 3.1 on the following page.[17] Predicates and constants are in upper case and variables in lower case.

[17] The content of this table is repeated on p. 219

Table 3.1: Predicates and constants used in temporal logic

$\wedge$	Conjunction
$\vee$	Disjunction
$\neg$	Negation
$\Rightarrow$	Implication, it implies
$\Leftrightarrow$	Equivalence, it is equivalent to
$\forall$	Universal quantifier, for all or in the case of any occurrence of
$\exists$	Existential quantifier, there exists or it may exist
ϵ	Set notation, inclusion
HOLDS(p, t)	A property holds during a time interval
OCCUR(e, t)	An event occurs during a time interval

3.6 Conclusion

Chapter 3 presented the application of philosophical methods culminating in a derivation of a series of semantic statements that describe Work in the Work System in chapter 10.

The chapter advanced the argument that Work defines the person and their status in society defines the Work they undertake. Consequently, changes in society, represented by epochs or ages during which social structures were challenged (for example the Renaissance, the Enlightenment, and the Industrial Revolution) encapsulate challenges to the social fabric of an ordered society. Challenges coincided with advances in technology and permitted the redefinition of Work as industries were created and populations moved.

Subsequent changes in technology have sped the rate of change in society and therefore Work. The example provided is that of IS. The rate of change is such that technology has moved faster than the effects of change have been understood and theories that have been developed to investigate technology, the effects of change and those effects on society. Therefore I argue that there is the need for a hard core of theory in IS on which auxiliary theories may be built. When such a hard core of theory is established, then it may be that the field of IS develops a progressive problem-shift.

The philosophical basis upon which the thesis is built comes through the work of James and other pragmatists. The study focusses at an epistemological and ontological level where the presentation of knowledge as formalism is paramount. Therefore, a method for the formal description of Work and the Work System that takes into account spatial and temporal considerations is outlined.

Chapter 4 presents cases that offer real world evidence for the arguments that are made through the remaining chapters. These have been selected on the basis that they represent various applications of Web 2.0 technologies and tell differing stories of development, application, implementation, and success.

Chapter 4

Web 2.0 case studies

4.1 Introduction

The cases presented in this chapter represent implementations of Web 2.0 technologies in an organisational context and have been selected on the basis that they illustrate the impact that Web 2.0 applications have on the Work that people do. There are scant examples of such cases available at this time as most case studies describe the impact of technological advances on organisations' customer and supplier relations, economic forecasts and results, productivity and output, applications in advertising, marketing, promotion, public relations, and so on, but do not relate to how they affect people.

In §4.2, an overview of Web 2.0 is presented. This section presents a current understanding of the Web 2.0 concept and technologies that comprise it. §4.3 continues the discussion by outlining positive and negative impacts that have been observed because of the adoption of Web 2.0 technologies by the enterprises in the cases. The cases described in §4.4 pertain to technological areas with Farm Credit Canada (H. A. Smith & McKeen, 2008, in §4.4.1) and its use of Services Oriented Architecture (SOA) and Social Networking applications at IBM (Majchrzak et al., 2009) and British Telecom (Dennison, 2007) in §§4.4.2 and 4.4.3. In §4.4.4, the analogy of the shoemakers children serves to illustrate how the use of Web 2.0 technologies can be applied to decision making processes to improve the quality of outcomes and to reduce the amount of time and effort required to make decisions.

In chapter 4, there are minimal original contributions. This chapter outlines cases that are used throughout the remainder of the thesis to illustrate and test concepts and arguments.

The cases have been selected on the basis that they represent the spread of usage of the IT artefact, Web 2.0. In general terms, the cases are summaries of research articles. Therefore, no effort is made to provide additional commentary or argumentation.

4.2 Overview of Web 2.0

Web 2.0 denotes those technologies that facilitate activities on the Internet such as social networking, blogging, collaboration, and information and data sharing across a broad range of devices and platforms.

In this thesis, the attributes O'Reilly (2005/2009) lists are taken to represent core features of the artefact, Web 2.0: (1) *Data* are the driving force; (2) it provides an *architecture* of participation; (3) it favours *open source* development; (4) it involves content and service *syndication*; and (5) it introduces the concept of the *perpetual beta*.

The applications and features that are normally considered in the Web 2.0 mix are:

Wiki A democratic, accessible community of users responsible for its own content, supported by an open model of knowledge creation and communication (Grace, 2009). Wikis usually provide editing, indexing, search, monitoring, and analysis functions. There are varying levels of permission granted to prospective editors, from very open to highly restricted (with suggestions for changes going through a process of validation by moderators before they are incorporated into the wiki text).

Blog Entries are made in the style of a journal by a blogger (Sutter, 2009). Apart from providing editing capabilities and commenting by third parties, most blog tools allow other bloggers to link to content in the blog, for the blogger to link to other sites, to maintain an index and archive of content, to maintain links to other blogs, to create searchable indexes, monitor accesses by readers, produce site statistics, and so on.

Really Simple Syndication (RSS) A protocol that allows for the aggregation of changed content from different websites (Sutter, 2009). Applications that include RSS functions (RSS aggregators) maintain links to websites' content. When content changes, it is provided to the reader as a list of headings, often with a short summary. This means the reader does not have to constantly traverse websites to check if they have changed recently.

Social networking This takes many forms and may include file sharing and peer-to-peer networks, post ranking systems, friends lists, social bookmarking and linking, and the

sharing of links, articles, and lists (Sutter, 2009). Essentially, they all provide people with the ability to make and update relationships with others, often through the sharing of things considered valuable or useful.

Mashups "Mashing" together two or more web services or web-based applications (Sutter, 2009). To be successful, provision of an Application Programming Interface (API) is required for other systems to link from. Content can be transformed and mashed together to create new information.

The concept of "Web 2.0 as a platform" serves various groups in differing ways; for example, it is a platform for business, communications for marketing, new media distribution for journalism and entertainment, and software development for developers (O'Reilly, 2005/2009). As such it can be said that Web 2.0 symbolises a cultural phenomenon that Tenenbaum (2006) summarises as a collection of emerging technologies and methodologies making the Web more participatory, semantic, and real-time.

Kim, Yue, Perkins-Hall and Gates (2009) identify six key features that users experience on numerous Web 2.0 applications:

Participation An application or service is designed to improve or facilitate user participation while lowering barriers to use. Examples might include social networking sites, syndication of news feeds, creation and maintenance of blogs, and sharing of media files like photographs and video.

Collaboration Similar to participation, with the distinction that users work together with a common goal or aim in mind. Wikis are a common example.

Social networking Builds on the previous concepts of participation and collaboration: to fulfill social and cultural norms. Social networks are built to facilitate the establishment and maintenance of social connections both in private, public, and work oriented situations.

Rich user experience The success of Web 2.0 applications is closely tied to the ease with which the user can interact, share, and access Web content. Important to the success of this is having a consistent set of tools and functions. These are facilitated by the common use of scripting and programming languages.

Semantics As consistency is important to enable a rich user experience, so it is too for standardisation of terminology. A logically structured system is essential to the success of Web 2.0 technologies to facilitate organisation, management, and relationships between data.

A consistent and logically developed system improves interoperability between systems and platforms.

Interactivity responsiveness With the increase in complexity of web-based applications, there is apparently a proportional drop in waiting time experienced by end-users. AJAX has enabled a more responsive user experience by refreshing only portions of a web page instead the whole page. Added to that, as content is updated on a remote server, the page's content can be updated accordingly too.

A feature of many Web 2.0 applications is the highly distributed way in which data are stored and processed. This has led to the evolution of cloud based architectures and the provision of services via networks that O'Reilly (2005/2009) refers to as the Web 2.0 platform. Iyer and Henderson (2010) describe cloud computing as global, distributed, and service-centric. Where an enterprise can access cloud computing services from anywhere and at anytime and, and where access is via a network-based infrastructure. They classify vendor offerings into an abstracted "stack" with five layers:

> (1) *Infrastructure Level.* Vendors such as Amazon provide basic services like computer processing time to developers. These services operate like dedicated servers with memory. Once a computer process is started, the developer has complete control over its operations and must add necessary processes to it and then terminate it once he or she is done. (2) *Platform as a Service Level.* This level provides a higher level of abstraction that allows developers to build applications without worrying about computer processes. Typically, vendors such as Google and Salesforce.com provide a development environment with a programming language that can be used to create new applications. (3) *Application Level.* Offerings at this level are the most popular in the cloud computing stack. Users can access online services through Google Maps, Salesforce.com, Google Docs, and so on, paying as they go. (4) *Collaboration Level.* The collaboration level is [composed] of a set of applications that focus exclusively on social network applications, such as Facebook, LinkedIn, and others that help build communities and support collaborative work. (5) *Service Level.* This level includes companies that provide consulting and integration services, such as Appirio, Boomi, and Opsource. Iyer and Henderson (2010, pp. 118–119)

Additionally, Mell and Grance (2009) describe how cloud computing may be referenced according to its deployment model. (1) A *public cloud* is generally owned by a large enterprise who on-sells cloud services; (2) a *private cloud* is owned by an enterprise for internally accessed services, although maintenance might be outsourced; (3) in a *community cloud* the infrastructure in ownership is shared, which reflects the nature of the activities associated with it, for example SETI; and (4) the *hybrid cloud* infrastructure is composed of two or more clouds that remain unique entities that are bound together by standardised or proprietary technology for enabling data and application portability. It is possible that the hybrid cloud will emerge to be the most common application, as enterprises find that a single cloud does not meet their needs. .

4.3 Impacts of Web 2.0

Kim et al. (2009) describe changes that have occurred in various parts of society (education, media, culture, the economy, and enterprise functions), which they attribute to new technologies. They make special mention of 'Enterprise 2.0' and how enterprises are incorporating Web 2.0 technologies and principles into their work. They say that enterprises are using social computing tools (wikis, blogs, and virtual communities) to communicate and interact with their employees, customers, business partners, and society as a whole. Examples they cite include the use of wikis in the production of project proposals, manuals, and reports; creating meeting agendas and minutes; doing business analysis and product reviews; brainstorming new ideas; managing information repositories; developing new products; and so on (Murugesan, 2007, cited in Kim et al.). However, Sutter (2009) says that while the social use of Web 2.0 has proven itself popular, the pay-off for the enterprise has been more limited.

The impacts of Web 2.0 in business are classified by Kim et al. (2009) into two broad categories: (1) *Internal business applications* that are related to internal activities and focus on improving business processes by delivering productivity gains, innovation, teamwork and employee relationships, and helping to make better decisions (Murugesan, 2007, cited in 2009). For example, using wikis and blogs to collaborate, tagging schemas to improve knowledge management and search responses, and sharing common interests and responsibilities through social networking. (2) *External business applications:* involving businesses and their customers, suppliers, distributors, and the public. Examples include, using mash-ups to aggregate data

for various sources, improving communications (marketing and customer relationship management) through blog channels and syndicated feeds. Also, using wikis to obtain feedback to identify new product opportunities and other innovations, using social networking applications to locate or investigate new employees, and personalising data output through the use of client selected opt-in preferences on various devices from mobile devices to desktop computers.

Table 4.1[1] shows that the adoption of Web 2.0 technologies in the business sector is being led by large enterprises and that smaller enterprises have invested less although this does not address other means by which enterprises may be accessing Web 2.0 technologies. Table 4.2, shows that the amount of money enterprises are prepared to invest in Web 2.0 technologies has been projected to increase at a steadily increasing rate. However, the amount of money spent on technology is not necessarily a measure of satisfaction or benefit received.

Size	Buying	Considering	Not considering	Sample size
	Values are % and rounded			n =
20,000+	51	12	37	236
5,000–19,999	40	16	44	257
1,000–4,999	41	15	44	510
500–999	33	15	52	226
100–499	26	16	58	481
six–99	20	16	38	519

Table 4.1: Adoption of Web 2.0. *Source: Forrester, cited in Sutter, 2009.*

Technology	Years and projections from 2009 to 2013. Amounts are in millions of USD and rounded.						
	2007	2008	2009	2010	2011	2012	2013
Social networking	149	258	437	701	1,603	1,514	1,997
RSS	78	120	182	262	357	463	563
Blogs	64	118	201	290	341	355	340
Wikis	63	108	177	259	342	410	451
Mash-ups	39	61	98	165	285	458	682
Podcasting	33	50	76	111	158	214	273
Widgets	29	47	75	118	175	250	340
Total	455	764	1,246	1,906	2,721	3,664	4,646

Table 4.2: Global Enterprise Web 2.0 spending. *Source: Forrester, cited in Sutter, 2009.*

[1] Factors that influence these figures are not made clear. While they provide indications of possible change, they cannot be considered as accurate.

Sutter (2009) lists a number of enterprises that have benefited from the implementation of Web 2.0 technologies:

Intuit Recognised that informed users of their products are well disposed to helping other users by forming a community of power users to aid in answering questions and providing expert assistance to other Intuit customers. The company found that the cost of servicing these customers was reduced. In addition, the community serves as an evangelical group, promoting solutions and techniques using Intuit products.

Texas Instruments Instead of having an expensive call centre to maintain, the company uses collaborative facilities to help engineers at those times when they need to find answers to questions and problems. The solutions to common problems are then shared throughout the user community.

IBM Has deployed a social networking capability in place of the traditional phone book and locator system. In addition to serving as a reference for contact information, this "Facebook-like" facility enables people to share areas of interest, expertise, and work experience with colleagues throughout the firm.

Dell States that $3 million of its 2009 computer revenue was attributed to Twitter.

Grace (2009) identifies four principal challenges an enterprise may face when implementing Web 2.0 technologies and in particular, corporate wikis:

Security The wiki environment, unless it is closely moderated, represents a high level of freedom and flexibility. To ensure that such openness does not present a threat to the enterprise it usually falls to someone to monitor the wikis. The nominated person needs to check that content does not pose legal, regulatory, or competitive problems for the enterprise.

Access to wikis needs to be controlled to protect sensitive information but the level of access given to individuals must also be considered. Therefore, it serves the enterprise well to adopt written policies and guidelines for staff and to help them make decisions on what should be included or excluded from a wiki.

These same issues apply to any other form of Web 2.0 technology in which content is created.

Data migration Web 2.0 uses a range of languages and technologies. If corporate data are to be included in Web 2.0 applications then the enterprise must consider the implications of

transforming existing data through what may be relatively untested systems that are in a state of perpetual beta.

Training issues There are various levels of existing knowledge and skill in terms of computer literacy, but the issue is the level familiarity of the user has while using a web-based environment, as opposed to an application program-centric approach to Work.

Categorisation of information Folksonomies in wikis provide the notion that employees can make decisions about the structure and categorisation of explicit and tacit knowledge. Categories are often based on natural language and their choice is subjective. If categories are developed without discrimination into an inconsistent application of a schema of knowledge, then the result will be a meaningless jumble of irrelevant terms. Irrelevant, that is, to anyone who was not directly involved in the classification of the knowledge.

Socially, the impact of Web 2.0 has been limited by the opportunities of individuals to access the Internet. Kim et al. (2009) claim that individuals who have access also participated and interacted on a globally social scale and that this has changed them into producers and consumers of locally created and publicly marketed art forms, merchandise, and information. They go on to say that the requirement for an agent to act on their behalf is reduced, and that class and social standing have less influence. Indeed, they go so far as to claim that business models have changed worldwide. While it may be true that some specific business models around the world have changed, it does not therefore mean that the whole of the business environment has also changed and so one must consider that, the overall impact of Web 2.0 is confined to those who have access.

Access through social networking sites appears to allow greater facility for keeping in touch with friends and family by exchanging messages and media files such as photographs, video, sound files, and other documents (Kim et al., 2009). News organisations are able to quickly update and post news stories but at the same time, governmental and non-governmental organisations are able to post propaganda that are retrieved and disseminated equally well. However, in the online social community, individuals are often able to influence policies and standards even though they may not have the final say. On the downside, questions exist as to the degree to which personal privacy, identity, and ownership are lost. Also brought into question is the use to which information that is voluntarily submitted is applied, and it needs to be remembered that data is often permanently stored so images and comments can return to haunt the individual.

4.4 Cases

The cases of enterprises that have implemented Web 2.0 technologies in this section present rationales for choosing Web 2.0 technologies, design and implementation processes, issues that arose, and what benefits were received. Three of the cases involve large enterprises: Farm Credit Canada (§4.4.1), IBM (§4.4.2), and British Telecom (§4.4.3). The fourth case (§4.4.4) illustrates a small scale experiment of guided collaboration. In each case the adoption of Web 2.0 technologies has accompanied changes to workers' work practices, although they have not all expressed how changes to work practices were received by their workers. Currently, research is focussed on how Web 2.0 affects the enterprise and especially its bottom-line margins and productivity rather than the people who work in them.

Note that the Farm Credit Canada case (§4.4.1) details changes that occurred during and from the design and implementation of new technologies at the infrastructure and platforms levels, whilst incorporating a distributed computing model. The IBM (§4.4.2), British Telecom (§4.4.3) and the 'shoemaker's children' (§4.4.4) cases more specifically relate to Web 2.0 deployments. The broad spectrum of cases reflects the breadth of the thesis.

4.4.1 Farm Credit Canada

H. A. Smith and McKeen (2008) report on the Services Oriented Architecture (SOA) at Farm Credit Canada (FCC). FCC is a 50 year old national lending institution that focusses on the agricultural sector. It is based in Regina, Saskatchewan, western Canada. The enterprise derives its business from lending to primary producers and food processors through each stage of the business lifecycle, offering a range of finance products and services. It operates 100 field offices across Canada, employing around 1200 staff. Competition comes mostly from banks and credit unions that service the agricultural sector.

Due to rapid growth FCC, found their current technology deployments were no longer able to support the company. In 2002, FCC embarked on a course to change its IT function from an "application-centric" orientation to a "services-centred" architecture, following a six-step process. The transformation of the enterprise had the goals of building its agricultural knowledge, making its sales-force more available, improving cross-channel interaction, and defining standards for customer interaction. Key to its success was the development of a SOA.

Step 1 of the transformation involved implementing new cultural practices that were designed to get culture, process, and technology to work together. The enterprise's executives took specialised training for accountability and practices. These were then demonstrated to staff and subsequently rolled out to all staff by spring 2006.

While the cultural transformation initiative was underway *step 2* was initiated. This involved creating improved customer experiences. The CEO, Tom Ryan, recognised that technology had the potential to resolve the company's problems, although he did receive resistance. In particular, IT functions were not well integrated and as a department, IT was seen as an impediment to the technological aspirations of business units. To get past this a business/IT committee was formed and tasked with finding out what technology would be required, what to do first, and to ensure that all initiatives under the new corporate strategy would be integrated appropriately. The committee was led by the Director of e-business.

A serious problem emerged, that the company had initiated $40 million worth of projects and there was no one managing their integration. The committee admitted defeat and recommended that a dedicated team be required to address the issues. In January 2004, the Enterprise Integration Program (EIP) was launched to find the best approach to achieving integration. The success of the EIP was dependent upon the support of the project sponsor, the CEO, particularly to ensure that individual business units did not interfere by lobbying for their projects. The programme leader gathered a team of business and IT staff that worked to establish issues and key inhibitors to future growth.

Key inhibitors to the future growth of FCC were found to be that the enterprise had a systems-driven approach to process design that produced cumbersome processes that worked around the functionality of the systems, rather than achieving what was required by the enterprise, there was a lack of enterprise-wide integration, and the now cumbersome processes had too much low-value-added work. Another area of serious concern was that while business-unit leaders knew what they wanted from their systems individually, there seemed to be no-one who had a whole of enterprise understanding of how it would all fit together. This redefined the integration issue from being an IT problem to a business problem.

Before any work could be undertaken, it became obvious that the first task was to understand FCC's entire enterprise value chain and related business processes. The technical issues presented were, in effect, there because there had been insufficient governance and this needed to be addressed. The programme leader set about developing a methodology to expand

and clarify key strategic drivers that the CEO had already identified. When completed, the programme leader's team set about identifying processes that were in place; these were then mapped to the current-state enterprise value chain and processes.

Subject matter experts were enlisted to review the business processes in workshops. During the workshops, it was found that customers' experiences were inconsistent across delivery channels: there were different people doing the same things under different roles and that accurate reporting was difficult. Perhaps what was more important was that the workshops enabled the EIP team to define more clearly, what it was that the corporation wanted. In particular, these were greater process transparency and better process consistency. To achieve this, it appeared that a portal to guide workers through required tasks and provide the necessary information for them to complete their work was desirable.

After successfully demonstrating that significant changes were required to how the corporation made decisions about its IT governance, the EIP team were given the mandate to proceed with their investigation until all recommendations were completed. This resulted in six principles to guide future business architecture at FCC:

1. The ability to cross-sell a full portfolio of products and services across channels.
2. Consistency of customer experience across channels, incorporating formal and informal customer feedback.
3. Enterprise value-chain-based process redesign and transparency to speed learning and increase effectiveness.
4. A single user-centric interface to aggregate functionality from multiple systems.
5. The exposure of process and context-specific knowledge (about products and customers), skills modules, and explicit policy, at the point of need.
6. Automated business rules and workflows designed for audit and reporting.

H. A. Smith and McKeen (2008, pp. 64–75)

Then a gap analysis was undertaken to identify strength and problem areas, leading to a preliminary road map.

Step 3 involved the transformation of the IT organisation, so that it could better support the planned enterprise integration. There was no doubting that the IT department had become less and less effective for a number of reasons and that there were significant tensions between the department and the business units. The transformation was conducted via a process of identifying the current state of the corporate IT structure and designing the future state

model. From that process, it was decided that an SOA would best meet corporate objectives. With its distribution across the North American continent, FCC is especially suited to a set of architecture principles for combining loosely linked, but interoperable services that could be recombined to provide process oriented functions such as adding customer billing details, performing credit checks, and so on. Due to its distributed nature, these services would be provided to FCC staff working in business units, using a web-based portal.

The new model has four features:

1. The only permanent staff would be those in senior, high-leverage, and strategic positions. Operational positions, those that only require commodity skills, would be sourced through contractors and consultants.
2. IT would be funded more appropriately through a new funding model. In the new model, funds are aggregated under the corporation and business units must compete for them. To gain funds, they must satisfy a scoring system used by the IT Steering Committee.
3. A new process-centric governance framework, overlaid over functional departments. Three macro-business processes were identified, each with an executive process-owner: (1) pre-sale, (2) purchase, and (3) post-sale.

   Subsequent sub-processes of the macro-business processes were defined, developed, and IT applications mapped to them. For example, customer and loan management and partner and channel platforms. These overlay the functional departments.
4. The separation of business and IT meant that roles and accountabilities were defined.

A proof of concept occurred as *step 4* by implementing the "loan renewal process." Previously, there had been no consistent process and the staffs were required to access up to five separate systems to find information to complete a loan renewal application. This earlier version of the process required that every account manager do their work differently and therefore, there were often errors in the process and a long learning curve for staff.

H. A. Smith and McKeen (2008) report that the new loan renewal process was to use a user interface that was tailored to meet the needs of the individual user. Within the interface, processes were structured such that users were guided simplified and streamlined business process steps. "For example, should a customer question the need for an additional credit check, the agent can simply click on 'policies and procedures' and learn why it is required and then explain this to the customer. 'This has proven to be a great just-in-time learning aid for newer employees' " (2008, p.80).

The roll out to the corporation of the remainder of the systems, *step 5,* has required further planning and adjustments to the design schedule with new resource functions having to be taken on such as staff training, and re-presenting the rationale to staff. The whole process has been ongoing, rather than being taken in one giant leap.

Ultimately, FCC acknowledged six main benefits (*step 6*):

1. Improved and more effective communication between business units and the IT department. "Business managers focus on processes while IT managers focus on enabling them with technology — and these clearly articulated roles promote effective and productive communication" (H. A. Smith & McKeen, 2008, p. 82).
2. The business processes have been streamlined. While the transition is not always smooth, there is now discussion about how each technology can support the work practices required.
3. IT assets developed for the proof of concept have been reused.
4. The successful proof of concept has achieved support for the long-term vision of the enterprise-wide transformation.
5. The successful proof of concept has proven the technical viability of SOA.
6. Finally, as at 2007, five major purchase and post-sale processes are being redesigned. For both of them, the IT infrastructure and business sub-processes are being renovated. It is expected that this redevelopment project will continue until the end of 2011.

4.4.2 IBM

Majchrzak et al. (2009) report on social networking applications within IBM. They use the term "corporate social networking" as the use of technology to help employees identify who knows what, who is interested in what, and what it is they want to contribute to. This is undertaken in the interest of furthering the business of the firm.

The principal reason that IBM has implemented social networking tools was to keep its huge number of employees connected. IBM has more than 380,000 employees, of whom more than 50% are mobile, and 200,000 contractors in 170 countries at 2,000 locations. Since 2002, it has made 70 acquisitions meaning that 50% of its employees have less than five years experience with the company.

Another major cause for the adoption of social networking tools is changing demographics in the company. There are three distinct generations or workers: mature workers who feel

comfortable with using email as their main means of communication, mid-career workers comfortable with using instant messaging, and new generation workers who are not only comfortable with using social networking tools but come with the expectation that they can use those tools to connect with others. Social networking tools were adopted to bridge the generational gap between the newest and more senior workers.

Majchrzak et al. (2009) say that the most important motivator for the adoption of social networking tools was that they facilitate innovation through collaboration, and that is a key strategic and tactical driver for the company. The tools enable collaboration across time, distance, function, and interests.

IBM has implemented a variety of tools that facilitate mass collaboration and Majchrzak et al. (2009) discuss three: ThinkPlace, SmallBlue, and Beehive.

Launched in the third quarter of 2005, *ThinkPlace* is an intranet forum where ideas can be suggested, commented on, modified, and rated. An open and transparent environment allows for the rapid development and deployment of solutions. "IBMers world-wide can submit ideas for how to improve any business, consulting, administrative, or engineering process; go after a market opportunity; or even address a societal challenge" (Majchrzak et al., 2009). Administration is taken care of by a few dedicated people who are assisted by volunteers who browse the ideas posted to see which ones are worthy of merit. The measure of worthiness is based on comments that have been posted, how the ideas have rated through scoring, and how it has morphed into something that can be implemented. Additionally, data mining tools monitor ratings and comments to identify promising ideas. The selected ideas are then put through a formal review process where human "innovation catalysts" help to carry the idea forward by bringing them to the attention of those in IBM who have the necessary expertise or resources to implement them.

Since its launch, ThinkPlace has attracted more than 160,000 users. More than 18,000 ideas have been generated, of these more than 350 have been adopted and had an impact of over $500 million in various ways, of which 52% introduced time saving improvements, 44% made cultural improvement, 29% focussed on cost savings, and 17% targeted new revenue opportunities. The largest impact has been from small and inexpensive ideas that could be implemented without significant cost.

Initial concerns when ThinkPlace was launched were focussed on it becoming a platform for complaints or personal frustrations. While these appeared, they were responded to quickly by

other users of the system by, for example, directing complainants to where they could resolve their issues. To encourage the posting of value-added comments, IBM established an Innovator Award of up to $10,000 that would be awarded to individuals or teams who have been able to implement ideas that also delivered the highest business value.

ThinkPlace has continued to evolve since its launch. In 2008, ThinkPlace Next was launched, improving idea pipeline management using visualisations that enabled repeat users and catalysts to be more effective in their role. ThinkPlace Next also integrates IBM's other social networking tools through plug-ins, extensions, and widgets.

SmallBlue is an opt-in social network analysis tool. It is designed to provide business intelligence by reporting on who knows who and what they know about them. This enables employees to visualise their networks of connections within IBM by analysing non-private and non-confidential email and instant message transcripts. Linkages are identified and relative expertise is then inferred when an employee conducts a search on keywords. The use of SmallBlue has shown that when an employee conducts an analysis in selected topics, they also breed new connections.

SmallBlue provides a relatively simple interface with four views. The "find" view allows the employee to search for people with specific knowledge or skills. The search parameters include lines of business, country, and degrees of separation in their personal network. The "net" view presents a visualisation of the search results based around the topic and key influencers and brokers. The "reach" view is used to validate a person's level of expertise by taking into consideration what they have posted about themselves (in the BluePages), the communities they belong to, and recent postings they have made. The "ego" view presents a visualisation of the individual employee's social network and the social capital of each of their contacts ("social capital" is the number of new contacts that the employee can be introduced to through direct connection via their contacts' links). This view is private to the employee only.

Beehive, launched in September 2007, is similar to other public social networking sites like Facebook and MySpace. IBM staff has found this useful to make contact with people who, for no other reason, they might not have contacted. They say this has had a humanising influence on the workplace, enabling them to advance their corporate careers, and helping in the promotion of their own projects. Beehive provides functions that include picture facts, offers of invitations to events, visualising of connections, posting personal photographs, and any textual information the employee chooses to post about themselves.

The intention of Beehive is to encourage IBM staff to consider that they are part of a small community. To facilitate this perception Beehive includes top-five lists that let people choose their favourite things like "5 things I like about my job," "5 things I am reading," and "5 favourite websites." While it was assumed that people would only post about work when Beehive was rolled out, it turns out that people post about both work and non-work related items. Since its launch, Beehive has attracted 50,998 registered users (as at January 2009). Engineers constitute 27%, VPs and directors, 10%.

Majchrzak et al. (2009) say what factors that have contributed to the success of social networking tools at IBM are. (1) That the role of the CIO requires a business focus and is a role that is rotated on a two–three year cycle, and having a business focus means that the role is not so tied to technology. (2) The degree to which the Internet has been integrated into how people work at IBM so that there was little to change in peoples' work habits. (3) A culture focussed on employee outcomes, in particular innovation, rather than monitoring activities (the amount of time spent on posting in ThinkPlace or developing one's Beehive are not considered as unproductive). (4) Social networking has been integrated into IBMs core business strategy with a focus on innovation through mass collaboration.

4.4.3 British Telecom

Dennison (2007) reports on the implementation of social media tools at British Telecom (BT) where around 4000 employees joined a Facebook group called BT. This came after a web "liberalisation" project by BT, which ensured that employees would be able to access social media tools.

There was initial resistance from BT's human resources, security and legal policy makers because the promoters of social media in BT announced that social media would change everything people did. The reaction of the policy makers was, understandably, a mix of fear and uncertainty. However, upon reflection the promoters recognised that social media tools actually offer nothing that is particularly new, being mostly just content management systems. Rather, they are differentiated from their predecessors by being intuitive and simple, offering no technical barriers to participation, and reflecting social behaviour rather than creating a distorted version of it, and at this time they are fashionable.

Usage and abuse patterns also closely reflect previous experiences on the Internet and intranets, so the tools were already covered by BT's policies. To ensure compliance with policy,

it was decided that tools that allowed user-generated content would be via BT's single-sign-on application to ensure that there could be no anonymous publishing. This supported the principle that people would be held accountable for whatever they said, internally or publicly. While the principle supports notions of democracy and self-determination, in practice allowing staff to make comment about BT was not supported by policy.

Two issues needed to be addressed. Should staff be allowed to make comment both internally and externally? Permission was granted in respect of the first issue in August 2006 by the BT Communications Council, allowing staff to make comment internally. It was only after the development of a nine-point action plan that included reviews of who had already been blogging, what bloggers were saying about BT, and what peer organisations were also doing, that permission was subsequently given in January 2007 for the second issue, so that external comments could also be made. What swayed the council was the support given to the project by the CEO.

At the same time that negotiations around policy were undertaken, a pilot using JotBox to build some social media tools was deployed on the BT intranet. The pilots were a low cost, low commitment test to see whether BT staff would make use of social media tools. The pilots were not publicised: people were allowed to find the tools then tell others.

Initially, there were three applications: a wiki called BTpedia that allowed any BT staff member to post or edit articles, a blogging tool, and a social media tool called MyPages. Within weeks, there were several hundred articles in the wiki and around 300 blogs. MyPages allowed a staff member to create web pages that others could edit like a wiki, set up photo sharing pages and file storage, set up wiki calendars, create blogs, and a linking function that permitted them to link to 'friends.' The success of MyPages as a tool was centred on its functionality being managed through a single portal. MyPages proved to be even more successful than the other tools, with over 1,500 active users in only a couple of weeks. Indeed, it was so successful that JotBox collapsed.

Google subsequently bought JotBox and offered a revision that differed in the way that BT had implemented it. That, and the way in which the application was initially deployed, meant that the tools were no longer sustainable. During the following six months, the IT department changed their policy on Open Source. This meant that the social tools promoters were able to trial alternative tools, such as WordPress, Mediawiki, Confluence, and SharePoint 2007.

The impact on BT's intranet has been variable. Postings have become the property of the community and internal communications consultants have had to let go control. That includes where and how they are expected to work. For example, Dennison (2007) says that communications have become a 'conversation,' rather than a managed activity requiring a different type of engagement by those traditionally responsible for communications activity. There are questions about governance and ownership of content that need to be answered. Whereas previously, content owned by one person could be managed by them, community ownership presents different questions. Who takes responsibility for management, archiving, or deletion of content when no one person owns it? What governance model needs to be applied?

Contrary to reservations that were expressed previously, BT staff used the channels provided to them in a positive way. Management and communications teams still hold people accountable for what they say, but mostly, staff responded to being trusted.

From a different viewpoint, how people access information is also changing. Social media tools add a layer of complexity by allowing unstructured data to be posted. How people then extract value from all the information becomes increasingly difficult. Tagging information helps people to categorise posts and the use of RSS feeds alerts readers to new content. For staff who have been used to reading only structured information, this has posed quite a challenge in itself and how they behave has been caused to change.

The principal lesson learned from this exercise has been to concentrate on the value that social media tools can bring to the organisation and not the risks. Starting small has allowed BT to adapt and offer tools that people want to use, and to remove tools that were not being used. Offering tools as soon as they were available, in beta form, allowed the users to decide early on whether they wanted them or not.

Another important lesson learned was that policy makers need to have a hand in the process early on. They need to understand that social media tools are an evolutionary process and that they will not dramatically change the working environment, rather that the tools already exist in the enterprise and that this is just another application of them like the content management systems.

"Finally, have realistic expectations about what you can achieve — the Intranet and the Internet are different beasts. Much of what makes social media successful on the internet does not directly translate to the corporate environment. For example, a cornerstone of social media on the Internet is the concept of the 'wisdom of crowds' — i.e. if you have a large

enough body of people collaborating on a single topic, you will distil the 'truth' from them. Does the wisdom of crowds work with a smaller population of people, or will the result be unbalanced opinion rather than 'truth'?" (Dennison, 2007).

4.4.4 The shoemaker's children

Kane and Fichman (2009) argue that Web 2.0 tools, specifically wikis, have begun to influence business and knowledge sharing practices in many organisations. Specifically, they claim that since insufficient time has been made to the consideration of whether these technologies may provide opportunities for researchers to reform their practices and then, they say, the IS discipline needs to engage in a process of self-reflection on how Web 2.0 tools can allow a researcher to change their core processes. They also call for a series of experiments regarding how a researcher might adopt Web 2.0 technologies in their practice.

The title, in reference to the shoemaker's children, draws a parallel between the children of a shoemaker who have no shoes of their own and researchers of Web 2.0 technologies who do not take what they have learned and apply those lessons to their own work practices. It is from this basis that Kane and Fichman make their claim.

The authors suggest using wikis as a research environment that can provide both quantitative and qualitative data because its history is traceable. When used in a collaborative exercise, it can be used to uncover roles of breadth and depth in discussion threads within the social construction of meaning for groups, textual data can be analysed with automated tools, theories of knowledge evolution and collaborative behaviour can be tested. Then motivations for contributions relative to various types of content are addressed. Kane and Fichman also suggest that wikis could be an appropriate medium for peer review and publication or articles that in this report, becomes a major theme for them to pursue.

Kane and Fichman take issue with the current peer review process that they say, while largely automated and online, still follows the previous paper-based process. Online databases have replaced physical storage of manuscripts and electronic distribution has replaced physical mail.

> Authors often voice complaints about the number and length of review cycles required to reach a final decision on a paper at top IS journals. Reviewers are often overworked, needing to formulate an independent recommendation on a paper

> but also provide constructive feedback without knowing what the editor's ultimate decision will be. Editors must assemble often disparate reviewer opinions into a singular decision letter (and recommended revision strategy) without knowing whether the recommended strategy will satisfy all of the reviewers and whether this guidance might even create unforeseen problems. Authors' perceptions that the review process may be somewhat arbitrary may lead them to shop a manuscript from journal to journal, with too little effort made to incorporate the suggestions from previous review teams. Further magnifying these challenges are the rapid increase in submissions in recent years to top journals, such as MIS *Quarterly* and *Information Systems Research.* We worry about the potential for a dysfunctional feedback loop at the top IS journals, where increasingly overworked review teams perform less effective reviews, leading to more rounds of review and more manuscript shopping, resulting in ever greater demands on editors and reviewers.
>
> Kane and Fichman (2009, p. 7)

They say that there are three factors that are hampering the review process: a linear, "waterfall" approach to completing review tasks, excessive compartmentalisation of communication between different actors, and a general lack of transparency in the whole process. Instead, they suggest two periods of anonymous interactivity between members of a review team. Only the editor would know who is posting what. The first period would be initiated by the editor and involve the reviewers discussing cases that might be considered for "revise and resubmit." The reviewers would be invited to comment on the reports of others and their own. The second period would be an open dialogue between the authors and the review team. The entire review package would be posted as wiki pages and authors would be invited to engage in a critique with the review team. "Authors could use this opportunity to seek clarification on criticisms of the manuscript or recommended remedies, to argue for the validity of what they have done, or to seek feedback on candidate revision strategies" (Kane & Fichman, 2009, p. 7). Following this, the editor can choose the best action to take.

The benefits of this strategy, Kane and Fichman say, would be to allow editors to make better informed decisions. If reviewers can respond to each other's comments, then the period of open dialogue, in deciding whether to accept the submission for publication and what might be suggested for improvement, is a better use of the reviewers' time. The interactive nature of

the process would allow the editor to leverage the social nature of the environment to improve the review process as a whole.

On the other side of the consideration, Kane and Fichman present possible problems that might face a wiki-based review. (1) They say that review process would require energy and effort by all the stakeholders in the review process. The energy and effort consumed would not guarantee that the review process will improve for the future and there is no direct reward to the extra effort on the part of reviewers. (2) There is no guarantee that the wiki-based review process will net a positive gain. It is quite possible for a dysfunctional team to produce poor results and it would be incumbent upon the editor to resolve issues. (3) Unforeseen changes to the review process may occur, resulting in potentially undesirable consequences. (4) The authors believe that interactivity will decrease the workload of the review team if they are able to remove a review round from the process. However, this may be offset by having longer review stages. Presently the reviewer can choose when it is most convenient for them to conduct their review, whereas the new process would require a much tighter window of application.

4.5 Conclusion

In chapter 4, cases that illustrate the deployment of Web 2.0 technologies are offered as evidence for subsequent chapters. The chapter provides an overview of Web 2.0, as it is presently understood.

In chapter 5, the notion of Work is described in detail and as part of that, the cases in chapter 4 are presented to illustrate practical implications of Web 2.0 adoption by the enterprise. The range of cases in chapter 4 shows that the effect of the adoption of Web 2.0 in the workplace is broad. How such effects are measured, is dependent upon the definition of the Web 2.0 technology that has been implemented. In each case, differing measures have been applied, but they all show that impact of Web 2.0 deployment is marked.

In chapter 5, Work is defined as an objective notion: as purposeful directed action and a property of the natural being of the person. It will be shown that Work serves to fulfill a largely economic role in the life of the person, but that the benefit that Work provides extends well beyond base economic requirements. It will be shown that Work provides social and moral sustenance to the person and that the person needs to belong to something purposeful, useful, and creative.

Chapter 5

The notion of Work

5.1 Introduction

Anderson (1964) and Masaryk (1938/1971) say that it is the manner in which the members of the working collective apply themselves in Work that sets the tone for how they live their lives, and this discloses their lives to themselves. Society learns about itself by seeing how it is that the members of society work and this brings into question the ends that workers work to achieve. Work is such a core component of the lives of all of society's members that any individual may be forgiven for not questioning its presence, however I suggest that for as long as the human has been capable of rational thought, they have directed that thought and associated action towards expressions of social status, aspirations, desires, and goals. Since that time when the human emerged from its cave of darkened ignorance, the notion of Work has resided as an urge in humanity to fulfil its perceived potential through acts. The notion of Work, therefore, is that it is purposeful directed action.

In chapter 5, the notion of Work is presented as purposeful directed action and is a property of the natural being of the person. The factors and reasons that define Work vary. In §5.2, Work is the effort required to transform things in a natural or raw state into things that we want or desire. These then have a tradable value but as a role, Tannenbaum (1952) says, Work has social and moral values too. The argument is presented that Work is a means of support for economic gain, a sense of fulfilment, the facilitation of life, and the legitimisation of religious doctrine or some other utopian ideal. It is part of the worker's being, naturally so, intertwining them in the industry of which they are a part. In §5.3, I argue that when the person is reduced to

an economic unit or human resource to be exploited, and then the person is separated from the beingness of their creative itself. Further, I argue that the separation of the natural state of the person from its abstracted form, the symbolic worker, prevents engagement in which the person finds their true expression. The objectification of the person of the worker provides the conditions for exploitation through the application of the principles of Scientific Management.

The notion of action is presented in §5.4. The discussion starts by distinguishing between the person and their act, and that action is the embodiment of the person's intention to produce, but the actions of the person are roles that they play. Thus, that which is produced because of the action of a person who is fulfilling their role is regarded as a cultural artefact. Information systems are regarded in this context as cultural artefacts with the added dimension that they also emulate the human act. It is argued then, that information systems are designed to assist in the resolution of human problems and they do so by emulating aspects of the human act. However, the issues raised in this section result in questions about whether information systems that are designed to assist the person to resolve problems might also effect changes in the nature of the person too.

Dewey (1938) offers a means to answer the questions raised in §5.4 by considering whether or how the human has changed since the time of the ancient Greeks. The discussion in §5.5 focusses on those attributes of the person that change over time and how such changes may be observed. The section concludes with the observation that, unlike in Dewey's time, institutions are bent on shaping cultural and social attributes through various means.

Work is then considered within the context of the modern technology, Web 2.0, in §5.6. Web 2.0, represents a cultural artefact such as that described in §5.4. There is a distinction drawn between Web 2.0 and the Semantic Web to lay down the technological context that has influenced organisational decision making processes through the application of, for example, Services Oriented Architectures and Software as a Service. Other issues facing enterprises that are addressed in this section include the maximisation of resource use against cost. It is argued that the reliance on information systems which are difficult and costly to change once implemented, creates an impediment to organisational responsiveness. The effect of the adoption of Web 2.0 technologies in the enterprise is at present, not well understood. However, some cases are reasonably well documented. These are discussed, highlighting the potential for positive change in the enterprise and the limitation of negative effects.

The chapter concludes in §5.7, drawing together the arguments from the previous sections with the conclusion that information systems recognised as Web 2.0, are cultural artefacts that are expressions of the desire existing in the person to communicate, joined with others of their own species. The somewhat unstructured and uncontrolled environment of the social networking scene mirrors a social milieu that is supportive, confirming, open, and in essence, reflects attributes that are found in human nature.

In chapter 5, a working notion of Work is: that Work is purposeful directed action, with expressions that arise from its property of rationality and purpose.[1] Amongst others, the human expression of Work has as its appearance a sense of social status and aspiration. However, humanity is the composition of individuals, thus it stands that as purpose changes, so too does Work. As Work changes, so too do its sense of fulfilment, aspiration, and purpose. Thus, the argument in §5.2 is that a person's reason to begin Work entails multiple criteria, and that the world in which the any person lives exists within the confines of an economic model. The internal and external pressures of selection determines the nature of a person's Work and to understand the notion of Work, one must see it as a means towards achieving some goal, not as a haphazard idle through space and time. This argument is reflected in the way that, for example, information systems are designed.[2] Additionally, when work is undertaken, the use of energy is gradual. Not all of the content of one's energy reserves are expended at once, because the expression of activity involves time and space. In many cases, activities are repetitive and while these may be mundane and offer little stimulation, they must still be done. In many systems design projects, repetitive activities are targeted as opportunities for automation: removing them from the work schedules of workers. However, just as nature tends to present new and different obstacles that require new and different solutions, when activities have been automated or otherwise removed from the work schedule, others appear and take their place.[3]

In chapter 5, philosophical positions are set against others to establish constants in the appearance of Work. For example, Utilitarianism provides a rationale for working that is tied both to a protestant conception of nature that it is something to be overcome and controlled, that to put oneself to Work is evidence of one's adherence to religious doctrine and performance of one's social duty, and that the worker's role is tied to a strictly defined social order. To Work, in the Utilitarian context provides a social good and the more Work that is undertaken, the

[1] 99:7–99:14. 108:15–108:17. 111:16–111:23.
[2] 105:1–105:7.
[3] 108:21–109:4.

greater the benefit for society as a whole.[4] I argue that Utilitarianism combined with science provided a philosophical basis for productionism. In another example, while conflicts between the philosophies of Smith, Rousseau, Jünger, Heidegger, Masaryk, Taylor, Tannenbaum, Locke, Marx, and Engels exist. I argue that the ends for Work are consistent.[5]

The juggernaut is presented in chapter 2. In chapter 5, the concept is advanced and I argue that humanity has lost sight of the reason that technology existed. Technology has become the means and the end, where the reference to the juggernaut posits that humanity is now part of technology. The juggernaut is the compound of humanity,[6] thus humanity, combined with the technology it has created, also comprises the means.[7]

In chapter 1, Work is presented objectively and subjectively. In chapter 2, the concept of abstraction is addressed. In chapter 5, these approaches are applied as a pragmatist notion of Work, where Work is an epistemic object, such that theory must not deny the metaphysical properties of the person.[8] Additionally, the notion of artificiality is introduced in chapter 5 as a new argument, in which artificiality is an imitation of reality and since some thing is made in imitation, it can then be used and applied in varying ways.[9] Where artifice is a means of production,[10,11] then production is spatiotemporally defined and Work is the action of producing.[12] An illustration offered is the information system: the information system is artificial, from the standpoint that it is built in imitation of the human act. That is, information systems perform activities and tasks that would previously have been undertaken by a person. Information systems, as technology, are designed from some purpose and according to sets of rules and where these attributes are quantitative.[13]

I extend the argument, in which Peirce's pragmatism maxim suggests that the validation of the design of information systems ought to be tested against all factors that were incorporated in the initial design stage.[14] Knowledge of the existence of the information system provides

[4] 106:16–106:18. 107:26–108:2.
[5] 106:26–106:29.
[6] See §1.4.
[7] 108:3–108:6. 109:5–109:5.
[8] 109:7–109:15. 110:12–110:16.
[9] 110:1–110:9.
[10] Creating the artificial entails selecting properties for exclusion. While time moves on, an environment changes. Thus, when the artificial is brought back into nature's environment, it is sometimes difficult to reconcile artificiality with the new environment. To accommodate the disjuncture between the artificial and the changed environment, efforts are made to rationalise about the distinctions by, for example, calling the variances 'cultural.' This provides justification for their inclusion.
[11] 111:26–111:31.112:1–112:3.
[12] 109:20–109:22.
[13] 110:17–110:22.
[14] See §1.8. 110:23–111:5. 24:23–24:23.

evidence that it not only exists, but that the observer is part of the environment in which the information system exists. Therefore, testing all parts of the information system entails the inclusion of its environment, including the observer. The observer is irrevocably connected to the information system. As the observer makes changes, changes are effected in the observer. This creates a distinction between theory and practice: objects of knowledge can exist outside environmental effects, but objects in nature cannot escape. Doctrine exists outside spatiotemporal confines and is the reason why Dewey warns that objects of knowledge must also pass the test of common sense.[15]

In chapter 5, a second new argument is presented: that the world of nature has mechanism but while this allows nature to be observable and predictable (to a degree), it is often seemingly irrational.[16] Mechanism is often complex and not easy to discern *in situ*, so science observes from outside the natural environment to facilitate clarity of understanding. That is, to remove an object from its complex set of relationships provides the opportunity to build rationality. The problem with taking *ex situ* observations is that even then; environmental factors cannot be completely removed. Often, observations of phenomena vary as a result and it is necessary to identify common effects from experimentation.[17] In the field of IS, observations of phenomena from other fields are commonly applied in the design of information systems. The application of objective knowledge from various epistemic foundations is fraught with complicating issues that arise from competing and conflicting requirements for adaption and change, from various artificialities, to one continuously changing reality.[18] I find some agreement with Nietzsche's argument: that the purpose of humanity is to satisfy the Will to Will. I contend that the person has choice, but it is when their Will is of the same kind as that of the technological system that they may choose only those options that are allowed by the system. For the person who submits to the greater power of the system, they will find they no longer have choice.[19] When the person is reduced to the status of artificiality, then the person may be steered and the technological system provides the cybernetic authority. The person who is thus steered has abdicated their sense of self.[20]

[15] 111:12–111:15. 116:17–116:20.
[16] 112:7–112:16.
[17] 112:17–112:24.
[18] 112:25–112:32.
[19] 118:21–118:26.
[20] 118:27–119:4.

A third new argument is presented in chapter 5: that systems tend toward entropy.[21] I assert that the manner in which information systems are designed preclude the possibility or ease of alteration or change. Alteration or change may be either at the system or enterprise level. A second resistor to alteration or change is preservationist thinking: that which provides for a stable and predictable systems environment. A third resistor to alteration or change is the perceived need for security that *in reductio*, can only be achieved in a hermetic system. In other realities, there exist variances in levels of security and increasing levels of security increases entropy. The subsequent effect that these influences have on the enterprise is to stymie growth, reactivity to external pressures, and responsiveness.

A fourth new argument in chapter 5 extends Nietzsche's argument of the Will to Will: that the knowledge worker produces information for the sake of producing more information, but information has connections to both itself and the natural world (where it is referential). In cases where information references people: information production that does not take into account the requirement for ethical use is a threat to confidentiality and security. However, as information production outstrips ethical deliberations, levels of acceptability have varied and the widespread nature of change signals a cultural shift.[22]

A fifth new argument in chapter 5 states that one must seek for one's humanity inside the technological system: to bend the system to the will of the human.[23] The view that humanity is not a perpetual victim of the industrial system conveys the attitude that humanity will not be held back from what it chooses for itself. Web 2.0 provides mechanism for humanity to subversively regain its Dasein, inside the system.[24] Not all humanity has given away its beingness. The expressive quality of the person, its creativity, cannot be extinguished because it is a property of humanity.[25]

5.2 What Work means to the person

It is easy, when considering the subject of Work to branch off into discussions of economic theory, such as the notion that at one time the labour theory of value was attributed to goods (for example Ricardo, 1821/1999; Marx & Engels, 1998). However, while I do not intend to be thus

[21] 115:3–115:15. 115:18–115:19.
[22] 115:27–115:30.
[23] 117:27–118:2.
[24] 118:3–118:11.
[25] 119:5–119:16.

diverted, the reasonable person must accept that Work, in the context of the modern person, cannot be removed entirely from reasons for why Work is undertaken and most often, and for most, those reasons are economic. In discussing the notion of Work, I am referring to Work as that effort applied to achieve a specific goal rather than as some bricolage, in which whatever artefact produced appears as the result of haphazard attempts at solving some ill-defined purpose. I take this approach because IS planning, design, and development requires that produced artefacts meet requirements that have been established during the design process.

To paraphrase A. Smith (1776/1937), Work is the real price of everything.[26] That is, Work is the effort required to transform those things that are in a natural or raw state into those other things people want or desire. Smith's economy is based on the notion that the Work of one person's transformation of raw material into an item of value is met by the Work of another who desires that thing, having put effort into the creation of another thing which might be valued by the first (Dupré & Gagnier, 1996). Since Smith, the labour theory of value has been replaced by the concepts of use-value and exchange-value because items produced by either worker are rarely theirs to do with, as they will. Instead, workers are more likely to have exchanged their labour for a money wage.

Tannenbaum (1952) points out that Work fulfils more than just an economic role, but that its role is also social and moral. Indeed, he says that the "vacuum between the job and the man has proved intolerable; and it cannot be filled with higher wages, shorter hours, better conditions of labour, music in the shops, or baby clinics" (1952, p. 105). More must exist in the relationship between worker and their industry than purely personal pecuniary gain.

While Locke (1690/1980) considers that Work is an essentially good thing and as a means to end, it leads to the accumulation of wealth and divine fulfilment. For Marx and Engels (1998), Work is not only purposeful in its own right. Work is the worker's purpose for working and their labour ought to be united in the person of the worker. When these are separated, they are little more than an ant driven by instinct. Such division reached its extreme interpretation under the capitalist Taylorist production environment.

Some four decades after Taylor, Tannenbaum (1952) says that the worker has to belong to something real, purposeful, useful, and creative. He says that these attributes are part of the worker's being and that they must belong to their industry or the industry belongs to them. Either way, the two are permanently linked to each other but "what gnaws at the psychological

[26] A comparison is drawn between Smith's reference to labour and Work, where they are both purposeful and directed action.

and moral roots of the contemporary worker is that most urban people, workers and owners, belong to nothing real" (1952, p. 106). For the displaced worker, there is nothing greater than the expectation of monetary reward.

Berthoud (2007) says Rousseau's teachings tell us that Work teaches wisdom about time and a sense of self and reality that protects everybody from imagination, passions, and society's harms. This view is wildly utopian and more likely is the pragmatic reality that the "majority of people in contemporary societies do not do the kinds of work that could be a source of self-fulfilment, even when they share liberal notions of the self" (Dupré & Gagnier, 1996). Berthoud casts a critical light on Engel's notion of Work, that Work does not lead the individual to some kind of human existence, but rather leads away from it. He reports Rousseau's conception that Work is an access to economy, but Rousseau's economy exists under the rule of the use-value system and that it is qualitative.

While for many, Work means a succession of small and unpleasant tasks that no-one really likes to do (Masaryk, 1938/1971), utopian romantics like Jünger (1932/2007) present heroes performing great deeds or perhaps laying down their lives for some greater good.[27] The utilitarian approach would be that what is essential are the daily chores that need to be completed so that life is facilitated. Working is the constant fight against ugliness, wickedness, evil wherever and whenever they appear. All that is needed are perseverance and fearlessness. Jünger defined Work as: the representation of the Gestalt of the worker (Zimmerman, 1990). Gestalt is not another name for being but is the beingness that grounds entities and from Heidegger's viewpoint, "Jünger spoke as if technological humanity transformed itself into the meaning-giver and ground-bestower to all things. Heidegger maintained, by way of contrast, that humanity has been transformed into the worker because 'to be' means 'to be worked upon and transformed in accordance with the imperative of production for its own sake.' " (1990, p. 82).

For Masaryk (1938/1971) Work is not all excited, noisy bustling and striving. Work also occurs in inactivity, in watching. Work is not the ideal, the ultimate end, but the means. Moreover, this raises the question: what are the ends? Those ends are economic gain, a sense of fulfilment, the facilitation of life, or the legitimisation of religious doctrine or utopian ideals.

[27] Note that his view changed in later years when the anarch (Jünger, 1977/1994) became representative of the ideal person. Maintaining a separation between the person and their appointed role that enables the anarch to facilitate their goals and desires while not falling victim to the vicissitudes of those who might lay claim to power.

5.3 Reason for Work

In §5.3, the reasons that Work has become a principal feature in the life of the person are discussed. First the discussion highlights the Nietzschean conception of the system's Will to Will in §5.3.1, that is the person accepts the obligation to Work in order to satisfy the Will of the system, and that there is little to differentiate the Will of the person from that of the system itself. In §5.3.2, the quality of Work that the person engages in becomes a factor in why they choose to Work, or the Work that they choose to do. The argument is put forward that while Work is categorised as mental and physical, in any case, Work must provide for the worker physical, emotional, mental, and spiritual nourishment. Finally, in §5.3.3, the person is shown that they have little power in their Work and is thus objectified. The person who adopts the role of Work assumes the role of the worker who exists to be exploited through, for example, the adoption of the principles of Scientific Management.

5.3.1 The Will to Work

Zimmerman (1990) says it is the Will to Will that calls the populace to Work and that it was Nietzsche who made willing an end unto itself. Will is the unconditioned subjectivity of life to become ever stronger, such that the Will to Power is comparable to Will to Will: the aimless striving for ever more striving. The only limitation to the expansion of Will is Will itself. The Will to Will expresses itself in human terms through the domination of powers as Will seeks to extend its boundaries over previous gains. The Will to Will is driven on by the perception that what has gone before is lesser, weaker, or no longer relevant. The play of power can be seen in the manner in which scientific research is undertaken, where findings are disclosed as a means to render down previous findings. The idea that truth, whether Cartesian or Greek, should play a part in the production of such outcomes is outmoded. Truth no longer has a place: the scientific method has given way to the Will to Will (Nietzsche, 1883–1885/1978). The Will to extend the bounds of the Will itself is victorious over the Will to find truth.

There exists in the nature of the person an urge to engage in the constant struggle to overcome the forces of nature and bend her to its will. Technology has evolved from that desire and, particularly in the industrial and post-industrial revolutionary era, that was a driving motivation for ever larger and more complex machines. To improve the lot of the person, it became an act of Will that the person should gain power and mastery over nature's

chaos. However, Heidegger argues that humanity has become slave to that power and that technological producing is the enactment of enslavement.

The person has become the means by which technology is produced and the ends are beyond imagining or ken. Thus, the person becomes an object in the juggernaut[28] that is the technological system and their Will is lost to that of the whole. The Will of the person exists only to magnify the Will of the system and so the result is the Will to Will that is also the call to Work.

5.3.2 How to Work

In a series of lectures delivered in 1898 at the University of Prague entitled *How to Work*, Masaryk (1938/1971) draws a distinction between two types of work: mental and physical. The former is administrative and directive; the latter is the rough work of the labourer. The mental worker, he says, is the new proletariat.

The mental worker displays two types of phenomena: (1) will and effort that is regarded as work, and (2) imagination that is emotional and subjective. In either case, discrimination and judgement are seen as active, and the search for truth and arriving at conclusions are purposeful. Physical work involves effort, but that is confined mainly to the stresses required to move the electro-skeleto-muscular framework around. There is also fatigue that arises from mental work that is from the emotion, psychology, and mental effort.

Nature is cyclic and this makes for the periodicity of toil (Masaryk, 1938/1971) although for the person who is thus engaged, they may not be aware of that and only see themselves as slogging through the days and weeks while performing tasks that are neither meaningful nor pleasant. Work therefore, is the means and force exerted to overcome a difficulty and this must be achieved periodically rather than in one large, all consuming effort towards resolution. Utilitarianism put the worker to task by completing those assignments that are essential to facilitate life, the daily chores that must be completed. Nevertheless, is it utopian to consider getting rid of such vulgar and mundane tasks? Perhaps some may be done away with, but others are inevitably added in their place.

In all Work, there is an element of tedium and in many respects that is what is 'vulgar.' In our days of computation and automation, processes are defined atomically to the extent that the worker's life becomes one of relentless dreariness. For example, in previous decades the worker might have had call to go to an archive with a sheaf of requests, they or the attendant

[28] See the comment about the juggernaut in footnote 31 on p. 59.

would then have to shuffle through records to find the desired information, amendments might be made, the records reordered and returned to their place in the archive. Nowadays this is done with the click of a mouse, the hitting of keys on a keyboard. The worker barely needs to raise their buttock cheeks with the effort.

Thus, the worker of today is the subject of small and mean tasks. Consider the Zen principle that nourishment is provided to the body, the mind, and the soul and that one's food must be of different colours, shapes, and textures because it is the whole person that is being nourished and not just their physical self. It is more than just the provision of proteins, sugars, carbohydrates and so on, but also the impressions provided by colour, texture, smell, sound and of course, taste. Work requires effort but it also provides nourishment of a kind. The mind is fed by stimuli and the soul by balance. The worker of today needs more than just streamlined processes to facilitate efficient transactions to keep them engaged, they also need to have balance in the various parts of their lives, especially through their emotions, and they need stimulus. Without these, the worker becomes subject to their small and mean tasks, and the result of that is frustration and fatigue.

5.3.3 The person becomes the object

The principles under which Scientific Management was established allowed for new conceptions of Work. Space and time were reframed such that for workers, Work is their only reality (Heidegger, 1931/1981) and Work is work for the sake of more work (Zimmerman, 1990) where Work is a function of the industrial machine. Work is then tied to the boundary conditions of time as a material property of production. The functionalisation of time and Work refers to the binding of the worker to the time clock in an industrial plant.

In an effort to understand the impact of industrialisation in Germany, the Frankfurt School was established and it found that "the very system of industrial production that was supposed to liberate humanity, not only had altered the institutions of society, but also had changed the character structure of the members of the working class. Industrial modes of production tend to make people more authoritarian, more willing to accept a passive position in a hierarchical society. Instead of being an emancipatory factor in human history, then, industrialism threatens to become a more complex form of enslavement, one legitimated by the 'dictates' of efficiency, rationality, and technical expertise" (Zimmerman, 1990, p. 217).

For the person, their new reality is the artificial, but artificiality for the person is not foreign. Artificiality for the person is a natural part of its being. The person makes symbols and always has, for as long as it has been able to conceive of dimensions beyond itself. Whereas the person of ancient times created symbols as a means to understand themself and relations within and between nature and super-nature, now the person has become a mere symbol, an object. As an object, the person may be framed according to need and exigency; it is devoid of unique and identifying features. When the object-person is defined as a role within a plant, then the person no longer exists, the person is reduced to a mere one page description to which supplicants may apply themselves.

5.4 The notion of action

Unlike Rousseau's (1762/1968) qualitative conception that Work is an access to an economy under the use-value system, there exists a quantitative distinction between the act and the person. The role of the person is the expression of what is possible for any instance of human action and is limited to that instance's ability to embody either, the full, or some partial measure of the potential act. The products of the person's role in action are cultural artefacts and, where they may be put to use and therefore have some value, are qualitative.

As a cultural artefact, information systems emulate the human act. That is, information systems are conceived in response to need and embodied conceptions are limited to the imaginative capacity of the conceiver. The conception of artefacts may be limited by factors that range from the quality of the conceiver's education, the availability of technology to facilitate further expressions of what may be possible, and political, economic, cultural and social limitations in the context of where the information system will be conceived.

These factors present themselves as problems to be solved in the formation of the information system. The issue of how to resolve problems, according to the objects of knowledge that have been built around perceptions gained from a process of abstractive thought, is essentially practical in nature. At some point, it is necessary to test conceptions through experimentation, that is, to take action. There is no great revelation in this view. Action is fundamental to universal interaction and when interaction occurs in which the consequences of life-processes are to be effected, at some point in the future, then that process is called an act. Thus, if knowing occurs in nature, then knowing is an existential overt act. That is, knowing within nature

modifies what already existed there and its worth amounts to how much change took place. In the positivist perception of science is the ability of the observer to stand apart from nature and observe from outside a process. Such observations can only occur in those cases where it can be demonstrated that there has been no modification of the observed environment, through the observation itself.

That observations of nature can be called scientific only when there has been no demonstrable effect on the environment as a result of the observation begs the question: When then does the idea that science is able to step outside the reality of everyday experience, to experiment with but not affect nature? Dewey (1891) suggests that this spectator theory of knowing was likely inevitability since thought was regarded as an exercise of the process of reason, separate from the body, and through which truth was obtained. So then, what is the relationship that exists between knowledge and action? I argue that conclusions from knowledge arise from changes in ideas, and changes are effected from the imputation of action. Thus, there exists a distinction between knowledge that arises from theory and that, which comes as the result of experience and practice.

Just as there is a distinction between theory and practice, so there is a distinction between two kinds of action in which one is intelligent and the other blind. Blind action takes place unknowingly, has no understanding of past or future events, is controlled by external factors without recourse, and has no ken of consequences. Intelligent action is that which is directed, it is represented by acts that display qualities of instruction, information, knowledge, and it carries 'purpose.' If intelligent action is purposive action and if the action is a phenomenon of natural occurrence that takes place under specifiable conditions, then 'purpose' (like intelligence) is within nature and 'purpose' therefore is a *category* having standing and validity. Dewey (1891) points out that distinctively human conduct can be understood only in terms of 'purpose' and distinctively human action is marked by its 'intent.'

While 'purpose' is ascribed to nature because the person is part of the natural world, when parts of nature are studied, they are removed from their environment. The isolation of bits of nature also excludes the concept of 'purpose,' but science is full with these kinds of abstraction. By a curious reversal, much of archaeological anthropology is about reattaching 'purpose' to objects that are found in a natural context, in which clues are extracted from the surrounding material and conditions.

Similarly, it is a common approach in the design of systems to redefine the 'purpose' of IT artefacts as examples of cultural artefacts, suggesting that they are mutable. It is through the imputation of the human act that 'purposes' are ascribed to artefacts. Dewey (1939, p. 236) agrees when he says acts "are viewed in their connections, as it is surely the province of philosophy to view them, nature is seen to be marked by histories, some of which terminate in the existence of human beings and finally in their intelligent activities."

Nature that has purpose, use, function, and more, has mechanism. Mechanism in philosophy is the doctrine that all natural phenomena are explicable by material causes and mechanical principles, and so nature has this as a feature. Mechanism forms the content of objects investigated in the physical sciences. It would not be the case if through experimentation it were demonstrated that there were significant variations between occurrences because in this case, there could be no uniformity or constancy such that predictions and inferences would not be possible. So it stands that much of scientific thought is about the subject-matter of the relations between constants, and that since not all observations will produce the same results due to environmental variations, they are statistical in nature. Such observations are not descriptions of the exact structure or behaviour of every individual thing, but what is reasonable to expect.

No mechanically exact science of the person is possible, since such an investigation would need to take into account its history and any environmental changes that have occurred during its existence. However, those constituents of the person that are known are derived as statistical constants from a series of operations. In this regard, physical knowing is taken as typical of the nature of knowing. The trust given to this approach comes from operations that are perfected and the scheme of symbols that are well tested. Science obtains of credence as an intensive form of gathering knowledge, one that provides a powerful tool for providing other modes of knowledge.

Applying the argument that application of the scientific method results in knowledge that is made available for use in other modes, then it holds that in the field of IS knowledge from related fields is applied in the design and implementation of information systems (the IT artefact). In practice, the context in which information systems are designed and built is subject to variable rates of change. Change requires the systems designer to make adaptation so that the system will function within an altered context. From these considerations emerge two questions: Will this change also result in changes in the person who engages with the systems' iterations? Will exposure to these systems have a cumulative effect on the fundamental nature of the person?

5.5 Change in the nature of the human

Dewey (1938) seeks to answer the question of whether human nature changes when working conditions also change. Treating the question as one that is essentially practical, his initial thoughts point towards the affirmative, that human nature does change. But linking his argument back to the effort to find constants in nature, and in particular that of the human, Dewey takes this opportunity to bring into the argument, considerations of what does *not* change in human nature. One such factor is that the human's biological needs have not changed; it still needs food, air water, to reproduce and nurture its young.

Physical requirements of the human, says Dewey (1938), appear to be ingrained in its nature along with others that do not appear to satisfy the physical form immediately, the need for companionship, the need to exhibit power over others and its environment, and so on. However, these examples, while integral, would not be human nature if they changed. To differentiate between what is fixed and permanent, one needs to look at which constants appear to change and under what conditions. For example, someone who refuses food must have something wrong with them and, within a given cultural environment, those who exist within it would tend to view askance anyone from outside if they should happen to refuse the food that is eaten on a daily basis. So while the fact that food as a necessity is a constant, regardless of culture, for a given situation the selections of foods are of no less importance. By comparison, Dewey cites Aristotle and the rest of his society's claim that slavery was a natural occurrence. Aristotle would not have understood calls for the abolition of slavery, because for his and his kin, there was no point in taking the effort to change what is in human nature, and what is therefore immutable. In their view, there were those for whom being a master over others and to have power over them was natural.

The reluctance to accept changes in nature that are imposed through the calls of, for example, radical elements, or those that come to an institution because the society in which it operates has already changed, and those are percolating throughout it is likely a case of the inertia of custom. That it takes time to get accustomed to the idea that habits have formed and that they must be reformed. In finding the answer to the question, Dewey (1938) says to take into account first, the force required to maintain and change existing traditions and customs that represent the patterns of action and belief.

In order to execute change, when the resistance to change comes from cultural structures, it is wise to find out what forces are already at work. When one has identified the forces that

already exist, they can be reinforced so that their moment is directed towards the desired change, gradually weakening the conditions that prevent change.

The idea that changes cannot be condoned or are impossible because of the fixed constitution of human nature, such as was the case with the Aristotle's ancient Greeks, is no more than a diversion of attention away from the other question, of how to go about it. Instead of dealing with the nature of change required, the objection brings into the array blind emotion and brutish ignorance. In the end, it serves to encourage those who think that change is best effected with a liberal dosage of violence, evidence of which can be viewed on the nightly news.

The question now is, how to most effectively modify human nature. Indeed, with so many institutions clamouring to make changes to the way people think, act, and respond, with methods that vary from punitive force, to emotional blackmail, to chemical solutions to perceived problems, it would perhaps be a welcome change if one could wind the clock back to 1938, when Dewey was more concerned about the absence of human sciences. Nevertheless, the best solution, then and now, is through the application of education in its widest sense.

5.6 Web 2.0 in Work

The Semantic Web or as it is often referred to, Web 2.0, represents a fundamental leap in cognisance, in the way that information is treated and regarded. In the leap, the distance covered ranges from the idea that information is made up from data that have been made useful, to one in which new information is created from unplanned, unexpected, and unintended linkages between data and data, data and information, or information and information. Web 2.0 promises an Internet that allows greater participation, with applications that allow anyone to create and publish their own content. Common examples are forums, wikis, and blogs that enable naïve users to publish content with templates and preset options. Maximilien and Ranabahu (2007) point out a distinction between the Semantic Web and Web 2.0, saying that the Semantic Web has its roots in AI and academia (see for example, Dietrich & Jones, 2007) and that is a reason why its uptake has been relatively limited compared with Web 2.0 technologies.[29] Web 2.0 has been shown to increase value, reduce cost, and improve communications and open new channels for

[29] See page 2.5.

communication. Integration in heterogeneous environments can be facilitated using interchange formats, as well as the delivery of applications in geographically distributed situations.

However, as with cultural objects, systems tend toward entropy. As efforts are made to address the concerns of the organisation, so that information systems are developed to meet perceived demands and requirements, then information systems are further embedded into the organisation, thus the organisation becomes ever more tightly bound by the processes that were intended to free it. The by-product of this is the effort, to not be wasted, that becomes subject to preservationist thinking so that systems become stabilised. Security measures ensure that new systems become increasingly difficult to implement or subsequent changes made to existing systems. Ultimately the systems become impediments to efficiencies. Entropic systems stymie corporate growth and development. As information systems have become increasingly embedded into the corporate structure, their tendency towards entropy also becomes a factor, resisting the ability for the corporation to shift and change. While the essential problem appears to be technological, in reality it lies in the natural instinct in the person to resist change, thus the solution lies there.

A corporation remains dynamic when it maintains a moral and psychological milieu (Tannenbaum, 1952) that brings into being almost infinite possibilities, ideas, and processes. The threat of failure and loss in adopting new technologies and the efforts to mitigate those losses are the very same forces that cause an entropic response.

While there is an increasing volume of published research on the technological aspects of Web 2.0 and how applications can be implemented, there is relatively little published on the impact of newer technologies on Work, Work Systems, or the impact on workers. In this instance, events in the world are far outreaching the efforts of researchers. Significant company mergers have taken place, major marketing campaigns that involve social networking applications, political battles that are conducted on public forums, and militant organisations that gain international support by distributing recordings of their messages (Constantinides & Fountain, 2008). All these illustrate how the person has been educated about how to make use of information for his or her own purposes. The knowledge worker truly has become that, a worker of knowledge for its own ends. Such ex-societal uses of information are presented as threats to the status quo. Such threats represent a cultural shift in permission and acceptance.

There are increasing numbers of enterprises experimenting with Web 2.0 technologies (for example Koch et al., 2007; Rowe & Drew, 2006; Yi et al., 2006) but as with anything new,

there are concerns from businesses. Some concerns expressed include security, return on investment, and their staffs' skill in implementing and integrating new technologies with legacy systems (Hoover, 2007). According to Berners-Lee (1998), Web 2.0 ought to represent a consistent level of semantic interoperability and applications should be sharing services or where necessary, be self updating, and universally applied standards should be implemented. It is expected that historical problems associated with the integration of heterogeneous environments should be somewhat alleviated (Kobielus, 2007). Indeed, it is becoming a predominant paradigm in the development of distributed software systems because web services can provide the potential for software to be modularised in a way that functionality can be described, discovered and deployed over a network to maintain platform independence (Bell et al., 2007).

Users of Internet- and Intranet-based information systems interact with them in ways that are often different or new. This was especially the case at BT where the non-promoted releases of tools were quickly taken up by a large number of staff. Dennison (2007) reported that enterprises need realistic expectations about what can be achieved because the nature of the interactions making social media successful does not necessarily translate to the corporate environment. However, that also means that those who have responsibility in the enterprise for internal and external communications and policies need to be involved early on and they need to understand that it is not a fixed set of processes and tools, but that it shifts and changes according to context. The introduction of social media tools at BT was more a proof of concept and Dennison (2007) says that they were somewhat taken by surprise by its popularity. He has advised that it is a good idea to start small and make adaptations to the system, then offer tools that people want to use, and to remove tools that are not being used. Then offer tools as soon as they are available, in beta form, and leave the users to decide early on whether they want them or not. Nevertheless, they found their implementation was quickly overwhelmed and efforts to expand the system were frustrated when the provider was bought by a competitor who obsoleted the platform.

IBM realised there is a rising expectation among some the new generation of employees that they can add, change, or update content in real time (Majchrzak et al., 2009) and it is a prime requirement to be able to have direct access to the latest data or content and, as such, direct access to components of an organisation's value chain. Having this level of access is seen as a given, along with the ability to make changes to or reconfigure internal processes (Butler,

2000). Successful implementation of a number of focussed and well developed tools at IBM taught the enterprise that the Internet has been integrated into people's lives to such a degree that the introduction of Web 2.0 tools did not substantially change how people work, so that there was little to change in peoples' work habits. The tools also promoted a greater sense of opportunity and therefore innovation, because attitudes toward production changed. Rather than monitoring activities that people were involved in, postings on ThinkPlace and Beehive were analysed to identify staff outcomes. This had led to a focus on mass collaboration, and in a sense, has promulgated the 'wisdom of the crowd.' In the BT case, this conception was questioned because of the much smaller population involved.

Majchrzak et al. (2009) supports the view of Gruber (2008), that Web 2.0 represents a set of tools allowing for collective bargaining, argument, and decision making. As well, the IBM case adds weight to Rahwan (2008), where the use of Web 2.0 has created a field of intellectual freedom where opinions and argument can be presented. This in turn enables the application of large-scale argumentation, and innovation is encouraged because there is freedom for different views to be presented, challenged, and evaluated by contributors and readers.

Yukihiro (2007) says that Web 2.0 tools challenge traditional institutional boundaries by drawing the decision making power down from higher levels of management and giving greater autonomy to teams who can communicate openly. At FCC, H. A. Smith and McKeen (2008) reported an improvement in effective communication between business units and the IT department. The introduction of SOA also gave an opportunity for business managers to focus on processes, while IT managers focussed on enabling them with technology. At IBM, there existed a unofficial gap between long serving staff and new recruits. The introduction of Web 2.0 tools, in particular social media tools, provided a space where such inter-generational gaps could be closed. This also has been observed by Shimazu and Koike (2007), who say that open communication can occur if close linkages between a variety of communication tools and job systems exist and where frameworks are in place to support their development.

I have said that Work is the effort required to transform things that are in a natural or raw state into things that people want or desire. I have also said that Work is more than just an economic role, its role is also social and moral and to that extent, the worker belongs to something real, purposeful, useful, and creative. The ends of Work ought to include factors that connect humanity to its Dasein: that either they belong to their industry, or the industry belongs to them where the two are permanently linked. Of course in any industry, a pattern of

repetitive behaviour and action that is attached to every role must exist, making the person redundant, where the person is abstracted and recognised only as an object.

While the role of the worker is a symbol separated from the beingness of the person, humanity has shown the tendency to do the unexpected and reveal that technology has no fixed trajectory. Unexpected effects show that technology may face disruption, especially when it has become entropic or subject to competitive forces. To limit the adverse effects of revolutionary disruption, the enlightened organisation ought to maintain a moral and psychological milieu that in turn allows its workers scope for creativity and expression. Web 2.0 information systems provide just such a symbol that, as a cultural artefact, emulates human nature. Therefore, while the notion of Work is that it is purposeful directed action, the purpose itself is mutable and so then is Work.

5.7 Conclusion

It has been stated that Work serves to fulfill a largely economic role in the life of the person, the benefit that Work provides extends well beyond the boundary of the industrial plant. Work provides social and moral sustenance to the person, that the person needs more than just a fair wage; they need to belong to something purposeful, useful, and creative and for the person, satisfies the urge to be and to feel their humanity.

Such concerns as these bring into question the reason that a person would engage in Work. Nietzsche would argue that the person works to satisfy the system's Will to Will. In working to satisfy the system's Will, to produce for the sake of more production the person accepts their obligation to Work in order to satisfy the Will of the system. The Will of the person then becomes of the same kind as that of the system. It may be said that Work has qualities: that what the person seeks to obtain from Work is the quality of Work that the person chooses to engage, which becomes a factor in why they choose to Work and the Work they choose to do. When the person accepts that the system's Will is superior to their own, then the person has little power in their Work and is thus objectified and made exploitable.

The person-object, thus created, whose Will is that of the system, is steered towards the creation of artefacts that emulate human actions. Such cultural artefacts include information systems that are designed to solve human problems. However, the creation of the person-object entails that some change has gone on in the nature of the person, which Dewey discusses in

relation to the role the person plays in society, and how changing roles reflect changes in society. He says that the fundamental nature of the person does not change, that is, the person still needs to eat, sleep, has arms and legs, and so on. However, culturally significant changes have been observed and if culture is part of the person, then the person has changed too.

While efforts have been made since the beginning of the Industrial Revolution to create an image of the ideal worker (with images striking a variety of forms from the Marxist/Maoist agricultural/industrial worker to Jünger's Overman, to Jünger's later anarch), there remains in the person the tendency to resist such structural limitations. It is argued that the use of Web 2.0 technologies, such as social networking and mashups, are a natural response to the creative urge that exists in the humanity that has not completely given over to the Will of the system. That the building of such cultural artefacts are no more than the expression of the desire in the person to communicate and be joined with others of their own species in a way that for them results in a social milieu that is supportive, confirming, open, and in essence, reflects attributes that exist also in human nature. Therefore, Work is a property of the person, and despite efforts to control the person through redefining Work, the person still finds means of expression through Work.

In chapter 6, I present the argument that through productionism, Work has become the means by which scientific principles are to be applied to humanity, and progressively strips away the beingness that hinders manufacturing processes. That is, the beingness of the human is regarded as a hindrance to the achievement of improved efficiencies in the productionist environment. The result of the application of productionist methods is a dehumanised production environment, populated by technological humanity. However, the technological human seeks to rationalise the worlds that are created as part of the industrial complex and applications classed as Web 2.0 represent a case of where the technological human rationalises its loss of social fabric, and moral and ethical boundaries.

Chapter 6

Work as the means to production

6.1 Introduction

In chapter 5, the case was presented for the natural occurrence of Work as a property of the person. It was argued that while Work is purposeful directed action, the purposes to which it is applied varies according to the context in which it is found. An economistic conception of Work provides the understanding that Work is the effort required to transform things in a natural or raw state into things that are wanted or desired. The role of Work is social and moral to the extent that the worker must belong to something that is real, purposeful, useful, and creative. That suggests the worker is more than an economic unit or human resource to be exploited even though as an object, the person is reduced to little more than a one page description as a role. Work is a means of support for economic gain, a sense of fulfilment, the facilitation of life, and the legitimisation of religious doctrine or some other utopian ideal, it is part of the worker's being, naturally so, intertwining them in the industry of which they are a part.

The industrialisation of the workforce saw the role of the worker reduced to a point that allows for complete redundancy, where the person has become an abstract symbol. The role of the worker is defined by what the person must do how they must behave, what they respond to, and what they must not respond to; the role separated from the beingness of the person, where they are reduced to no more than a job description. The separation of the natural state of the person from its abstracted form, the symbolic worker, prevents engagement in which the person may respond naturally. Technological advancement has shown the path of development

to have no fixed trajectory and thus the enterprise faces disruption when the path of technological development moves into the unknown, such as is the case with Web 2.0.

In chapter 6, the part played by 'productionist metaphysics' in the evolution of the technological human from Heidegger, Jünger, Zimmerman, and Dewey is presented. Productionism is defined in §6.2, in which Work that was once seen as the means to disclose a product and production was centred on the concept that the disclosiveness of technology was tied to human existence. Work became the means by which scientific principles could be applied in order to strip away the beingness that hindered the manufacturing process, resulting in a dehumanised production environment. By contrast, in §6.5 it is shown that modern technology in the age of Web 2.0 and beyond serves to re-link the two by allowing for the beingness of humanity while reaching towards improved production methods, reduced costs, and improved performance measures. This quasi-organic approach to systems design has led to a rapid expansion of new technological methods and it is these that redefine Work in the IS world.

The argument in §6.2 states that the human has moved away from the conception that Work means to release product from their source, disclosively, to the current view, that to produce is the result of industrial processes. In Zimmerman's conception of productionist metaphysics, a semantic distinction is made between the ancient Greek 'production' and 'making' and the 'production processes' employed in industrial technology that is seen today. To conceive of production as including only those processes employed in an industrial setting, then technological humanity tries to rationalise everything, either through defining for everything a purpose, or its use as an instrument, where its sense of completeness and security is in knowing all exists because it is meant to be. In §6.3, a dystopian reality is described: for the technological human, there exists a loss of purpose in which there is a movement away from the disclosiveness of production, and a differentiation is made between what is art that appears through disclosure, and products that are made through an industrial process. The motivation for the remanufacture of artwork appears to differ whether it is called art or the product of an industrialised process, whereas the technological system has moved towards a manifestation of the Will to Will where the technological system strives for ever greater production for its own sake.

In §6.3, the movement of the technological system away from the reality of the natural worlds towards that of meeting the needs of an economic exigency creates a dystopian technological world is described. For the person, the technological world has become an abstraction and it

is barely perceived for fear that it might overtake technological humanity's sense of self and might therefore be lost. As a result, the enhancing of the power of the 'system' has become more important than contributing to the well-being of the person, the technological human, who works in the system. Upon the technological human rests the requirement to come to terms with the juggernaut,[1] technological humanity created. It is the gathering of momentum in the 'system,' the juggernaut that in the end entwines the technological human into the system's purposes and engulfs the human with the Will of the system.

Then in §6.4, in coming to terms with the juggernaut, the technological human incorporates technological developments into its personal and Work life. Humanity is itself subservient to the technological system and this subservience is expressed through all parts of a person's life, and can be extrapolated to incorporate the rest of society. It seems inevitable, in the dystopian view, which the person must change fundamentally to meet the juggernaut of technological development. However, the question remains, can a person change the nature of their self or the nature the juggernaut to which they are a part? Technological humanity cannot change naturally occurring entities, but when nature proves unsatisfactory for its purposes, the technological human reframes nature so that it at least gives the appearance of correctness even though reframing results in the representation of entities in ways that are obscene. Reframing becomes necessary to align naturally occurring entities with technological humanity's created conception of economic exigency.

The chapter concludes in §6.6 by stating that the technological world as an abstraction exists within the minds of those who have established it and that it takes the form of the juggernaut. That the juggernaut is unstoppable, the call is for the technological human to come to terms with it and to adapt to the demands of the technological system as the juggernaut. Adaptation is made possible when the goal is to re-establish human properties that were stripped from the being of humanity as the desired outcome of productionism. Re-establishment of those properties is shown to be achievable with technology, such as Web 2.0. But the human never be returned to what it was, it is now of a new form of technological human that is reframed to meet the needs of the technological world, discussed in chapters 7 and 8.

The principal argument in chapter 6 is: that productionism is founded upon the rationality of science.[2] That is, the transposition of science over nature has seen the conception of production

[1] See comment in footnote 31 on p. 59.
[2] 128:7–128:17. 128:5–128:6. 140:9–140:16.

move from the natural creative capacity of the artisan to rational, repetitive industrial processes,[3] because much that exists in nature is irrational and therefore of no account. This presents a dystopian view of production (here termed productionism) where the scientific method has created a reality for the technological human, in which humanity is bound to the spatiotemporal conditions of the industrial complex.[4] Further, that the reach of the technological system extends beyond those who maintain it. The system draws in humanity through promises of being logical, rational, and having a purpose.[5] For the worker, the only offer under productionism is a money wage and there is no room for the creative being.[6] Additionally, I argue that within the technological system, there is a battle for supremacy, in which opponents represent extremes of political and economic doctrine.[7] Each argues for a preferred means of recovery of personal Dasein for technological humanity, but neither will achieve what they claim because they are caught up in the technological system and they all represent the system's aims.

In chapter 1, it is argued that material notions of Work must be presented objectively and subjectively in order to address the material and metaphysical. In chapter 2, the argument is extended to include the abstraction of naturally occurring phenomena. Abstraction of the material and disassociation from the metaphysical has facilitated the establishment of the technological system. Thus, abstraction permits the decontextualisation of naturally occurring phenomena, for example, in chapter 6 I argue that the scientific method, when applied to the industrial plant, has helped create a technological human that is ignorant of their own context.[8] However, for the person to make sense of the rationality of the technological system, the person must be able to view the system objectively.[9] To do so entails a rationale for objective knowledge of the technological system, where humanity is presented as a means for prediction.[10]

The conception of mechanism, presented in chapter 5, allows for the observation and prediction of natural phenomena, but mechanism is very complex and seemingly irrational. In chapter 6, I argue that the process of scientific rationalisation (as productionism) enables natural phenomena to be released from the impedimenta of irrationality and absence of purpose and

[3] 126:19–126:21.
[4] 131:24–131:25. 132:27–133:15.
[5] 128:21–128:26.
[6] 136:11–136:17).
[7] 139:19–140:4. 140:7–140:8.
[8] 129:27–130:2.
[9] 128:31–129:2.
[10] 129:16–129:21.

logic. As abstract objects of knowledge, they can be applied at will[11] and objects that do not conform to the requirements of the system are reframed and made to fit.[12]

In chapter 2, the juggernaut represents the technological system (the accumulation of humanity and technology) that progresses inexorably forward. In chapter 6, the technological person has no recourse, when disconnected from localised expressions and entities, but to adopt those norms that are provided by the juggernaut.[13] The juggernaut summons all of humanity to change and meet its demands: that change must occur, so that all is made rational and that which is natural is fully exposed under the light of scientific review. Once exposed, what is left of the natural human is processed, homogenised and synthesised, then taken up by the system, ready to be put to Work.[14]

The technological human is inveigled into assimilation in the juggernaut with promises of ease and leisure and the means to obtain such things.[15] The provision of the means to attract and trap technological humanity has spawned a massive entertainment industry. However, in the dystopian view, the entertainment industry offers these distractions as a panacea against the pain of having to sacrifice all of oneself that is natural. The juggernaut incorporates humanity's intelligence (both the function and the capacity to know).[16] It seems inevitable that the technological human must finally succumb and be whatever it is that the juggernaut wants, at the time it is wanted; even allowing the technological system to reframe humanity's moral and ethical coda,[17] so that the worker welcomes the opportunity to be regarded merely as an object or data.[18]

In a parallel argument, in chapter 6, I assert that Heidegger's technological human is largely a product of his own being. His discussion reflects The Fall of Man: an archaic analogy that tells of the eponymous ancestor and his fall from grace (whilst not a state of perfection, certainly in receipt of divine gift). Heidegger's technological human is weak, troubled, and subject to iniquities that it created (as a consequence of its choice to live outside grace).[19,20] However, while I accept that technological humanity is a by-product of the technological system and that

[11] 134:27–135:5.
[12] 135:6–135:8. 135:11–135:14.
[13] 132:23–132:26. 142:7–142:18.
[14] 133:31–134:3.
[15] 133:18–133:30.
[16] 137:26–137:29.
[17] 138:6–138:13
[18] 138:14–139:3.
[19] 126:22–127:2. 127:7–127:9.
[20] The technological human has no options except those offered by the technological system, where the system provides completeness and security for the technological human.

humanity has been reframed and objectified for efficiency and convenience.[21] I do not accept that all that is human has been stripped away during its objectification. The argument that the technological human is left only with its rationality but not what is natural, precludes that technological humanity may regain its sense of self and denies that the technological human can address their latent Dasein.[22] Humanity demonstrates a seemingly inexhaustible scope to adjust to the demands placed upon it.[23]

In chapter 5, it is stated that objectivity requires observer status. In chapter 6, the conception is extended, such that observer status entails being able to separate technological humanity from the person. Separation requires the person to acknowledge the essence of each and to reject one. The person must accept that the technological system was first a product of its own making, that the technological human was thus a by-product of the technological system, and that the essence of humanity still resides within the person. Thus, separation is essentially pragmatic: the person must accept the reality of their technological and naturally occurring human self.[24]

In chapter 2, the barber's paradox is presented. In chapter 6, the paradox is readdressed: that the human calling is to be human. That is, the calling summons the person to recognise their plight, but head-on confrontation with the juggernaut leads only to counter forces that produce undesirable results. Instead, the technological human must accept they are no less part of the system and to attempt to force the juggernaut back means trying to force themselves back: the paradox would see the human seeking to gain mastery over the technological system, which is itself.[25] To break thee paradox, humanity needs to acknowledge that the ways and means for humanity to regain its Dasein already exists within.[26] What is required is for the human to play its part and reconnection to its Dasein.[27]

In chapter 5, security is presented as a resistor to change in the enterprise as one factor that leads systems toward entropy.[28] In chapter 6, security is presented as a reason for much that humanity does. For example, in the absence of community and extended family ties, the

[21] 127:15–127:20. 127:26–127:27.
[22] 130:7–130:12. 139:5–139:8. 141:32–142:5.
[23] 131:7–131:13. 131:13–131:17. 136:3–136:7.
[24] 129:11–129:13.
[25] 142:30–143:1.
[26] 143:1–143:4.
[27] 143:27–144:4.
[28] Note that the real threat to the enterprise in a Web 2.0 world comes not from those it employs; the threat comes from the enterprise's entropic nature. 143:18–143:26.

technological human has had to create its own communities in unions or through the application of technology and in this instance, Web 2.0.[29]

Therefore, the first new argument in chapter 6 is: that the human property of social connection resists efforts at eradication; despite that the technological system has attempted to strip from the technological human, its connection to what is considered natural.[30] For humanity, strength may be found in connection. The juggernaut broke apart communities, weakening the people, making them malleable and ready for alteration in preparation to play their part in the technological system. Within a few short generations, all knowledge and connection to history was gone.[31] However, catering for humanity's irrational need to maintain connections, communication technologies fulfill social functions that the displacement from local communities made almost impossible, even though the technological system takes that as an opportunity to reframe communication by turning it to a means of production.[32]

Consequently, in chapter 6, the second new argument states: while Web 2.0 provides a means for technological humanity to regain aspects of human expression that were seemingly lost, regaining them must still be achieved within the technological system.[33] For example, to regain human expression, effective communication must be conducted through channels that conform to those of the technological system[34]

6.2 Productionist metaphysics

Productionist metaphysics is the semantic distinction made between the ancient Greek 'production' and 'making,' and 'production processes' employed in industrial technology in use today. Zimmerman (1990) questions the 'being' of humanity where, for the ancient Greeks, 'to be' meant that something was produced. Heidegger's beliefs, common for his time, are based on the ideal of the Fall of Man and a reaction against prevailing Judeo-Christian attitudes towards the beneficence of being put to Work.[35] The conception that the human condition has moved inexorably from a point of purity (which reached its zenith with the ancient Greek

[29] 140:25–141:10, 141:12–141:20.141:21–141:29.
[30] 136:18–137:25.
[31] 139:14–139:18.
[32] 137:17–137:25.
[33] 142:18–142:24.
[34] 142:26–142:29.
[35] Derrida (1978) says that Heidegger failed to deconstruct the idea of a primordial epoch in which there was an immediate relationship between a primordial being and the human recipient.

philosophers), to a lesser state of being (represented by the nihilism[36] exhibited in the twentieth and twenty-first centuries), and where modernity is the final stage of appearance for the West. For the early Greeks, the conception of producing something meant 'releasing' or 'freeing' from where the essential form of an object had been locked up, so that the object could manifest. That production itself was primarily an instrument or some means to attain some human end.

For Heidegger, the destructive aspect of modern technology is directly related to the constriction of human Dasein's capacity for genuine caring.[37] Alienation from this capacity is the worst kind of dehumanisation and leads to the most terrible crimes against humans and non-humans alike. Tannenbaum (1952) and Masaryk (1938/1971) both support this view when they contend that throughout the industrialisation of the West, it is the separation of workers from their communities that has caused the separation of the worker from their social and moral basis, and it is this that provides conditions for violence, insurrection, and discord. A rational observer may note similar movements in large parts of Asia and the Middle East that are undergoing industrialisation and revolution.

Humanity today, the worker, is a technological human that works for a money wage instead of seeking to provide for and facilitating life's essentials (Tannenbaum, 1952). The technological human has Work as a predominant property of their life such that they have become separated from their creative being. The technological human is the by-product of the production process, whether reference is made to the displaced person who washes up on the shores of the industrial complex or Heidegger's artist. Zimmerman (1990) thus brings into question the purpose for which products are manufactured or that art is brought into being by the artist. He says that it is a feature of technological humanity that it tries to rationalise everything either through defining for everything a purpose or its use as an instrument. "Talk of producing as a 'freeing' or as a 'letting-be' makes no sense. Instead, to make something means to *cause* it to happen, to *will* that it come forth, in order to serve some purpose within the technological system" (1990, p. 235). While for technological humanity, there is a sense of completeness and security in knowing that all exists because it is meant to be, this masks a purposelessness in at least two respects: (1) In Heidegger's view, the technological system has left behind the purposiveness characteristic of merely *human* projects. As the manifestation of the Will to Will, the technological system strives for ever greater production for its own sake. (2) The motivation for the remanufacture of

[36] Nihilism is defined as "apart from my body there is nothing" (Masaryk, 1938/1971, p. 42).

[37] Where caring is based in the beingness of the person, then what is offered carries the person's naturally occurring entities, such as warmth.

artwork appears to differ whether it is called art, or the product of an industrialised process. Zimmerman suggests that the artist is not motivated by the dollar value of their work, and often master works reach their greatest value long after the death of the artist, and the monetary value of artwork is incidental to its being.

Artwork defies reason, if that reason is established through the lens of productionist metaphysics. Zimmerman (1990) argues that there is no 'reason' why things 'are' at all in the same way that Dewey says that nature simply exists. That is, productionist artificiality is rational. However, the effort expended to produce content for social networks, wikis, blogs, and other social media is neither rational nor irrational, it is irrational and content is created for no other purpose than to satisfy the desire to create content. These are claimed to be the nihilistic expressions of a culture in love with its own posturing and self worth, in which the technological human's urge to create is momentarily met through the trill of comment rather than the soul satisfaction of bringing forth. Creating is not rational because ultimately, creating has no purpose. But this view shrieks with the voices of millions who scream that surely what they are engaged in must be there for a purpose, surely there exists a reason why they spend so much of their time engaged in productionist activities, that their lives have not become so meaningless, that it has even extended beyond the realms of the rational. So "to overcome our terror and awe in the sheer presencing of things, we make up stories, myths, fables, and scientific theories to 'explain' what and why and how things are. Productionist metaphysics constitutes the 'story' told by Western man to explain — and thereby control — the cosmos" (1990, p. 235).

For the human, the technological world is an abstraction, barely perceived for fear that it might overtake one's sense of self, that the vestiges of its self might be lost. Such that in the technological age, it seems that no one is in control of the 'system.' That there is no apparent purpose and that enhancing the power of the 'system' has become more important than contributing to the well-being of the person. Technical innovation and industrial development have 'logic' and a 'purpose' that extends beyond the reach of the person. The acceptance of the industrialisation, first of the West and then of the rest of the world, has replaced traditional values with largely economic or utilitarian considerations which are blind to personal, social, religious, and environmental concerns (Tannenbaum, 1952). The likely consequence for the global technological impulse is dystopian, not utopian (Zimmerman, 1990).

To make sense of the rational, first see that it is not the human that is in control and secondly, Jünger says, the human chooses to give in to the 'system' and accept that it is part of

it. The human must accept that the system's destiny is intertwined with its own, that it is as an essentially pragmatic and natural phenomenon. Dewey (1939) tells us, in addressing the establishment of the pre-industrial economic environment, and taken from the standpoint that it is the inevitable outcome of humans living within nature, that commerce formed in large part through the interconnectedness of the natural formation of waterways. The phenomena of commercial use effected changes in natural conditions. People engaged in commerce held that it was necessary to change the environment in order to conduct their commercial activities and so they built harbours, docks, warehouses, factories, more efficient transportation mechanisms such as the steam engine, and while going about their business, modes of interaction changed too. For these people, their organs, instrumentalities, and operations of knowing existed within nature, not outside of it. The objective result is that when incremental changes were executed, they also changed what previously existed, and for them, the object of their knowledge was a constructed, existentially produced object.

Out of the considerations discussed, from Dewey (1939) comes the viewpoint that people are intrinsically part of nature. His view, from the pragmatic position that nature does not conform to any particular definition: that nature exists. To come to know nature is to be intelligent about it and understand it, so that when turned to human purposes, nature becomes an object of knowledge. This discloses the irrational property of nature as an object of knowledge. As an object, the person learns the effect of changes that have been wrought upon their self and nature or the relations they have with nature. Thus as changes are made to nature, so those changes are reflected in objects of knowledge.

That objects of knowledge can be changed runs counter to the Greek ideal that knowledge is perfect, that it holds in itself something that is complete and without change. Such unchanging truisms can only be a reminder of what people have always done, as far back in time that recall is permitted. Over time, knowledge changes, grows and gathers attachments. Change means to strip away that which is known of an object and to replace that with what is now known.[38]

The scientific researcher applies what they know of natural objects they are testing in order to learn more about them. The process is logical and rational. Through the application of Scientific Management principles to the manufacturing process, the process worker applies similar steps, albeit absent of either the intelligence about what it is they are doing, or maintenance of the context in which they are doing it. It is from scientific research that industrial processes

[38] See discussion on change in §9.2, on page 194.

originate, transformations mapped, waste eliminated, and conditions made manifest so that production may commence. To that end, Dewey (1939) says that the artificial simplification or abstraction that is a necessary precondition of the production process is complex. To achieve it destroys those special characteristics that identify an object as unique. Problems arise when abstractive processes are applied to social and moral objects.

Dewey distinguishes between methods of operation that affect and effect physical, social, and moral objects, and refers to them as kinds of reality. In its efforts to create a rational reality, the technological human has stripped away and destroyed those special characteristics that denote humanity. When that which makes sense for us as humans, are naturally forming human behavioural characteristics (the irrational), then the created reality of the technological human is rational. This then is the call that rests upon technological human; to come to terms with the paradox it has created within the juggernaut.

Zimmerman (1990) says that Heidegger and Jünger have similar views on technology, that "it could not be understood in terms of social, political, or economic categories; instead, the socio-economic structures of modernity, including great industries and mechanical warfare, were the empirical manifestations of that which transcends the causal-material realm" (1990, p. 46). For Jünger, the appearance of modern technology is the latest manifestation of the Will to Power, and the essence of technology is that humanity has become the primary instrument required to carry out this latest phase rather than its mechanised or technological state. Heidegger maintains a variation of this when, Zimmerman says, he concluded "the essence of technology was the disclosure of all entities as standing-reserve for enhancing the sheer Will to Will" (1990, p. 46). Where art is produced, in the Greek sense, and thus the being of an entity through its production is disclosed, then technology too is a mode of disclosure driven by the Will to Will, that Will which exercises its will upon itself for the sake of itself, for no other purpose than its own further expansion. Such expressions of Will are the gathering of momentum in the 'system,' the juggernaut, which in the end, entwines the human into its purposes and engulfs it with its own Will.

Toffler (1972) mirrors Heidegger's concerns about technological development and its effect. In *Future Shock*, he describes the possible impact of technological innovation where the effects of change are occurring at an alarming rate and that this is transforming the socio-political landscape in dizzying and even dangerous ways. He posed the question: how can it be that for existing institutions their social practices, values and expectations can keep pace with increases

in the development of new devices and systems? Heidegger says that innovations have often been depicted as labour saving, giving the consumer more time for leisure, for example. Instead, the result is that the time made available for leisure is consumed by the need to make money to pay for more labour saving devices. Another issue Heidegger raises is that innovations are often portrayed as solving problems when instead they give rise to new and usually unforeseen problems that may prove to be more damaging than those they were intended to resolve are.

In the more than two decades since Toffler (1972), it has become apparent that changes in society have occurred and whether or not these are the result of technological advances, it appears that users of technology aren't as concerned about such things as Toffler thought they ought to be. Instead, the technological human has incorporated technological developments into its personal and Work life, crossing barriers with the expectation that the person ought to be able to use the same technologies that are available, in all aspects of the person's life (Majchrzak et al., 2009). The person almost seems to appear to have an inexhaustible scope for expansion since they became the domesticated technological human. From the time that humanity had a direct a relationship with nature to now, when the technological human exists as an abstraction, the technological human has become malleable, able to be bent to the system's Will, with purposes applied as befits the occasion.

6.3 Dystopia

Zimmerman (1990) says the likely consequence of the global technological impulse is dystopian. The view of the world through productionist metaphysics shows that motivations for work are driven by external factors and the rewards are limited. Industrialisation on a global scale replaces traditional values with largely economic or utilitarian considerations, blind to personal, social, religious, and environmental concerns.

The promoters of Scientific Management principles reframed conceptions of space and time: they created a reality that is defined as nothing but the quantity of working. Just as the system is driven by the Will to Will; so has Work become work for the sake of more work. Zimmerman (1990) discusses the functionalisation of time and work and the binding of the worker to the time clock in an industrial plant. Through the principles espoused by Taylor (1911), work in industrial plants is organised according to functional processes and workers are either slotted into a production line, engaging in repetitive processes, or organised into production units.

The worker, who is entirely expendable, is reduced to an element in a production unit. In an obscene fractal Mandelbrot Set, the unit is matched to a chain of production units in the plant, the plant matched to other plants for the company, the company matched to others for the corporation with the result; Work is reduced and degraded. There is no difference in function, between worker and machine.

In the materialist philosophy of Marx and Engels (1998), machines are considered as no more than what they are, inanimate objects, and the complex means of production created to fulfil the goals of the capitalist system. For them, the technological means for production is not of itself degrading of the worker; so changing the ownership of machines from the capitalist bosses to the workers ought to create propitious conditions for the development of authentic social relations of production. Contrary to Marx and Engels, Heidegger (1931/1981) argues that degradation is not the result of any particular economic system, the same degraded status of workers can be observed in both capitalist and communist economies, but that it is a systemic result of production in the technological era.

Heidegger (1931/1981) agrees with Marx and Engels (1998) on the point that it is important to view machines as no more than what they are, that they are not autonomous. However, Machines, a class of entity that goes beyond any single instance, are no longer owned by any person or socio-political class. Humanity is itself subservient to the technological system and this is expressed through all parts of a person's life, and can be extrapolated to incorporate the rest of society. Zimmerman (1990) singles out language to show how it has become an instrument serving the universal production process. Local dialects are becoming overrun by Mid-Atlantic Anglo-American and that this is now the de-facto universal language of modern technology. This results in alienation at a local level and the loss of cultural identity, and it may restrict further evolutionary development instead of letting local entities show themselves appropriately through language. People in the dystopian technological era are compelled to use language to disclose things, but through the filter of the global technological system.

Winner (1997) also maintains that technical innovations are no longer the neutral means to ends, but that they help to shape the ends of society itself. He contends that changes to the socio-political domain usually occur without public debate because technologies are not just aids to human activity, they manifest powerful forces that give meaning and direction to humanity, and so he demands to know: "What kinds of personal practices, social relations, legal and political norms, and lasting institutions will emerge from this upheaval? More

importantly, what kinds of practices, relations, rules, and institutions do we want to emerge in these settings?" (1997), while Heidegger (1931/1981, p. 276) insists that, "technology is in its essence something which man cannot master by himself." Zimmerman (1990, p. 202) would reply that, "instead of mastering technology, technological humanity has developed remarkable disciplines designed to master humanity itself, so that individuals will be amenable to the demands of technological society." According to Winner (1986), there are at least five ways that technology might alter the socio-political terrain: (1) Technological advances in transportation and communications facilitate and encourage centralised control in virtually all institutions. (2) The 'economies of scale' associated with new techniques call for gigantic social structures that were unheard of in previous centuries. (3) The rational arrangement of technological systems produces its own forms of hierarchical authority independent of the political realm. (4) Centralised, hierarchical technological systems tend to crowd out other types of human activity, for example agribusiness that displaces family farming. (5) Large socio-technological organisations exercise undue influence on the very political structures designed to 'control' those organisations.

Tannenbaum (1952) and Heidegger (1931/1981) agree that innovations have been depicted as labour saving, giving the consumer more time for leisure. This contention is brought into question if one asks: What happens with the extra time? Time made available for leisure is consumed by the need to make more money to pay for more labour saving devices. It does appear that technology, rather than reducing the amount of work that has to be done, seems to be increasing it. Instead of there being fewer jobs, the number of occupations is increasing and people are performing tasks and incorporating technologies into Work that had not been thought of even a few years ago. In the meantime, some skilled occupations spawned by former technological developments no longer exist, an example being the printing industry's typographer is now extinct in New Zealand and has been redefined as a Graphic Pre-press Trades Worker (Statistics New Zealand, 2008). The role has changed to meet the requirements of new technologies: workers have had to either retrain to stay in employment or find other occupations. There has been a massive growth in the leisure and entertainment industry during the previous and current centuries and it shows no sign of slowing, it looks as though the expansion will grow as fast as ever, if not faster.

There is inevitability in the dystopian view that the human must change fundamentally to meet the juggernaut of technological development despite that Dewey (1938) said change

occurs only at the cultural or societal level. What is the nature of change that needs to be made and in what form, should it take? The technological system creates the new dystopian technological human by making changes to the way it thinks, acts, and responds. What Jünger (1932/2007) recognises as the 'worker' is defined by those perceptual patterns or shapes which possess the qualities of 'worker' but that, as a whole, cannot be described merely as a sum of its parts. It is from the degree of influence of the printing and stamping received by the 'worker,' Jünger claims, that when one talks about Gestalt one is indeed referring to the highest meaningful reality and that the 'worker' makes its appearance through symbols, representations or impressions. In the same way that the 'Gestalt of the worker' embodies the totality that a 'worker' may be, it may be said too that in the technological era, all are expressions of the 'worker-soldier.'

Jünger was influenced strongly by his wartime experiences (for example, Jünger, 2003) with the result that he concluded that the best way for humanity to cope with the onslaught of modern technology was to embrace it wholeheartedly (Zimmerman, 1990). From a utopian perspective, the overman (Nietzsche, 1883–1885/1978) becomes the cybernetic future that retains elements of rational humanity without the irrational and emotional factors that have brought about the nihilism of the West. It was warfare that "furthered the planetary technological *Gestalt* by hastening the industrialisation process in which workers in factories and soldiers on the field became virtually indistinguishable. Soldiers consumed what the workers produced" (Zimmerman, 1990, p. 51). The result is a dystopian world, the relationship between producers and consumers of a perpetual war economy that elevates social and economic progress globally.

Zimmerman (1990) refers to Heidegger's vision of the pre-technological era, a period when humanity still saw itself as part of nature and not as its master, and people were required to adapt themselves to a pre-existing natural order. A time recognisable to the ancient Greeks, in which there was a natural order to things and nature provided all that was good. Dewey (1939) tells us, for example, that Greek science operated with objects in the sense of stars, rocks, trees, the weather and other observable phenomena; but with the advent of experimentation, those objects became data, which meant that they were freed up from the knowledge that had accreted to the objects, so they became subject to further interpretation. They became subjects that could be thought about rather than objects to be observed. Objects are in this sense, completed finalities, they are finished and are therefore available for definition, classification, logical arrangement, inclusion in syllogisms, whereas treating these same things as data suggests that

they have become evidential, indicative, signifying, as clues pointing to some conclusion that is not yet reached. Therefore, as data, they are mediated toward a means, rather than as an end in themselves. The shift in understanding is vitally important because it moves knowing from a revelatory or aesthetic enjoinment of the properties of nature as the result of divine art to one of knowing as a means of control.

Control became secularised, moreover it was freed from the monastic tradition when science and religion were torn from each other,[39] so that the material of nature provided the means by which change could be effected. As Dewey says, "when one change is given, and we know with measured accuracy its connection with another change, we have the potential means of producing or averting that other event... The attitude of control looks to the future, to production" (1939, p. 98). Now, when nature proves unsatisfactory for human purposes, it is reframed so that it at least gives the appearance of correctness, even though it results in entities being represented in ways that are for them, obscene. Reframing becomes necessary to align naturally occurring entities with the human created conception of economic exigency.

6.4 Dystopia and IS

Early approaches to the design of computerised systems in business involved the replication of processes that already existed (for example, Gane & Sarson, 1979). The Transaction Processing System (TPS) and its derivative information systems are now ubiquitous in the enterprise, having established a tight technological web that links all enterprises. The movement of the technological system is as a juggernaut that has been built around the exigency and expediency of pragmatic business mores. Checkland (1997) provides the example of those systems designed for the accounting focussed business environments that are designed with transaction control and processing in mind which reflects, the company's business processes. The Accounting Information System (AIS) is clearly definable by its sets of processes and flows of data. It has become a model for predictability and its form is observable in information systems of various kinds. From Heidegger, the Will to Will of the technological system moves towards a manifestation in which the system strives for ever greater production for its own sake. Zimmerman (1990) takes the position that the technological human is lost in the workings of the technological system, so that they have become irrational and must keep trying to improve

[39] Religion tended to be focussed on historical values and viewed objects as already finished, complete. Importantly, the attitude that objects are complete also suggests that they are beyond the control of the person. By extension, conduct, if viewed objectively, can therefore be seen as a means of exercising control, or as a fixed role that has been handed down from the divine.

what they have built but the "usual 'means-end' interpretation of instruments... makes no sense when applied to the technological era: humanity has become the 'means' for an end that lies beyond human control or ken" (1990, p. 201). In the Will of the technological system, the human participant finds its place increasingly marked by the requirement to come to terms with the juggernaut. The human participant, the technological human, must incorporate technological developments into its personal and Work life so that the person can better express the Will of the juggernaut.

Tannenbaum (1952) tells how the separation between the life and work of the individual in society was in part caused by the industrialisation of society. Masaryk (1938/1971) says that this process of separation was accompanied by the creation of the Work ethic, which is that Work is seen as something essentially good and of benefit to society. Socially and culturally, there became a distinction between what you were paid to do when earning a money wage, and living a decent and moral life outside that with family and friends. This has created in society a polarised existence where a person's value is placed on their paid occupation and those who are not wage earners are seen as something lesser, as cop-outs from legitimate aims and aspirations. Whether this has changed the nature of the human, as Dewey (1938) said, there may be some doubt.

The human in its most basic form is social.[40] Regardless of whether looks at humanity through the lens of tribalism or the simplified modern nuclear context, humans crave the intimacy of contact with each other. This means that communication for the human is fundamental for it to maintain and build its relationships with other humans. The advent of the cellular telephone has changed the way that people engage in communication, although it has not fundamentally changed the human need for contact. Instead, it offers greater access and opportunity for the fundamental urge to connect and communicate. Before the widespread acceptance of the use of cellular technology, it was accepted and normal, that one might spend hours or days out of communication from their peers, family, friends, and colleagues. The social fabric of society was as much filled with the pauses in communication as it was with the interactions. When two people who had not seen each other for a period met, they would typically exchange greetings and a complex series of interactions would ensue, often in tandem. They would: (1) Re-establish their social framework, such as the social placing or level, relationships, interconnections with others in the same social network. (2) Reconnect at an

[40] Refer to §1.4 on page 19.

emotional level with where they were in their last encounter: if their previous encounter had been awkward or tense, then that would be the emotional state that predominates from the beginning of this encounter. (3) Update each other on what had occurred since their previous encounter, based on those points of commonality that exist between them. (4) Relate goals and aspirations, especially those that have been progressed. While doing these, they would (5) compare what they have seen or learned in the intervening period.

The introduction of the cell phone into the life of the technological human has had the effect that periods of non-communication have become interstitial. The expectation is that the technological human should be in constant contact: a curious reversal of the position taken by both Tannenbaum and Masaryk. In this instance, the cell phone has become a unifying technological artefact progressing the Will to Will of the technological system, and that draws the Work life and home life of the technological human together. It closes the gaps between communications instantiations, provides the immediacy of contact, but at the same time it merges burdens from the paid occupation of the individual with their other lives. It brings the pressures of belonging to polarise social orders into the same space and this creates friction and tension. The Will of the juggernaut is a constant reminder to act for the sake of its Will.

The technological human is subservient to the technological system and what is seen in the case of the person is reflected in the millions who are also tied in to it. The cell phone is no longer just a means of communication; it is now a means to produce. The cell phone has moved from a communications device to a platform that permits the ongoing of Work even after the end of the working day. The mobile platform allows the technological human to conduct their work regardless of location, and facilitates the speeding up of certain kinds of transaction that might otherwise have required them to travel to a point where they could gain access to the information systems that either provided detail or where they could update or add new information.

It seems inevitable, in the dystopian view that the technological human must change fundamentally to accommodate the demands of the juggernaut. Change occurs at the level of tradition or culture (the efforts of conservatism notwithstanding). What is the extent of change? Dewey (1938) says that human nature is essentially plastic and to change the nature of the person requires education, while there are certain properties of human nature that appear constant. He cites the example of the constant state of war and that the human is combative with an instinctual need to wage war. The human displays pugnacity, fear, pity, and sympathy, the

human responds to stimuli through its instincts and war, he says, is merely the channel through which those responses are expressed. Just as the theatre of war may close and reopen elsewhere, those factors are to be found in cultural institutions or artefacts, whether one looks at family, religion, legal systems, or government, and they are all subject to change. The requirements to eat, sleep, reproduce, and so on are fundamental to the design of the organic species, but in themselves, these are properties of the person. Without them, the person does not exist. Through accommodations to the Will of the technological system, the technological human has learned to survive in the industrial landscape. The technological human has shed values and moral codes in favour of securing a money wage and has created for itself a technological society that is predicated on the manufacture of industrial goods rather than social goods. The technological human is a cultural artefact, a by-product of technological society, and together they have produced the juggernaut. Thus, the Will to Will of the juggernaut effects change on the technological human.

The separation between the human and nature, and its own nature to some extent has occurred as it has become subservient to the juggernaut. Nature often sets up inconvenient impediments to the progression of the juggernaut of the technological system and so nature is reframed. By reframing, technological change at least gives the appearance of correctness even though it results in entities being represented in unexpected ways. Most are familiar with the image of the call centre, occupied by rows of cubicled workers producing words like battery chickens producing eggs, performing virtually mindless acts from scripts that are provided for them on their computer screens. One may have seen the video clip of the worker who explodes into a rage and proceeds to kick their computer along the passageway while their co-workers look on in shock. The image is parodied and exampled throughout both fiction and non-fiction. Reframing becomes necessary to align naturally occurring entities with the human created conception of the economic model. The call-centre is the epitome of order and control, where processes are provided to deliver appropriate responses for any likely stimulus. The worker exists as part of the chain of events through which the caller is channelled with their enquiry or complaint, and there is no scope for variation unless the call is escalated to a point where some autonomy is allowed. Is this a natural state for the human? Jünger said that peace could only be found when you release self-control and give it over to the machine. The rational existence that permits only specific responses runs counter to the apparent state of chaos that defines the mind-states of most people. Depression and frustration are by-products

of the relinquishing of the supremacy of the self and giving it over to the machine. Suppression and depression are the lot of the technological human who is lost in the dystopian system of productionist metaphysics.

6.5 Productionist metaphysics and Web 2.0

Escape from dystopian productionist metaphysics lies in one's capacity to belong through attachment to one's own beingness. To belong to a social and cultural formation, future or past, or that part of the system that offers the most pleasure or the least pain. Accepting that for the modern human, its destiny is as much tied to that of the system as it is to its own. Tannenbaum (1952) refers to the pre-industrial period when a community was defined by the interconnectedness of its parts through social frameworks or environmental dependence. There existed complimentary development of skills so that in the community, there were always those who could ensure that at least the essential functions of society were kept in order. Social mores based on traditions, values, a shared history and a spiritual link that tied the community together, kept aberrant behaviour in check. In the process of industrialisation and the movement toward the urban environment, humanity lost these anchors and workers from the country became fodder for the formation of the juggernaut. Their future became inextricably tied to the fate of the industrial complex, and all knowledge of their previous history was lost in but a few generations.

Is there an escape from the juggernaut or should the person retake control of their Will? Perhaps escape requires a reversal of the process of which the technological human is the result, such as those who opt out of society and reject the apparent purposeless of productionism. In the extreme are Marxists who advocate the destruction of urban social structures and a return to the rural existence of peasant life, such as the case of the Khmer Rouge in 1970s Cambodia. For most, the possibility of becoming Luddites and rejecting technology is entirely alien and consideration of an alternative must be given: the technological human must take back control of its destiny and regain attributes lost in its technological transition.

The development of Web 2.0 technologies has seen a move away from dystopian productionist metaphysics by bringing into the design process, human factors of participation, development through the open source community, distribution through syndication, and allowance of change and variation through the concept of the perpetual beta (Sutter, 2009). These

factors redefine Work from being solely a means of production, to include social aspects that take into account the natural propensity for the technological human to network, and accumulate links in order to build value. Thus, Work is separated from the means of producing through the application of specific tools. Zimmerman (1990) refers to the manner in which tools that function as designed, effectively disappear from the worker's consciousness and only become visible when "they are *missing*, when they *don't work*, or when they *get in the way*" (1990, p. 139). However, Web 2.0 itself has become a phenomenon, the technology has begun to lead organisational changes.

Through the lens of productionist metaphysics is seen the distinction between 'production' and 'making' in the Greek sense, and 'production processes' in the technological age, where the industrialisation of the West has brought about the formation of the juggernaut that produced a technological society and human. As discussed, the technological human faces a purposeless existence, and in response to that realisation, technological humanity attempts to rationalise its world. The technological human's attempts at rationalisation have their appearance through defining every other thing a purpose or its use as an instrument, and Web 2.0 is one such attempt at rationalisation. In this case, Web 2.0 is a set of tools, each of which that are not in themselves new or innovative. To redefine those features under the banner of Web 2.0, O'Reilly (2005/2009) mentions the place held by data, that the architecture encourages participation amongst users, so that the collaborative nature of the open source community can be leveraged to generate applications. Readers can participate by linking to content updates and continuing the sociotechnical trend, and the acceptance that application development is both never ending and is led by the users and readers of content. These features produce for O'Reilly the concept of 'Web 2.0 as a platform.' Whereas the Internet had been perceived as a means of distribution of content, now it is a major component of the technological age.

While for technological humanity, there is a sense of completeness and security in knowing that all exists because it is meant to be, this sense masks purposelessness. Technological humanity's self-realisation, that it has lost its human purpose, creates the conditions for the rationalisation of the productionist world it finds itself in. If technological humanity's destiny is tied to that of the technological system, and if the system fails, so too does the technological human and the worlds it has built. Therefore, the technological human is tasked with maintaining the system to protect the system, itself, and its worlds. The purposes of industrial manufacturing from its early days, for example, that employment in manufacturing would

keep the idle employed, keep the poor warm, and "fill the mouths of the hungry" (Niles, 1823, p. 259) is lost now. It is but the Will to Will that keeps the juggernaut rolling and here lies the means by which purpose for the human may be regained. If all that the technological system demands is to produce in order to produce, then the directive may be redirected to fit any purpose the technological human desires. Web 2.0 is a technological artefact that as a collaborative environment, it exists as a set of tools that can be applied to any task with a purpose. This point supported by O'Reilly (2005/2009) who says that the platform concept of Web 2.0 serves various groups in differing ways, from it as a platform for business, to a communications channel for marketing, to providing infrastructure for new media distribution for journalism and entertainment, and as a platform for software development for developers.

The features found in many Web 2.0 applications that Kim et al. (2009) refer to can be used to bend the purposes of the technological system in productionist metaphysics. First, Web 2.0 relies on the willing participation and collaboration of contributors to both its development and use. As more Web 2.0 applications such as social networking sites, syndication of news feeds, creation and maintenance of blogs, and sharing of media files like photographs and video are created, then, the more Web 2.0 is able to remediate the social functions that Tannenbaum (1952) said had been eliminated from society. The wiki provides an example of both participation and collaboration for contributors to work together with a common goal or aim in mind, but the form is not determined by the system. Therefore, the purpose of the wiki is not defined by the technology but by those who use it.

Dennison (2007) makes reference to a fear that the introduction of Web 2.0 tools into the enterprise will result in some kind of corporate meltdown and that its secrets will be held manifest. However Majchrzak et al. (2009) illustrate that the reverse is true, that the person will use technology in a responsible and knowledgeable fashion. Such examples as Majchrzak et al. (2009) and Dennison (2007) provide support for the premise Tannenbaum (1952) made, that the workers who found themselves displaced in a foreign industrialised urban environment set about rebuilding some of the social fabric they had lost. The rebuilding of social networks and the re-establishment of moral and ethical boundaries represent the part that Dewey (1938) refers to: the human form that is natural and slow to change. In Dennison (2007), BT workers, rather than acting maliciously or irresponsibly against their employer, acted in a way that was positive and responsible and the system provided proved so popular that it quickly became overloaded. Their Work, in association with their desire to be morally and socially good,

enabled the workers in BT to construct a purposeful social network that was beneficial to both themselves and the enterprise. The social networks they built take the concepts of participation and collaboration further in order to fulfil social and cultural norms. Social networks, say Kim et al. (2009), are built to facilitate the establishment and maintenance of social connection both in private, public, and Work oriented situations.

6.6 Conclusion

The technological world, as an abstraction, exists within the minds of those who have established it. This is the form of the juggernaut, which is not a physical manifestation of some technological horror but the sum of the collective Will of those who participate. For every person, the juggernaut takes on a different appearance and form that is composed of the instantiation of the component parts with which they interact. As a whole, the technological world can barely be perceived by the technological human because for it, the system is too large and too complex to hold in its mind. Yet, does this put off the human participant? It seems not, with increasingly larger numbers joining the throngs in the Web 2.0 space. Are their efforts to be involved a conscious and deliberate act to escape productionist metaphysical pressures? There still exists in the technological human attributes that denote its humanity as a moral and social animal and that it is those desires that continue to draw it back to its natural state (Masaryk, 1938/1971). Web 2.0 provides the means by which they can use the 'system' to express those desires, whether consciously or otherwise. However, to escape productionist metaphysical constraints, the tools provided in the Web 2.0 space need to lower the barriers for the technological human to engage to the extent that any personal inertia that prevents engagement socially, is overcome. Web 2.0 applications ought to provide an interface through which the technological human can interact, share, and access Web content. Consistency is therefore vital to their success and so too are the languages that are used to develop them. Kim et al. (2009) refer to this as the 'rich user experience,' seen in the case at IBM where communities have sprung up inside the corporate structure of the enterprise. Consistency goes further, where a logically structured environment enables interoperability between communities and to be realised, requires that an abstracted version of reality must be created so that a generalisable schema can be created.

The call for the technological human is for it to come to terms with the juggernaut. To challenge the juggernaut head-on will not produce anything but undesirable results since they

are part of the same 'system.' In coming to terms with being, the technological human must take recourse into what is for it, the customary and traditional habits (Dewey, 1938). Dewey says it is "hard to teach an old dog new tricks and it is harder yet to teach society to adopt customs which are contrary to those which have long prevailed" (1938, p. 9). He says there are few social changes that can be opposed because they are contrary to human nature itself. The technological system is an expression of the natural human urge to make, produce, and therefore Work. The 'system' has produced the phenomenon of Web 2.0 and so by proxy, Web 2.0 is no more than an expression of the human urge to make and produce. Dennison (2007) claims that much of what makes social media successful on the Internet, does not directly translate to the corporate environment. He mentions the concept of the 'wisdom of crowds,' where 'truth' can be exposed if there are enough people 'producing' on one topic, but questions whether that would necessarily apply in the corporate context where the population is smaller. What Dennison seems to fail to appreciate with this question is that Web 2.0 expands the territorial boundaries that were limited by corporate designations. The abstract conception of the 'company' is limited by the traditional organisational structure, where the gate-keepers of the enterprise need to learn that they can have faith in their workers to Work in the best interests of the organisation.

Unless the enterprise learns by what is happening in the world, then the effects of social re-engagement will overtake it. The enterprise adapts and learns to change its nature will survive; those that do not become dead-end in a game of technological evolutionary advantage. The gathering of momentum in the 'system,' that has entwined the human into its purposes and engulfed it with its own Will, must do the same with the enterprise. The enterprise is a social artefact produced by human endeavour just as Web 2.0 is a technological artefact and together they are part of the destiny of the technological human. Efforts to resist the influence of the technological system are in vain and so with the enterprise too, must come to terms with the juggernaut.

The technological human that has come to terms with its place in the 'system,' incorporates technological developments into all parts of it, and this is extrapolated to incorporate the rest of society. In the merger of personal and Work life, the technological human has no more social, cultural, or traditional barriers to overcome. The cycle of separation that started with A. Smith (1776/1937) is closed and the technological human, irrevocably changed from that 'country innocent' that first washed up on the urban shore to earn a money wage. The technological

human seeks return to the community-sense that was lost, but finds that sense in Work and through technology, in this instance Web 2.0. Just as productionist industry reframes nature to suit momentary purposes, so has the natural state of the human been reframed, to include Web 2.0 in the make-up and purposes of the technological human.

In chapter 7, democratisation of Work is viewed in relation to the technological artefact, Web 2.0. Work, that had previously been defined in the productionist context, is redefined under the lens of democracy. The democratisation of Work represents a shift in the asymmetric distribution of power in the enterprise, where the role of the technological human now has access to mechanisms and processes that allow greater participation in formative decision making. If the democratisation of Work is to be successful, then responsibility must be passed down through the enterprise, and the person or team given a high degree of autonomy. This gives rise to the conception that the person is less subservient to the technological system and adopts the status of 'participant.'

The redefinition of Work provides the opportunity for Work and associated environments to be reframed, and that means the natural state of the human is reframed to include the technological human and the 'participant' as the naturalised technological human.

Chapter 7

Democratisation of Work

7.1 Introduction

In chapter 6, I argued the part that productionist metaphysics has played in the evolution of the technological human. To summarise, the meaning of 'produce' and 'production' has changed so that for the 'ancient Greeks,' 'production' and 'making' was the means by which products change be released from their source, disclosively. 'Production' employed in modern industrial technology, on the other hand, is the result of industrial processes in which 'product' is the result of rational processes. The rationalisation employed by the technological human masks a purposelessness that is represented by a movement away from the disclosiveness of 'production,' and towards a manifestation of the Will to Will, where the technological system strives for ever greater production for its own sake. A differentiation is then made between what is art appearing through disclosure, and products that are manufactured through an industrial process.

It was argued that the technological system is based on an economic model, whereas what was previously the case for pre-industrial humanity, 'production' was determined by nature's exigencies rather than the exchange value of goods and services. The result of the transformation of the human from living a natural existence to existing in the industrial complex has created an abstract technological world. However the technological world masks the purposelessness of 'production' and therefore, those tasked with producing have no purpose either. It is in this state of perpetuated production fulfilling the Will to Will, that the technological human's sense of self and itself are abdicated. It is more important in this new

reality to Work to enhance the power of the technological world, than it is to contribute to the well-being of humanity. Therefore, the technological human, to find any benefit in the technological world, must come to terms with this new reality and accept that it is little more than a particle in the juggernaut.[1]

Thus, in chapter 6, I have argued that to come to terms with the juggernaut, as the 'system,' the technological human is required to incorporate technological developments into all aspects of its life, personal and Work. The technological system is, for the technological human, its new natural state and developments such as Web 2.0 provide an interface where the technological human begins to regain its sense of self, its beingness, and a return to its own Will. 'Production' in the Web 2.0 space is irrational in the sense that producing art is irrational; 'production' is a disclosure that provides the means of escape from productionist metaphysics. In so doing, the technological human recaptures the sense of community it lost when it became the innocent on the urban shore. The technological human re-negotiates the moral and social boundaries of its societal existence through reconnection to the values, norms and mores that had been forgotten under productionism.

Therefore, chapter 6 concludes with the notion that Web 2.0 confounds political and economic models, based on nineteenth and twentieth century ideals. The individual is king, not compacts, and the crowd is an alignment of viewpoints, desires, wants, needs, social ties, political positions, and so on. Such alignments may shift and in the Web 2.0 space, they often do. The concept of the wisdom of the crowds, when applied to Work, brings forth the expectation in the person that they may choose to align themselves with certain policies in the workplace, or they may choose to partake of specific Work practices because they bring about positive change. The Web 2.0 phenomenon allows the technological human to participate in decision making processes in Work and so Web 2.0 facilitates the democratisation of Work.

In chapter 7, I bring the arguments in chapter 6 forward, by putting under scrutiny the role that democratisation has in redefining Work from its source in productionist metaphysics, while under the influence of Web 2.0. In §7.2, the process how democratisation of Work as a shift in the asymmetric distribution of power in the enterprise, is explicated, as is the role of the technological human in the enterprise who has access to mechanisms and processes, and has greater participation in formative decision making.

[1] See the comment in footnote 31 on p. 59.

In §7.3, I argue for the concept of participatory democracy, particularly in relation to its application in what are typically understood to be autocratic organisational structures found in businesses and enterprises. I present the argument that early information systems, those that were designed to replicate work practices found in enterprises, were conceived as automation machines, separated physically, emotionally, and psychologically from the systems operator. That information systems stood apart from the operator as machines in the workplace, and the operators of them, were regarded only as the end-users of the system.

It is shown in §7.4, that through democratisation of work practices and decision-making through power sharing, and where end-users have the capability to adapt systems to suit individual requirements, then these same operators or end-users are now more properly regarded as 'participants' in the system. 'Participants' are not just operators or end-users of information systems, therefore. They engage with information systems to perform Work, as it is required of them. Work is purposeful directed action, but since the purposes for which Work is undertaken is mutable, so too is Work. This then means that the natural state of the human is reframed to include the technological human and the 'participant' is the naturalised technological human.

In chapter 2, humanity sacrificed its Dasein to have security inside the technological system. This position is extended in chapter 6: that technological humanity's sense of security is both found in the rationalisation of natural phenomena and finding for the irrational, some use or purpose. However, in chapter 5, security is also presented as a resistor to change, particularly in the enterprise where systems are entropic. In chapter 7, a further dimension to security is added wherein the technological human gets, for the price of its Dasein, admittance to subjugation through the asymmetrical distribution of power in the enterprise.[2] Further, in chapter 6, reference is made of the millions of internally displaced persons who washed up on the shores of the industrial complex. The combined effect of being ripped apart from their roots and in finding themselves in an unfamiliar matrix of asymmetric power distribution, workers tried to form mutually supporting social organisations: trade unions.[3]

Thus, the first new argument in chapter 7 is: that technological humanity is not a homogeneous group, nor is the institutions it created. Therefore, power asymmetries will be correspondingly diverse.[4] Further, while the motivation for maintaining power asymmetry

[2] 150:2–150:8. 164:13–164:18.
[3] 151:21–151:31.
[4] 150:9–150:12. 153:4–153:12.

emerges from the need to ensure that decisions are made and instructions are carried out,[5] unfettered facilitation has provided the opportunity for some to obtain apparently limitless power.[6] Additionally, technological humanity, disenfranchised, seeks confirmation and recognition as much as security. Engagement in the decision making process authenticates the existence of the person, so that the person may be recognised. Further engagement confirms status and power within the enterprise.[7] Where this is prevented or refused, the person may opt for unresponsiveness, ambiguity, or contrariness.[8]

In chapter 7, the second new argument is: whereas promises of rationality, purpose, security and freedom from the irrationality of nature have attracted the technological human to productionism, technological humanity is repressed through enterprise autocracy. However, participative democratic processes allow a greater freedom than that offered. Such freedom demands engagement and the technological human must face moral and ethical choices that had previously been decided for it. However, the possibility of success is improved in a heterogeneous population.[9]

In chapter 6, technological humanity is counselled to come to terms with the juggernaut and to regain the sense of self by addressing the knowledge that technological humanity never lost it. In chapter 5, the argument is presented that creativity, as a property of the person, cannot be extinguished and therefore provides a means for obtaining mastery over the juggernaut (the technological system). In chapter 7, I extend that argument: that participatory democracy provides a mechanism for self determination and thus, mastery over the juggernaut.[10]

The third new argument is presented in chapter 7: that usually, when a technological artefact requires definition, it is defined by technologists against a technical framework of understanding.[11] Then, when problems are identified, they are framed so that the solution will be technical in nature. I argue that this approach selectively excludes natural phenomena and ensures the technological system remains in supremacy[12] and any natural phenomena that are included must be described in technological terms.[13] Therefore, the technological system exists

[5] 151:4–151:5.
[6] 151:7–151:12.
[7] 154:5–154:10.
[8] 155:18–155:24. 167:18–167:26.
[9] 155:32–156:6.
[10] 159:21–159:25. 160:15–160:20.
[11] 162:7–162:9.
[12] 162:12–162:14.
[13] 162:14–162:17.

through a process of selected cause and influence[14] and all of humanity that is encompassed by the technological system is of the standing reserve, regardless of rank or function.[15]

In chapter 7, I reconceptualise Heidegger's standing reserve as data.[16] In its reduced state, the technological human performs functions on data, using the information system as a machine for ordering the standing reserve: the data.[17] However, while the technological human is called upon to be human, a problem is disclosed. The technological human is so much part of the technological system that when the technological human is called upon to reveal its Dasein: is it the technological system reveals its essence or the technological human?[18] The nature of humanity is to connect and as part of the technological system, technological humanity connects not just as a supplicant to the machine but also as controller. The equalising force of the connection enables technological humanity to adopt the essence of the system and to enframe it. Altering the technological system gives humanity the advantage.[19]

Further, in chapter 7, I assert that engagement with the technological system provides the technological human an opportunity to disclose the system's essence, and allow the technological human to gain mastery over it.[20] This is an important distinction with Heidegger. He wrote at a time when the machine was huge and monstrous and created a blot on the horizon. The technological system of today is writ in the small. It is ubiquitous, and as part of the juggernaut, it is vast and inescapable. There is no opportunity to reject the system where all are born into the technological age. Thus, the only opportunity that presents itself is to become of the system, and gain mastery over its essence. A key to engagement in participation comes from the education of the person and creating an environment that is enriching. When the person becomes part of a greater social organisation, other opportunities for enrichment and learning present themselves.[21] The mechanism of communication technologies provides opportunities for engagement and learning by positively affirming acceptable behaviour.[22] In addition, deliberation through communications technologies strengthens inter-group relations[23]

[14] 163:13–163:24.
[15] 164:19–164:27.
[16] 164:6–164:7.
[17] 164:9–164:11. 167:5–167:7.
[18] 164:11–164:13.
[19] 167:11–167:17.
[20] 167:27–168:13.
[21] 168:14–168:23.
[22] 168:24–168:27.
[23] 168:28–168:32.

7.2 Asymmetric power

Power asymmetry exists for any person whose existence is within the artificiality of a hierarchical organisational structure and its authority. Thus, power asymmetry exists for the technological human. Specifically, the technological human abdicated its responsibility to self, when it adopted a servile existence inside that of the 'systems' Will. The technological human traded its will for a sense of security and, paradoxically, independence. This independence afforded to the technological human takes the appearance of seemingly major and important decisions, while truly life-affecting choices are made by 'authorities' and are outside its control.

Asymmetry of power in human relations takes various forms. Typically, it refers to differences in the power relationship between parties (say between management and employees in an enterprise), but from there it becomes more difficult to define because power is perceived or exercised varies. Investigations will lead one through a maze of management, political science, sociological, and psychological domains, each of whom use their own epistemological frameworks and language to refer to similar, naturally occurring phenomena in human interactions. For example,

> ... under management's asymmetric power, co-operative practices paternalistically alter workers' descriptive perception of workplace reality or their normative sense of their own preferences and interests in ways that serve managerial interests. The proposition, in the argot of economists and cognitive psychologists, is that capital suppliers' managerial agents, acting either in the distributive interests of their principals or in their independent interest in managerial control, use their bargaining power to generate "endogenous" changes in the "preferences" or "perceptual frame" of weaker contracting parties. Stated in the terminology of critical theory, employers exercise domination over workers through "hegemonic" transformations in worker consciousness or ideology, either as an alternative or a supplement to coercive forms of control. In lay terms, co-operative schemes "co-opt" workers. That is, such schemes do deflect workers' group choice over workplace governance modes, and in a systematic direction — away from the full collective bargaining that the New Deal policy equates with objective "industrial democracy."
>
> Barenberg (1994, p. 762)

Power asymmetries are viewed across lines such as race, gender, class and position, access to authority and information, economic power, social and political influence, degrees or lack of respect (Barenberg, 1994; Bowman & West, 2007).

Asymmetrical power within the enterprise emerges from the need of management to ensure compliance for decisions that have been made. To make decisions palatable, they are cast in "the dual language of instrumental discipline and non-instrumental consent or commitment" (Barenberg, 1994, p. 771). This was especially true in the 1930s, at the height of the machine age where the technological system was in its ascendency, and fears of the cybernetic human were promulgated. Managers were under intense pressure from mass labour unrest and political challenges to their apparently limitless managerial authority, to adopt approaches that revealed a greater sense of moral authority, while the union movement had already become politicised. Vallas (1999) refers to a manifestation of productionist metaphysics in industry as 'Fordism.' Taylorist principles had been universally adopted into the motor vehicle manufacturing industry in the United States by the second decade of the twentieth century, and this created a technological system that had inculcated related industries. Prichard (1999) suggests that the industrialisation of Western society produced anxiety in workers (a point supported by Tannenbaum, 1952) and that a defensive reaction was to pursue strategies of control that would secure the identity of the controlling groups. The result was, rather than the emancipation of humankind, that power relationships that had existed before industrialisation were reproduced within the framework of industry and enterprises individually.

For the reasonable person, it is a fantasy to suppose that any enterprise might exist without some degree of power differential, and it is a characteristic of human nature to order itself and its world into ranking systems and hierarchies.[24] However, the industrial system stripped the individual worker of their 'natural' place in society. Whereas pre-industrial humanity lived by values that were attached to their society before, within the technological system, ordinary meanings that make life acceptable had evaporated. To fill the void, illegitimate means for the attribution of power advantages were built, such as the 'company union.' Barenberg (1994) says the 'company union' is, in some jurisdictions, a lawful body formed within and sanctioned by the company. It was created to replicate the naturally forming society, which the dislocated worker craved. The industrial juggernaut had destroyed societal frameworks so workers sought to form their own social units, based on their occupational employment: these became 'trade

[24] Refer also to the discussion on the Aristotelian perception of hierarchy on p. 113.

unions.' The worker needed a place to stand.[25] However, the 'company union' was a reaction against trade unions and invoked practices that transformed workers' consciousness of what they ought to desire and be interested in, how they ought to react and behave, and how they ought to work to safeguard the future of the company (1994). The principal aim of the 'company union' was to place the interests of management and worker in phase with each other.

If management seeks to put workers in phase with its decisions then it needs to have a means of controlling responses in given situations. Asymmetric information distribution has been used as a deliberate ploy in industry. For example, Barenberg (1994) says the company union has been used to create a conditioned employee representative. The union representative would be bombarded with company-biased information and arguments about workers' performance, but at the same time, making certain that the representative was well aware of their favoured status and apparent role of building solidarity. However, the representative would likely also begin to regard themselves as part of the management team and its machinery just through constant exposure on a cordial basis. To the representative, rank in a status hierarchy is addictive and since the effects of largesse wear off quickly, greater degrees of satisfaction are called for, but the greater pain is loss of status. To assuage the pain, the representative is increasingly likely to seek to find favour with management through the demonstration of information asymmetries over their peers.

That a condition of asymmetric power distribution exists between authorities and subordinates, according to Barenberg (1994), is not necessarily a function of coercion or normative consent. Compliance may just as well be a result of apathy, resignation, unconscious habit or custom, emotional patterns of coping or compulsion, or behavioural or psychic diversions and displacements. Compliance may have been produced from an abstract political stance taken by either the employer or the union, for example liberalism or socialism. Compliance may also be the technological system's representatives expressing their demand to manifest its Will, in effect, as the result of "the pre-reflective dispositions and discursive performances, the inarticulate, spontaneous practices and emotions that suffuse everyday experience" (1994, p. 813). With the loss of social context referred to by Tannenbaum (1952), Barenberg says that his views direct the focus towards the local social contexts that encompass the daily experience of the worker and mediates between them, the enterprise, and other individuals they interact with. He cites

[25] In the Māori language *turangawaewae* or *home ground* represents a place to call home and *ursprung* or arising. It is a bastion to be defended and fought for when the need arises. It is the first and last place of being. It often imbues a physical setting with an emotional and spiritual sense of connectedness and belonging.

as an example, the process of naturalisation in which a new subordinate is introduced to an existing context to find they must comply with its norms because of the existence of seemingly natural or inevitable practices woven into the fabric of Work.

People who engage in Work are not a homogeneous group and any groups that form are not fixed. The desires, interests, and perceptions of the human are plastic and multi-faceted. External influences are exerted upon the person such as ethnicity, generational influences, family status, economic well-being, religious and civic institutions, popular culture, mass media and advertising, and political ideology. These serve to shape how power can be exercised both by and upon the person, such that a group's opinions, desires, and will might appear changeable and indeterminate. This may be illustrated when a person who displays indifference to or apparently irrational changes in its allegiance in response to company attempts at social integration or communications. Barenberg (1994) suggests that the person arrives in an unformed state, and that afterwards volatility is retained.

> At a general level, empirical study and everyday experience suggest that human beings recognize in their behavior that there are limits to personal and institutional integration in tastes. They know that no matter how much they may be pressured both by their own prejudices for integration and by the demands of others, they will be left with contradictory and intermittent desires, partially ordered but imperfectly reconciled… Human beings are both proponents for preferences and observers of the process by which their preferences are developed and acted upon. As observers of the process by which their beliefs have been formed and consulted, they recognize the good sense in perceptual and moral modesty… [T]hey appear to be comfortable with an extraordinary array of unreconciled sources of legitimate wants. They maintain a lack of coherence both within and among personal desires, social demands, and moral codes. Though they seek some consistency, they appear to see inconsistency as a normal, and necessary, aspect of the development and clarification of tastes. March (1986, pp. 156–157)

The human finds security and safety in the non-disclosure of their true self, their feelings or intent, that Barenberg (1994) refers to as 'ambiguity' and 'inconsistency.' Such behaviours are especially marked in settings of asymmetric power and information where the less powerful

deliberately or unconsciously choose "ambiguous preferences and perceptions as a psychological defense against those with the apparent incentive and communicational resources to manipulate subordinates' preferences and perceptions" (1994, p. 871). The human has only had recourse to withdraw either themselves or their co-operation from the asymmetric power relationship between themselves and the technological system. The technological human on the other hand, does not seek security in non-disclosure, but in the expression of self-worth. In coming to terms with their place in the 'system,' the technological human also brings into phase personal and Work life by creating a technological bridge of information flow. Their role in the enterprise shifts from one of abject subordination to active participation in the decision making processes that provide governance to both themselves and the enterprise.

7.3 Theories of participatory democracy

For a person who has lived all their life under a democratic government, they might assume that democracy and participation go hand in hand and that the use of Web 2.0 technologies, suggest an enhancement in the opportunities for an individual to make decisions on things that will affect them directly. However, it is not necessarily the case that democracy involves participation. In this section I discuss what is meant by participatory democracy and how, for example, it might be usurped.

Discussions by authors on the role of participation in the democratic process or democracy normally focus on the merits of participation versus leadership by an élite, and whether or not increased participation weakens or strengthens qualities that denote a system as democratic. In most cases, authors do not address sectors in society other than national and public bodies, and governments, leaving out private institutions since it is assumed that they will be autocratic by nature where democracy has no place. Pateman (1970) specifically addresses this missing aspect of the discussion and so in this section I will briefly outline Pateman's participatory theory of democracy as it applies in industry.

Parallels exist between the participatory theory of democracy that Pateman (1970) describes and the adoption of Web 2.0 technologies in the enterprise. Participatory democracy is referred to particularly on the basis that "democratic idealists have long envisioned a vital egalitarian society, and for them, the Internet represents a means to implement classical participatory democracy" (Margolis & Moreno-Riaño, 2009, p. 18).

Contemporary theory of democracy is described as "a political method or set of institutional arrangements at national level. The characteristically democratic element in the method is the competition of leaders (élites) for the votes of the people at periodic, free elections... 'participation', so far as the majority is concerned, is participation in the choice of decision makers. Therefore, the function of participation in the theory is solely a protective one; the protection of the individual from arbitrary decisions by elected leaders and the protection of his private interests... Certain conditions are necessary if the democratic system is to remain stable. The level of participation should not rise much above the minimum necessary to keep the democratic method (electoral machinery) working... [and] any increase in participation by the apathetic would weaken the consensus of the norms of the democratic method" (Pateman, 1970, p. 14).

Pateman (1970) questions the meaning of the word 'participation.' She says it had become a popular term in politics in the later part of the decade of the 1960s. She provides a careful analysis of contemporary and historical political theorists to present a participatory theory of democracy that includes input from Rousseau, J.S. and J. Mill, and G.D.H. Cole. The theory is applied to group phenomena such as Cole's Guild Socialism and to industry because, she says, it represents a small scale political environment in which the principles of participation are observed through experiment. In this chapter I am not expressly interested in the inner workings of political systems and their relative merits but that Web 2.0 technologies promote democracy in Work, especially in groups, and that they encourage participation from those who might otherwise not be part of the decision making process. In the industrial or management context, participation provides the opportunity to create conditions in which people are able to influence decisions that affect them. Since influence varies, delegation can be viewed as a special case. A subordinate can gain greater control and freedom of choice relative to their responsibilities. McGregor (1960) says the term participation "is usually applied to the subordinate's greater influence within the superior's responsibilities" (1960, p. 124). Participation may be process oriented where, according to Sawtell (1968), it is those processes non-managerial employees use to reach managerial decisions that affect their work, and Lammers (1967) says that it is the legitimate upwardly oriented exertion of power by subordinates.

Schumpeter's analysis of democracy summarises it as " 'a political *method*, that is to say, a certain type of institutional arrangement for arriving at political — legislative and administrative — decisions' " (Schumpeter, 1943, p. 242). Under productionism, the person is absent

of decision making power, but participatory disclosure (production) via Web 2.0 technologies provides a means of escape and an emergence into a greater freedom. The technological human recaptures a sense of its social self when it can re-negotiate moral and social boundaries, and regain the power to make decisions about factors that affect it. The process of making decisions is further enhanced when there exists a heterogeneous citizenry in which there exists a range of attitudes, experiences, and abilities. This provides a stable and flexible system in which partisan loyalties remain somewhat fixed, but change occurs when people or policies exert forces that are onerous (Berelson, Lazarsfeld & McPhee, 1954). However Eckstein (1966) says that government tends to be more stable when it is congruent with societal patterns of authority and he gives two senses in which that may be observed: a close or graduated resemblance. He promotes the inertial effect of productionist metaphysics when he says that economic organisations are an example of the type of government that are too removed from democratic principles, and must stay undemocratic, authoritarian, for fear that changes resulting from the democratic decision-making process may lead to "consequences no one wants" (1966, p. 237). He says that for a graduated democracy to remain stable, there must also be a healthy element of authoritarianism in its makeup, because effective decision-making can only occur when it is present. The second argument he makes in this regard is that people need firm authoritarian leaders and leadership.

In §5.2, Rousseau's conception of Work was described as being wildly utopian, when he suggests that Work teaches about the wisdom of time and a sense of selfness and reality that protects everybody from imagination, passions, and society's harms. However, Pateman (1970) takes a different view, describing Rousseau as "the theorist *par excellence* of participation" (1970, p. 22). She says that his political theory hinges on the level of participation that the individual has in the decision-making process, that it is more than just a protection for or from institutional arrangements, and that it ensures a continuing interrelationship between the work of institutions and the psychological qualities and attitudes of the individual who performs Work in them.

Key points from Rousseau (1762/1968) may be outlined simply. (1) For a participatory system to be successful, certain economic conditions need to be met. That is: (a) There needs to be a society in which its members exercise economic equality and independence; (b) differences in economic equality should not be to the extent that political inequality results; and (c) each person should own some property because this affords security and independence. (2) The

members of society need to be interdependent, yet equal and independent. (3) Voting by independent equals provides a situation in which no one need vote for any policy in an assembly where there is no advantage for themselves when compared with the advantages that might be gained by others. Thus, policy that is accepted is done so on the premise that it is acceptable to all and any benefits and burdens are shared by all and therefore is always just. (4) While there would be tacit associations linked by common interests, ideally, there should be no groups present in the decision-making process, just individuals. However, in a situation where it is impossible to prevent such a formation, then there should be as large a number of groups as possible to dissolve their respective influence. In summary, participation involves decision-making and is a means of protecting private interests and ensuring good government.

The question then arises, how does the technological human exercise effective participation? To which Rousseau (1762/1968), Dewey (1927/1981–1991), and Pateman (1970) answer that it is the system that ought to develop responsible individual, social, and political actions through the process of making effective decisions. Particularly for Rousseau, the key to the success of this is through education, wherein the individual learns to take into account factors that are greater than themselves and that to gain the co-operation of others; the individual needs to see that their private interests are linked to those of the public.

Rousseau (1762/1968) says that once the participatory system of democracy has been established, it then becomes self-sustaining, because those attributes and qualities that are required of the individual to ensure the success of the system are the same as those that the process of participation develops. For the educative process of participation to be successful in itself, the individual needs to be able to exert some control over both themselves and others, and for this to be effective, there must therefore be a degree of freedom. "The individual's actual, as well as his sense of, freedom is increased through participation in decision making because it gives him a very real degree of *control* over the course of his life and the structure of his environnment" (Pateman, 1970, p. 26). To that extent, the individual might be forced into socially responsible action where they are 'forced to be free,' that is they may be obliged to exercise control over those that execute laws and representatives of indirect government. Nevertheless, participation in the process enables the individual's increasing the value of their freedom, because participation enables them to maintain self-mastery, but within the self-imposed constraint of law. By contrast, Dewey (1927/1981–1991) relates the existence of the 'robber band' with that of the 'law abiding citizen.' He says that the 'robber band' can only

exist in isolation from society because it cannot act flexibly with other groups. Whereas the 'law abiding citizen' in a generally law abiding society, finds that if they are part of a political group, then their life will be "enriching and enriched through their participation in family life, industry, scientific, and artistic associations" (1927/1981–1991, p. 328). Thus, as the individual becomes more involved in participation, they learn to be better participants in the process.

The functions Rousseau (1762/1968) ascribed to participation previously, that participation forces the individual to deliberate on matters and it forces them toward freedom, then derives a third function as a result of these two. Participation provides a means of social integration, that the individual gains a sense that they belong to something greater than they do. This integration removes considerations of class and social or economic status much like Dewey's (1927/1981–1991) conception of the "Great Community," a theory in which the aim of a democratic government is to pursue the common interest of the public (MacGilvray, 2010). Public(s) consist of all "those who are affected by the indirect consequences of transactions to such an extent that it is necessary to have those consequences systematically cared for" (1927/1981–1991, p. 245). Bohman (2010) explains that the members of a public are not the direct participants, those who have full awareness of them as engaging in some collective enterprise,[26] but those who are affected indirectly by the consequences of the actions of social and political arrangements. That is to say, the members of the public have no authority or power within their domain. Whenever the individual works on behalf of the public, they become a part of the Great Community. The individual is made to feel that "not only [is] the common weal . . . his weal, but that it partly depends on his exertions" (Mill, 1963, p. 230).

Dewey's view is largely congruent with Rousseau's political theory of democracy but unlike the utopian Rousseau, Dewey accepts that such a democratic form will most likely never eventuate, although through experimentation, apparent conflicts between disparate Publics in a political community can be resolved or mitigated. Dewey suggests that improvements in society come about when the role of the government is to provide the means of communication

[26]Mead (1934) displays a certain optimism at the possibility that the application of democratic norms and ideals in large publics and that those who cross national boundaries will be able to solve problems. Presaging the technological age, he asks whether a conversation might be conducted internationally and that such a question is one of social organisation. Meanwhile Dewey, saying that the primary purpose of any public is to recognise itself as a public, having one that is international in makeup presents obstacles and barriers to that possibility from actuating. "The [technological] age has so enormously expanded, multiplied, intensified, and complicated the scope of indirect consequences, formed such immense and consolidated unions in action, on an impersonal rather than a community basis, that the resulting public cannot identify and distinguish itself" (Dewey, 1927/1981–1991, p. 314). Web 2.0 facilitates the formation of publics, and these may exist on an international scale. Dewey's hesitation appears to be focussed on the inability of those who populate a public to scale social and cultural boundaries and history has shown that this is not the case.

between conflicting groups rather than trying to mediate between them. Rousseau would agree, adding that the major function of participation is that it is educative.

Mill (1965) describes how the individual has the opportunity to gain experience in the management of collective affairs in the same way it is exercised in local government. Real value is to be found in socialism and co-operation and especially as a means of education. Voluntary organisations in small communities that replicate national applications of principles accommodate widespread and disparate participation. The benefits, when extended to a co-operative industrial organisation are outlined. (1) Provide conditions for a 'moral transformation' of those who take part, leading to an increase in production. (2) Instigate a friendly rivalry in the pursuit of a common good. (3) Elevate the dignity of labour. (4) Provide for a renewed sense of security and independence in the labouring class. (5) Transform of the person's occupation from being merely a job to an opportunity to learn about socialisation and matters of practical intelligence. To an extent, Mill considers that the industrial organisation can play a role similar to that of the government in teaching the individual about social responsibility. Principally, in Mill's view of the modern world, the fundamental relationship between the employer and employee has changed so that what existed previously would no longer be maintainable. For this to be possible, "the authority relationship would have to be transformed from the usual one of superiority-subordination (managers and men) to one of co-operation or equality with the managers (government) being elected by the whole body of employees just as representatives at the local level are elected" (Pateman, 1970, p. 34–35).

The utopian perspective presented here, fundamentally changes the function of Work. The labourer's attitude to their Work shifts from that provided by productionist metaphysics and, as a democratic process, becomes educative and enriching for the individual and the industrial organisation on the one hand, and it gives the labourer greater control over both those factors that they can influence, and that influence them, on the other. Bohman (2010) adds that Mill argued for citizens' to be given the opportunity to deliberate on matters that affect them, and by doing so they build knowledge of their current situation (epistémé) and commonalities between them. The discourse that results does not require that they should renounce concrete identities and opinions.

In her discussion of G.D.H. Cole and in particular his theory of Guild Socialism, Pateman (1970) says that Cole's social and political theory builds on Rousseau's argument that it is will and not force that forms the basis of organisations. That means people must co-operate if their

needs are to be satisfied and for actions to be just, that is to not infringe upon the freedom of others, and people need to participate in the organising and regulation of their associations. His is a theory, Pateman says, of associations such that society is composed of them and the individual must be prepared to participate in all those in which they are involved.

Cole's purpose for associations is through the principle that democracy is itself manifest only through its function and purpose. It is through the assignment of functions throughout society that the individual finds understanding of the whole system, a state which cannot be achieved if the individual can only take recourse via a representative or mediator. Thus, Cole makes the distinction between national 'institutional arrangements' and democracy. Pateman (1970) makes the point that the individual needs to be able to participate in all those associations that concern them, and for this to take effect, democracy must be participatory. However, Cole also says that it is in industry that the average person spends the greatest amount of their time and effort and in this arena; they are taught to be subservient to their superiors through their daily occupation. The circumstances of their lives lead them to be unfit for power or responsibility. This is reflected in a politically servile population. Thus, productionist metaphysics provides for the technological human, the training for it to be dependent upon the 'system.'

By what means can the technological human who has been taught to be subservient, then turn around and be self-governing? Cole's reply is that if industry were organised on a participatory basis, then the effort expended on teaching staff to be servile could be equally spent on training them for democracy (Pateman, 1970). Cole's principal objection to the capitalist organisation of industry is that it represents the productionist metaphysical notion, that labour is no more than a commodity and the individual is denied their humanity. The Guild Socialist system is supposed to provide for not only humanity to remain intact, but also that it offers the individual the right of equality and opportunity too. Under his participatory system, first the structure would be flat with all having equal rights of decision-making. Leadership would be provided based on its representative function. Material efficiency, as a prime goal of industry, entails a central focus under Taylor. However, in Cole's Guild Socialism, rather than the motive of profit being the driver, it is instead the motive of free service offered when workers see how their efforts benefit the community (Pateman, 1970). Cole goes much further, describing functions throughout society, leading to a national congress. However, as has already been stated, industry is the manifestation of productionist metaphysics and is largely authoritarian. It is utopian to suppose that industry leaders will simply give up power and

control in their organisation. It is also wise to remember that most industrial organisations that exist in society are 'owned' and their 'owners' have a stake in the running of them and the retention of their claims to ownership.

Principally, Pateman makes the argument that

> ...the central assertion [is] that individuals and their institutions cannot be considered in isolation from one another... The major function of participation in the theory of participatory democracy is [that it is] educative in the very widest sense, including both the psychological aspect and the gaining of practice in democratic skills and procedures. ... there is no special problem about the stability of a participatory system; it is self-sustaining through the educative impact of the participatory process. Participation develops and fosters the very qualities necessary for it; the more individuals participate the better able they [are to do it]. *Subsidiary hypotheses* about participation are that it has an integrative effect and that it aids the acceptance of collective decisions. Pateman (1970, p. 42–43)

Therefore, for a democratic polity to exist it is also necessary for all political systems to be democratised and, Pateman (1970) says, industry is the most important area of a participatory democracy since that is where people spend most of their time and the opportunity to provide education is unparalleled. Pateman identifies three senses or forms of participation from empirical evidence she has investigated: (1) *Participation as control* — the impact of different Work situations affects the psychological orientation expressed by individuals, and is a crucial variable in how much control they are able to exercise over their own job and their job environment. (2) *Participation as satisfaction* — worker's satisfaction with their job is found to correlate to levels of morale, efficiency, and productivity; and (3) *Increases in participation* — for example, job enlargement programmes are designed to broaden the boundaries of the individual's job and increases in decision-making opportunities to give them more autonomy over factors that affect their conditions and productivity.

7.4 Information systems, asymmetric power distribution, and participation

The essence of the technological system is brought into question when consideration is given to the relationship between human strengths and weaknesses illustrated by democracy and

asymmetric power distribution. Heidegger (1954/1993c) identifies modern technology as a means to an end, that everything depends on society having a hand in manipulating technology so that the ends it serves are those of the human who must master it. However, the essence of the technological system lies elsewhere: the definition of technology purely as an instrument or artefact does not reveal its essence, instead the definition describes the functions to which technology is applied.

Attempts at describing or defining technologies are generally left to technologists where questions regarding technology are posed within a purely technical framework. Technical problems are generally framed so that solutions will be technical in nature. In this way, Laudon and Laudon (1991) define information systems as sets of procedures that collect or retrieve data, processes and stores them, and then disseminates information to support decision making and control. However, a definition by technologists does not acknowledge that the system exists as a human manufacture, but that the system is the means and end in itself. The information system they define finds its being in the technological system. Any definitions that do attempt to extend into human terms make reference to terminology generally accepted in the field of IS, for example, that benefits have accrued in the transition from 'manual' methods of information processing to 'automated' or computerised information systems. The range of benefits is specific to the context in which they are designed and implemented. (1) To improve efficiencies in the organisation, redesign business processes. (2) Providing relevant information facilitates business planning processes, thus improving decision making (although the volumes of information produced and the complex nature of businesses also means that middle-managers and executives find it increasingly difficult to monitor operations). (3) Data may be summarised in regular reports and real-time outputs. If these are displayed on dashboards, they may address issues of information overload. (4) The production of reports and real-time views allow operational decision-making to be delegated down with confidence, leaving more scope for strategic decisions and decentralisation of large enterprises. (5) The decentralisation and delegation of operational decision-making processes allow improved co-ordination and integration of specialised roles and activities across departmental boundaries. (6) To evaluate performance and thus to make more effective decisions, various tools and models for management are provided. (7) Improvement in operational processes and decision-making at all levels should lead to reduced costs. (8) In specific operational areas, there may be higher levels of predictability. (9) Improvement in the enterprise's competitive position through cost

reductions, improved processes, better levels of reactivity and customer responsiveness, and better decision making processes.

However, listing expected benefits to the enterprise from the deployment of an information system does not address the ends to which the instrumental technological system is affected. Heidegger (1954/1993c) says the means is that which results from when something is effected, and that the means by which something else is effected is a cause. The cause may also be derived from the end that determines the means and the ends pursued and means employed are led by causality when, as in the example of the information system, instrumentality is a core feature.

In referring to four causes,[27] Heidegger (1954/1993c) addresses the presumption that objects are subject to presencing and that they are, in a sense, lying about waiting for the *causa efficiens* to offer disclosure and that technology, as a means, it is disclosed when its instrumentality is traced back to this fourfold causality. For the field of IS today, the information system exists as the *causa formalis*, an artefact that is definable in the sense that it is a technological object.[28] The technological artefact is itself a mode of revealing where *alētheia* represents the truth of where and how disclosiveness happens, but this does not fit with what the technological system produces. This conception is true of the *causa efficiens* but does not adequately encompass objects produced by the technological system. Early information systems were designed to replicate work practices found in enterprises at the time and this has decided the *causa formalis* and the manner in which *causa finalis* is exercised by those who are tasked to perform the rituals of information processing. The *causa efficiens*, the builder of the technological system, is the whole support structure from designer to maintainer, it is the systems analysts and designers who fill the middle ground between the 'user community' and the 'programming community' (Gane & Sarson, 1979). Within this, where is the Work? What form does that take?

The work to which the technological system is applied is a revealing, but not in the sense of bringing-forth as in *poiēsis*. Rather, it takes the form of a challenging[29] in which nature is challenged to provide data that are stored, are set-in-order, and *set upon* nature itself. This *setting upon* expedites, in the sense of unlocking and exposure, the technological system's drive towards

[27] Aristotle described four causes: " (1) The *causa materialis,* the material, the matter out of which, for example, a silver chalice is made; (2) the *causa formalis,* the form, the shape into which the material enters; (3) the *causa finalis,* the end, for example, the sacrificial rite in relation to which the required chalice is determined as to its form and matter; (4) the *causa efficiens,* in this instance, the silversmith" (1954/1993c, pp. 313–314). These are described in more detail on page 196.

[28] The IT artefact was defined as "those bundles of material and cultural properties packaged in some socially-recognizable form such as hardware and/or software" (Orlikowski & Iacono, 2001, p. 122).

[29] Heidegger (1954/1993c, p. 320) uses the phrase *Herausfordern*.

some other goal such as those benefits that might be accorded a business. Challenging occurs through the revealing of what is locked up when released from its natural state, transformed, stored, distributed, and switched about in turn. The revealing never ends, it reveals to itself increasing numbers and iterations of interlocking paths, a web. The revealing is determined, it is regulated and at every intersection, it is secured.

Data called upon for ordering exists as a standing reserve, but they are more than mere stock in hand for purveyors of such things. The standing reserve "designates nothing less than the way in which everything presences that is wrought upon by the revealing that challenges" (Heidegger, 1954/1993c, p. 323), despite the conception of the information system as a means to automation of existing processes and the separation of processes physically, emotionally, and psychologically from the systems operator. Yet the information system is not yet autonomous in the Hegelian sense and the question is raised: what accomplishes the challenging to produce the standing reserve? While the technological human is capable of conceiving, fashioning, and carrying forward the intentionality of the execution of the IT artefact, the technological human does not have control over the disclosure of data. The technological human can only respond to what is addressed to it because it abdicated responsibility to itself and pre-industrial societal values and norms in favour of becoming 'independent' of nature, thus subservient to the technological system.

The technological human appears to be of the standing reserve, no less than any other resource (which is seen in the habit of referring to 'human resources' and the management of 'customer resources'). The subservient worker who operates at the information system interface is subordinate to the data they appear to control and this extends throughout the enterprise where they are challenged by the information requirements of managers and executives. Upper levels of the hierarchy are in turn challenged by their customers, competitors, suppliers, and the world at large. While that may appear to be the case, it is technological human 'who' that transcends the standing reserve through its power of ordering and takes part in the ordering that is passed down to the technological system.

7.5 Participative democracy and Web 2.0

Pateman (1970) refers to power distribution and participation within the context of the democratic process. In this, she says that democracy is effectively a means for the selection and

establishment of élites. The chosen élite is granted the power to make decisions on behalf of the mass, thus the system requires that an asymmetric distribution of power exists. However, the strength of the democratic system is that the mass has the option to change their decision makers on a regular basis. This is contrasted with the enterprise where the approach is autocratic and power asymmetries are maintained to ensure that decisions are carried out as required.

In very large organisations, an autocratic style of management has been shown to be rigid and inflexible. As limiters to responsiveness, this may become an impediment to change and growth and provides justification for the assertion that the enterprise leads to entropy.[30] Advances in communications technologies, such as Web 2.0, have given those enterprises who have been able to take advantage of them, significant competitive advantage. IBM saw staff that held significant knowledge and experience were also those who held management positions (Majchrzak et al., 2009). Their position within the organisational hierarchy often put them out of reach with new members of staff. IBM recognised that new entrants to the enterprise often had innovative ideas but lacked the means to implement them. The solution trialled involved the deployment of social networking applications that included visualisation tools to map power relationships and networks. The positive effect was that new staff members were able to build mentoring relationships with senior staff; innovative product development commenced when it may not have otherwise, and decision making power on project acceptance shifted down in the chain of command.

In the technological system, mistrust and the threat of attack mark the enterprise. These fears are reflected upon the workers, who are regarded as untrustworthy and must be controlled. These are the authoritarian means required to maintain power. Kim et al. (2009) report that the facilities that Web 2.0 offer, for example, keeping in touch with friends and family and so on, also allow individuals to influence policies and standards. While for some enterprises, this poses too much of a risk, for others like BT, policies already exist and the risk is manageable (Dennison, 2007). Initial misgivings were shown to be unwarranted and staff took to the tools, using them to facilitate information dissemination, decision making processes, group facilitation, and social functions. Workers' ability to act responsibly within the democratic functions in the social networking applications were confirmed and staff who contributed positively were recognised across the enterprise.

[30] See 115:12.

For established and entropic organisations, processes may be the result of years of accumulated adaptation. Such processes are not necessarily efficient, nor do they always deliver what is required. In the FCC case, the distributed nature of the enterprise and other factors meant that certain core processes (particularly loan renewals) were not being carried out efficiently, accurately, or consistently. The account provided by H. A. Smith and McKeen (2008) outlines these issues and presents a thorough analysis of the deployment of a SOA. Principal outcomes are that technical and managerial staff are now able to work better as a team, field staff make more consistent decisions, training new staff is eased through the deployment of contextualised and consistent materials, and policies are understood and can be authenticated. Whilst not in the social networking space, infrastructure does form an important part of Web 2.0 (O'Reilly, 2005/2009).

Opaque decision making processes distinguishes autocracy from other democratic forms of leadership. That is, there is no transparency in decision making and those who are affected by decisions may not have any influence in the process or outcome. Those who are involved in the production of journals and other peer reviewed media will understand the need for the double blind process, however Kane and Fichman (2009) question whether reviewers and others who are involved in the editorial process should be included. They propose a wiki-based solution to facilitate participatory decision making through deliberation. In their view, the decisions for inclusion or exclusion, and suggestions for improvement, ought to be made collaboratively by the editorial team.

In each of these cases, Web 2.0 applications provide the means for the redistribution of power through deliberation, participation, and education. This provides the mechanism for a person to participate in making a decision. In the Heideggarian sense, the person can regain the Dasein that was lost to productionism. Thus, the person regains control over their job, to obtain satisfaction, and choose to live in accordance with a moral and ethical code. Web 2.0 encourages that person who had previously chosen to be ambiguous or non-responsive, to become actively engaged.

7.6 Conclusion

The technological system is more than just a human activity; in the revelation of matter, the matter is ordered. The human is challenged to order the actual, as data, as a standing reserve in

accordance with how the system is revealed. The challenge gathers the human into ordering, and that concentrates it upon ordering the actual, again as data, as standing reserve. It is through inculcation of the human into the technological system that Heidegger (1954/1993c) refers to as *Gestell* or 'enframing' and is the term applied to the essence of the technological system.

To frame means the gathering together of the setting-upon that sets upon the human, that is it challenges the human to come forth, to reveal the actual, in the mode of ordering, as standing reserve. It is the way that revealing governs in the technological system but is not itself anything technological. Not all parts that are to do with the assemblage of the technological system are of the enframing but merely respond to the challenge of it. The technological parts, while responding, never comprise a part of the enframing.

Work, as the engagement of the human in coming forth and ordering the actual in concert with the technological system, sees the human processing the essence of the system as enframing. The technological human's engagement with the essence of the technological system conjoins their purpose and becomes one of participation in which the technological system operates as proxy to human intent. The human participant, who can only respond to what is addressed (carried forward through the concept of the Idea), requires that the technological system perform the role of ordering the standing reserve and framing the actual.

The technological human, under productionist metaphysics, is destined by what must be done, behave, respond to, or not and these separate the technological human from its essence. Nevertheless, the human form retains the capacity to respond creatively and with originality. Thus, the essence of the human is not tied to that of the technological human albeit that it is framed by the technological system, which challenges and orders the actual, and challenges the technological human through ordering. However, the system is an artefact that was brought forth and disclosed by the human. This is the appearance that the technological human is destined to be, both as standing reserve and in abdication of its freedom to decide and choose. Thus, the technological human displays ambivalence towards Work.

Democratisation of work practices may lead to greater decision-making power and adaptation of systems to suit individual requirements. Where once information systems stood apart from the operator, as machines in the workplace, and where the operator was regarded only as the end-user of the system, they are now more properly regarded as participants in the system.

The technological human as participant, is not just the operator or end-user of an information system, they engage *with* information systems to perform the work that is required of them.

At the time that Heidegger (1954/1993c) wrote, modern technology took the form of televised broadcasts, nuclear power, and large hydro-electric power stations extracting electric power from the Rhine to fuel monstrous foundries and factories. Modern technology in the mid-twentieth century was writ in the large and the massive. In the twenty-first century, it takes the form of the personal, the small, the ubiquitous, the connected, and combined and they dwarf the large-scale schemes of the '50s. This is the juggernaut where the form of modern technology in the twenty-first century involves the technological human, but not as the mere operator of a machine. The technological human has become participant in the technological system. It is joined with the essence of technology and enframes itself within the future that technology forecasts. The future of the technological human is intertwined with the future of technology and in it servitude to the Will to Will of the system. The technological human has abdicated responsibility to self and in this state. However, where does the person who engages with modern technology find their sense of freedom to be true to their human nature?

It is participation in the democratic sense that Work becomes educative and enriching with the participant's acceptance of greater responsibility and control over localised affairs. Web 2.0 technologies promote democracy in Work and encourage participation from those who might otherwise not be part of the decision making process. To take advantage, hierarchical managerial structures need to adopt a new Idea and form, so that decision making is conducted at operational levels and asymmetries of power are reframed. Freedom is gained by workers when they learn to take into account factors that are greater than they are. They learn, for example, to seek co-operation of their peers' individual needs so that their private interests are synchronised with those of the enterprise and this builds a history of success so they learn to be better participants in the process.

In the enterprise, where improved means of communication are provided, then improvements in participation may be recognised and encouraged. Disputes and conflicts between opposing views may be resolved through the inter-mediation of negotiation between groups and individuals rather than the enterprise stepping in to mediate.

A form of participative democracy, deliberative democracy, provides opportunities for holders of opposing views to build knowledge of the disputed situation and find commonalities. These processes do not mean that the groups or individuals are required to relinquish their identity, but allows them opportunities to improve their stance and create new frames within the technological system. As they reframe their reality, technological humanity reorders itself.

Integrating with the essence of the technological system allows the person to obtain of its power of ordering and partake of its capacity to offer democratically deliberative processes through the medium of Web 2.0. In this way, the technological human as the standing reserve, is subject to both itself and the technological system.

In chapter 8, the concept of enframing is applied to an objective conception of Work to illustrate how the technological system affects the social nature of the human, and how the human responds to that in turn. The human tendency to bring into its environment unanticipated variations and approaches becomes a point of weakness in the technological system, but the capacity for Web 2.0 to introduce participatory democracy to the workplace, enables the technological human to re-engage its social dimension and partake of argumentation to reach agreement. The technological system is strengthened through such processes, but not at the cost to the participant, rather the strengthening is mutually advantageous to both the enterprise and the worker.

Chapter 8

Socialisation of Work

8.1 Introduction

In chapter 6 it was stated that from the eighteenth to the twentieth centuries, productionism tore at the social fabric of communities. Whereas the life and Work of the artisan had been intertwined, productionism forced a gulf between the Work life and home or social life of the person where the home was a place from which to escape the horrors of production and industry. A human response to fill the apparent void created was to establish labour unions. This provided a relief to autocratic management, and the loss of power the person had over their own destiny by providing a social, democratic environment in which the worker could at least have some influence over their working conditions. More recently, Web 2.0 provides the facility to introduce into the workplace, additional democratic freedoms of deliberation and decision making power through the establishment of a social fabric based on the sense of community through the sharing of information, and the provision of an open environment in which discussion and debate are favoured.

In chapter 7 the essence of the technological system is described as an 'enframing.' That is to say, to 'frame' is a challenge to the technological human to come forward and reveal the actual, where the actual are the data that are accumulated as a standing reserve and ordered in accordance with how the system is revealed. 'Framing' is the manner in which to 'reveal' governs in the technological system, however 'framing' is not itself technological. The technological parts of the system are not of the 'enframing,' rather they respond to the challenge of it. The technological parts, while responding, never comprise a part of the 'enframing.'

Web 2.0 'enframes' participative democratic processes, while the tools facilitate discussion and deliberation. And so in §7.6, I said...

> Work, as the engagement of the human in coming forth and ordering the actual in concert with the technological system, sees the human processing the essence of the system as enframing. The technological human's engagement with the essence of the technological system conjoins their purpose and becomes one of participation in which the technological system operates as proxy to human intent. The human participant, who can only respond to what is addressed to it (carried forward through the concept of the Idea), requires that the technological system perform the role of ordering the standing reserve and framing the actual. (from p. 167)

In chapter 8, the technological human is enframed through socialisation in which the ordering of the standing reserve involves the common sharing of information. In §8.2 is presented on objective definition of Work, then in §8.3 Work is framed as a building of relationships through common webs of understanding and knowledge, and that through participation in the democratic processes of deliberation and agreement and involvement in decision making. In §8.4, the mix and match of socialised computing applications and work practices provides the opportunity for the technological human to make alteration in its attitude towards Work (discussed in §8.5) in which there is greater awareness of social aspects in the workplace and the manner in which decisions or actions impact on others and away from unitary productionism. Previous decades of industrial processes have created a perception of dislocation from those activities the person was obliged to engage in but the capability of the technological system to provide the ordering of the actual, frees the human from the drudgery of the machine operator.

The alteration in attitude towards Work, described in §8.5, is not so muchabout what people do, but how and why they do it. The technological system reframes the technological human from what was a mere operator at the human-machine interface and allows them to participate in the ordering of the standing reserve. The challenge for the technological human is revealed when the evolution of information systems places the responsibility for personal change upon the human themselves, in preparation to meet the challenges of new technologies as they are revealed. New Ideas provide new opportunities, but these can only be taken up if the technological human has the capacity to participate and be open to the possibilities they offer.

In chapter 5 Work is described as purposeful directed action and has properties of rationality and purpose. In chapter 6, it is argued that the worker is bound to the spatiotemporal conditions of the industrial plant. In chapter 8, I argue that Work effects change, thus Work is spatiotemporally dependent.[1] Further, I argue that the application of Work means that the object of Work obtains of inertia. Therefore, qualities applied during Work are transferred to the object while Work is undertaken. Further, humanity is defined spatiotemporally. Therefore, whatever is experienced or learned can only be done through spatiotemporal contexts.[2]

In chapter 1, I argue that the human is a social being and has the property of mind. In chapter 8, I add that socialisation provides mechanisms for the satisfaction of needs and urges that either cannot be met on its own, or may be difficult to achieve individually.[3] Furthermore, in chapter 8, the formation of the mind of the person is influenced through processes that are internal and external, and the mental arrangement of the person reflects that of their social group. Thus, through the mechanism of socialisation the person is accepted into a group[4] where acceptance requires a degree of participation by the person. The Work undertaken by all people in their social group, as duty, becomes a means for mutual support.[5]

While chapter 6 drew a distinction between the Greek conception of disclosure and the industrialised process of production, in chapter 8, the focus is brought back to the Greek conception, where the application of Work is spatiotemporally dependent.[6] In chapter 8, the first new argument has two strands: that which is produced out of Work is used as a measure of quality and Work is differentiated from the worker.[7] In the former strand, the qualities of the worker may be observed through their Work and qualities inherent in Work have an affect on those of the worker.[8] In the latter, qualities of Work are differentiated from those of the worker.

In the first strand, the product of Work is regarded from a purely materialist and therefore rationalist position. For example, the communist ideologies of Hegel and Marx are a rationalist conception of humanity and are productionist. However, it is immaterial whether Work is provided in the name of capitalism or communism when both have as their central focus, the technological system.[9] I argue that the enterprise is part of the technological system

[1] 176:3–176:8.
[2] 179:9–179:15. 179:17–180:1. 180:2–180:11.
[3] 179:7–179:8. 182:21–183:2.
[4] 180:14–180:22.
[5] 180:23–181:5.
[6] 174:1–174:10.
[7] 174:11–174:17.
[8] 174:18–174:25.
[9] 176:20–177:5. 174:26–175:3. 175:4–175:9.

and consistently fails to appreciate that its workforce is comprised of humans, engaged in their Work.[10] That failure to appreciate the drive and needs of the person also creates conditions for the enterprise to assume that it must provide for the person an artificial social environment that must be coordinated and controlled. Additionally, that failure is expressed as mistrust and fear of the workers.[11] Fear, mistrust, doubt mark the internal weakness of the productionist technological system.[12]

Therefore, in the first strand, I argue that technological humanity has responded to the imposition of fear and doubt in various ways during the last two centuries. Some expressions have been as labour unions and collectives, some have been civil unrest and revolution. Modern communication technologies facilitate a different kind approach, in which humanity may finally be able to take control of the technological system, bending it to the will of the human. The direct approach, that of revolution, has been shown to achieve nothing but to change the masters in the system. Instead, a new attitude is required.[13] The call to the technological human to regain its lost sense of self is expressed the urge to reassert its individuality as a social being, but to do so, the person must participate in the reformation of the technological system.[14]

In the second strand, Work extends beyond materialism where productionist conceptions of Work mask alternatives as being uncompetitive or anti-productive.[15] Non-materialist notions of Work, such as the argument for the application of democratic processes presented in chapter 7, become a vehicle for the expression of non-productionist human values. This provides a means through Work, for the human to reassert its beingness into its daily affairs.[16] For the technological human, the path to mastery is not clear and straight. There will be conflicts and seemingly irrational disagreements, and these are natural. It is important that there are mechanisms in place to facilitate the resolution of discord.[17]

8.2 Objective Work

Through Work, the act of doing is implied. The ancient Greeks differentiated between the person and what they did, from what it was that caused them to do what they did (Dewey,

[10] 185:18–185:19.
[11] 185:22–185:25.
[12] 185:27–186:2.
[13] 186:4–186:13.
[14] 187:17–187:20.
[15] 175:10–175:28.
[16] 175:29–176:2.
[17] 185:8–185:13.

1938). *Ergon* (ἔργον), 'work' or 'labour' is from the action of doing or the verb *erdó*. *Ergon* is the effort required to reveal or disclose and thus to produce, and it is the product that is disclosed or revealed by the effort. That is to say, a person can 'work' to produce, or they can produce 'works.' Unlike revealing or disclosure, the meaning of *ergon* is based on the context of its use and so it can be a 'deed,' the act of 'doing,' a quantity of 'labour,' or it is 'work' (*Strong's Greek Dictionary*, 2010). Work, *ergon,* is distinct from its cause and results, it is not a metaphysical notion or Idea but the physical or material action and process that itself causes some change. In the Bible it says: "And if by grace, then it is no longer of works; otherwise grace is no longer grace. But if it is of works, it is no longer grace; otherwise work is no longer work." (Rom. 11:6).

As a means of producing, Work finds its justification in what has been produced. Thus, the manner of Work provides justification for the veracity of the means. Therefore, if faults are found in the product then the suggestion is that the tasks or action of Work needs to be improved to prevent such faults. If the Work of producing consumes too many resources for the amount that are produced then, again, careful analysis of the Work that has been done needs to show where improvements can be made. Howsoever Work finds its justification does not give any kind of measure as to the qualities that might be found in Work or the worker.

Those qualities that exist in the worker can be observed through their Work, for example the worker that displays enthusiasm through qualities inherent in what and how they work. The work required of them has a bearing where drudgery is not likely to engender enthusiasm and so an observer may expect that the quality of what is produced will reflect that. Perhaps that is why we mock the 'chicken factory farm' styled call centre, where quality is enforced through scripted questions and responses. However, defining specific processes provides a positive benefit where the workings of policy disclose those things that might otherwise be in contravention.

Synonymous with the creation of strategy, principles and rules of governance: policy defines a possible course of action. Policies affect the operational level of Work by providing rules that workers adhere to when decisions are made. Policies are often adopted for the sake of expediency or are arrived at through the experience of exigency. While policies define rules or a course of action for a given action, they are disclosive when they are contravened. Thus, for example, if through performing their prescribed Work, a worker is found to be in error when dealing with another person from outside the enterprise, then a change to policy is

required. Unlike Work, which is validated by its results, policies are never validated, they can only be invalidated when they have been contravened and found to be in error. Policies are non-material ideologies relying on the physicality of Work for their acceptance and approval.

In a command and control management structure, instructions for a worker are passed down the chain of command. In variance with policy, instructions fed through to the intermediary of the supervisor to provide commands on what must be done, while the policy wording states what must be done, with, how and why they must be done. Thus *ergon*, Work, is materialist and quantifiable. Work can be assayed through tests being applied to the product of Work, thus it is both validated and justified through external tests.

Beyond the materialist conception of Work, it is through their Work that a person can learn much more than just the process of how to complete a task. For example, the quality of the person shows through their Work: integrity, seriousness, and incorruptibility. These attributes, hard to perceive in oneself from simple observation of oneself, become remarkable when perceived through the application of Work and the product of their disclosure. From there, labels that describe the qualities inherent in the product can be attributed to the producer. The person of quality is justified through their Work and not only through the power of faith, but the faith they have in themselves or some entity that they may use to justify themselves or their actions to self or others. While the quality of the person shows through in their Work, this is not to say that the person and their Work are the same. However, the person imbues their Work with the qualities they hold, so that if they should cease or withhold those attributes, then what is revealed in their Work will seem similarly empty. Thus, Truth is revealed through Work. Productionist metaphysics provides no difference between that which is manufactured in the industrial process and that which is produced by the artisan, except that the standardised state of the productionist manufacturing process is able to create consistent duplicates of objects where the artisan is variable in their state and so too, is what they produce. All that is produced by the enterprise under productionism is therefore stripped of the essence of the artisan where even the mask of humanity created by public relations announcements are devoid of the spark of spirited disclosure.

Work is not democratic but it can facilitate the democratic process where the machinery required is present. Just as there is no right to democracy for the human to exist, although it may be considered so that the human has the right to choose their own destiny and to have the power to make such decisions as to who or how they might be governed, so it is that Work is

not a right. Instead, Work is a natural condition of being human; Work is an expression of the beingness of humanity in its urge to do, to act, to disclose, and to reveal the truth that is hidden.

Therefore, for any kind of change to be exercised in the workplace, it stands that Work must be spatiotemporally dependent. That is, unless Work is applied, then nothing can change. All that is material obtains of some degree to inertia and Work, the effort exerted, seeks to overcome that inertia. It is the transference of intent, quality, purpose, emotion, and will from the worker to effect change. Emotional attachments are formed from the effort consumed when objects are produced. Work starts and ends. It does not exist in the passive or in the state of rest.[18]

8.3 The worker is reframed

In §8.3, I discuss how the technological system has reframed the worker into the technological human through the eyes of two commentators, Masaryk (1938/1971) and Tannenbaum (1952), whose views vary through time, space, and political tidal forces. Workers were drawn away from their rural domiciles to urban centres, to find the means for earning a money wage. Masaryk and Tannenbaum discuss the relationship of the worker and master/employer/boss. For Masaryk, the tensions are drawn between socialism and religion whereas for Tannenbaum it is between naturally formed social groups and imposed social orders that are generally the result of economic and political exigencies.

Masaryk (1938/1971) says the first principle of Social Democracy of Marx and Engels (1998), which was derived from the work of Hegel, has as its basis, the idea that both the individual, national groups, and even the whole of humanity when taken together are God. This sounds out of place since historical or economic materialism is atheist but, while humanity should not be deified, the proletariat is God. The second principle is that 'Man is what he eats,' thus where mind is a product of the body, then mind is a product of what is eaten. Since what is eaten is secured by Work, then the mind is the result of Work and of production generally. Therefore, humanity is what it makes. Marx and Engels take this argument to its logical conclusion when they contend that the conditions of production become the real foundations of all social life. For them, all history and development is reduced to the issue of how to secure food and what to

[18]Mortensen (2002/2006) says that in modern science, it is a physical law that force must be applied to cause a body to be moved or put into motion and so any change must have a cause. Uncaused change might exist conceptually but not practically, so it might be said that the absence of an apparent cause suggests that the cause has not yet been found. Conversely, a sustaining cause will result in no change if the thing undergoing change is sustaining a preventive cause (its negation) in the same moment the sustaining cause is applied. The application of cause that puts an object in motion also provides for recording of that motion during an interval of time. The concept of change is discussed in §9.2.

procure for the satisfaction of bodily needs. All else (philosophy, art, religion, the state, ethics, and morals) are ideology and utopian with no actual significance. This is at the essential core of productionist metaphysics and is the kind of socialism that is anti-individualistic. It is where the opinion and conscience of the mass of the proletariat is what is important and hence the reference to it being God.

If the anti-individualistic socialism of Marx and Engels establishes one end of the materialist world, then Stirner's (1845/1907) egoist individualism reaches to the other end. Stirner opposes socialism of any kind, whereas the Marxist doctrine of socialism denies the individual in favour of the proletariat. For Stirner, individualism defines humanity as the individual: humanity becomes a specific 'ego.' In an effort to displace hierarchies, the individual is not concerned about anyone or anything in favour of itself. The 'ego' is the super-truth and if it seems right to the 'ego,' then it is right (Masaryk, 1938/1971). However, as with Marx and Engels' socialism, Stirner's individualism seeks to emancipate the individual from their subjection to phantoms (the comparison does not end there because both stem from the work of Hegel). For Stirner, all general concepts, all religious and political ideals, and all Ideas are phantoms. In particular, the State itself is violence towards the individual where the goal is to have power, and power is the truth. The individual who can acquire and exercise power is perfect. Thus Individualism is the essential anarchism, absent of State sponsored government. Tannenbaum (1952) rejects the idea that nihilist individualism is a natural condition for a person or group of people. The industrial juggernaut[19] served to destroy most pre-industrial social links, and so workers, disenfranchised, formed their own social units based on their occupational employment. Tannenbaum also objects to the views of Marx and Engels.

For Tannenbaum (1952) the great moral tragedy of the industrial system was that it "destroyed the symbolic and meaningful world that had endowed the life of the individual with an ethical character" (1952, p. 8). Those who were first exposed to the industrial revolution came from a world in which people lived in mutually supporting clusters. Theirs was not a money- or wage-based existence, but one in which functions were fulfilled by skilled artisans and succession was often generational. In the productionist industrial and technological system, the individual worker has been stripped of their 'natural' place, any society they could naturally call their own, and those values that were attached to their society, values they were expected to live by. "The ordinary meanings that make life acceptable had evaporated. His economic

[19] See the comment in footnote 31 on p. 59.

insecurity was but part of a larger perplexity" (1952, p. 8). A new social order was being created with the rapid growth of industrial centres. For Tannenbaum the solution to the problem of the dislocation of the individual from their 'natural' place was through the establishment of trade unions. He admits that trade unions have become subject to socialist, political, and economic forces, but still sees that they offer a place of refuge for the individual. It is in the collective of the trade union that social ties could be wrought and some semblance of the community that had been lost, regathered. The collective provided the worker with a platform for the establishment of social norms, mores, ethics, and values. While they were largely egalitarian in the context of the workplace, there was, through politicisation, the formation of power structures.

In any sense of the collective, there are classes, and so classes of worker exist. Where classes of worker exist there are tensions that are the result of perceptions of difference. These are not the Marxist tensions of class difference that can only be resolved through revolution. Rather, they are the natural variances that ought to exist in a 'naturally formed' society. It is through their existence that growth occurs. Without the perception of difference, there can be no evolution or development because there is no recognition of need. Revolution is a destructive force. Energy is used up in a scrappy tumult, bringing only a return to balance, albeit at a different place to where the revolution started. Revolution, ultimately, is a political means to a political end.

Modern technology is a means to an end says Heidegger (1954/1993c), so that everything depends on society's facility to manipulate technology to ensure its ends meet those of the technological human. The essence of the technological system is to enframe, within which the human must master the ordering of the standing reserve. Thus, modern technology in the form of Web 2.0 challenges the human through its power of ordering, to reveal the standing reserve as information that can be used in the democratic process of deliberation and decision making. Democracy in the technological system is more than just a game of political power brokerage, for it becomes a means by which the standing reserve is ordered. Stirner's (1845/1907) insistence then, that it is nihilist power that enframes the individual, is out of place in the technological system. It may be said, that power is truth, but the power of truth is born out of the power to order the standing reserve, and in the context of Web 2.0 that means power lies with those who are best able to order data which has been stored for these then become the standing reserve. Power then, is exercised in the crowd, by the crowd, where the lone voice of the nihilist is largely lost.

According to Masaryk (1938/1971), the problem that the science and profession of politics must solve is to comprehend the relation of the individual to society, the problem of individualism versus collectivism, and the explanation of how the individual becomes a social being. That is, how the individual person ought to behave towards society and how they affect the rights and spheres of activity of other individuals. What then are the attributes that make a person a social being? What are their individual and collective duties?

A person does not exist alone, they need to survive and they have urges for belonging that must be met. That means they are more than mere members of a socio-cultural group they are more than just an individual within the group (Gripaldo, 2003).[20] For its existence to be validated and confirmed, the person must co-operate with other members in their group, to make this person a social being. In addition, the person is a historical being, meaning that over time as they grow toward maturity they have interacted with others in their socio-cultural group, from family to acquaintances. Thus, theirs is a spatiotemporal existence in which learning skills and abilities, develop awareness and sensitivities, and to create or adopt behaviours takes time and experience.

As a person grows from the time of their birth they learn about the world, into which they have been thrown (Heidegger, 1972/1993b). To begin, the person simply absorbs experiences and begins to fashion those into a synaptic web of understanding. Experiences cause internal reactions within the person such as: emotional responses like joy, sorrow, anger, and happiness; intellectual responses like understanding, appreciation, certainty, confusion, and doubt; and physical responses like pleasure, pain, arousal, agitation, and relaxation. From what they experience, the person can attach the stimulus that gave rise to their internal responses. At times, the stimulus is clear and directed, such as a set of instructions or commands, or the delivery of rules of conduct. Other times they may be more diffuse and produce confused or confusing responses, such as when a person tries to interpret the actions of another person but find they can only do so from the framework of understandings they already possess. While still a child, the person is guided by their peers and elders but as they begin to mature more questions arise regarding what it is that they deal with externally and what is happening to themselves internally in response to stimuli, and over time the child begins to develop a sense

[20] M. G. White (2002) refers to the artefacts that make up culture as religion, philosophy, science, technology, art, education, politics, and government. He argues that culture is itself a by-product of the beingness of humanity. He says in the cultural context, and in reference to Peirce, metaphysics are an important component of the cultural landscape and a philosophy of anything is bereft without it.

of their individual consciousness.

To explain individual consciousness, one must seek to understand what is the individual's and what is derived from its race, culture, social environment, and its species. Only then is consideration granted to consideration of the person's part in a socio-cultural group and the psycho-social impact of that. Although Marx and Engels (1998) say that consciousness is not individual and is thus collective and therefore the individual does not exist, Descarte's *cogito ergo sum*, while not evidence that the individual person as a material substance exists, does provide evidence of the mind of the individual. The person grows from birth and gains knowledge from their experiences and responses to stimuli. Their consciousness of self is revealed as they grow from infant to child, then through puberty to adulthood. They learn to differentiate between what is internal and external to them. A thinking person that exists and has the capacity to think therefore has the ability to recognise that they are thinking and therefore they exist (Kierkegaard, 1985).

The culture of which the person is a part is a blend of influences that have arisen from the combined and compounded internal responses of the individual participants and external influences. For example, natural phenomena like climate, availability of food and water, terrain, and aspect, and other socio-cultural groups who exercise some degree of influence whether through trade and agreement, aggression, cultural similarities and differences, religion, and politics. Often socio-cultural groups are identified as civil societies. These take the form of social groups that form around some degree of agreement in which there is mutual strengthening or weakening of character, or they are genealogical and the person gains admittance through their birth-right. Most groups are managed or controlled through some degree of political coercion.

What then are a person's individual and collective duties? These can be considered as ethical and moral imperatives. Duty is a social force that binds a person to some course of action, such as their Work. For example, a person may have the duty to perform their Work to satisfy moral or legal obligations. A worker is obliged to fulfil a role of Work and through this, their social and moral obligations to their socio-cultural group, to the extent that they satisfy their needs to survive and urges to belong. As a social being that co-operates with others in the socio-cultural group, the rest of the group relies on the efforts of the individual to perform their duties for the survival of the group. In the socio-cultural group, the worker is seen as more than just an economic unit or human resource to be exploited. In the fulfilment of their individual and collective duties, the Work done by the worker becomes a means of mutual

support.[21] Traditional roles and activities can be duties where successes of the past have led to an expectation that those roles and activities will be repeated. Historical events may be traditional but they may not have led to successes that members of the group want repeated. Some events may be seen to have been effected as the result of some external power or entity and cannot be repeated.

The ancient Greeks had the belief that political happenings and historical events were the direct result of the interference of the pantheon of gods (Guirand, 1987). Every action, while performed by the individual, is a manifestation of the whole, which in turn, is a manifestation of the divine. This view prevails in the apparent genius of the poet and artist who makes the claim that their art cannot be contrived but that it is formed from musings that are revealed through inspiration. The prophet is seen as an entirely different kind of human to the ordinary mortal and even politicians and heroes may be seen as heaven-sent.

The ideas of those who are perceived to be more than merely an individual in a socio-cultural group may be seen to have more impact and carry greater weight of importance than decisions that are made by those who are in the mass of individuals that comprise the body of the group. Democracy provides a means by which the greater mass can choose who they want to make decisions on their behalf. Often those who are chosen are elected based on of perceived merit or fame. The classical view of democracy described by Pateman (1970) sees a political method for choosing leaders or as a set of institutional arrangements at local or national level, where through competition, votes at periodic elections are counted to choose an élite. The person's participation in this process serves to protect both them and the élite who won the race to gain sufficient votes. However, as a system its stability is largely only assured if the level of participation does not raise much above the minimum necessary to keep the machine working. That means the greater mass must elect to give up (through apathy, resignation, abdication of responsibility) the right to make decisions in certain areas of governance, law, economics, and local management of resources, but there are often questions as to where the boundary between the individual's judgement and that of the collective prevail.

To what extent does judgement reside in the individual and in taught logic and to what extent in the collective? The process of sampling from the scientific method provides the answer, in that the judgement of all cannot be known and so a representative sampling provides an approximation of the collective decision. New law provides an example where the few

[21] See page 120.

who were selected create new rules of conduct for the many to follow. Government is by the few for the many, management also. In ethics the question is how far, does one rely on mass distinction to determine what is right? Is it correct to take it on the vote of the majority or from individual conscience? It is from these tensions that the apparent conflict between individual and collective, and anarchism versus socialism emerge.

Individualism, says Masaryk (1938/1971), is materialist where the essential nature of the 'I' or 'ego' is the body.[22] To the nihilist, the measure of all things is through the body and not the mind, ideas, or ideals where these things are merely utopian ideologies. The sensation of satisfaction is measured as the physicality of pleasure. The greater the bodily sensation of pleasure, the higher the satisfaction level. When the 'ego,' as the individual body, is only concerned with itself and what is therefore agreeable to itself and its own pleasures, then it becomes unvarnished nihilism.

Innovation and creativity are squeezed out from the forces that interplay between the individual and collective desires for power and to have influence over each other. Just as necessity is the mother of invention, so it is that conditions that provide for need are found, not in a utopian perfection but in the trials and tribulations of exactitude. Not just in economic or historical materialism but in all spheres of the individual's existence. The individual needs to be recognised for who and what they are, and what they have achieved. Without that, there can be "no formalised society, no accepted drama to act out, and no responsibilities for the individual or for the society to which the individual is functionally and organically related" (Tannenbaum, 1952, p. 69).

Web 2.0 as the technological system facilitates the instinct in the 'natural' human to bond and group, framed as the use of social and networking tools. The 'natural' human is reframed as the technological human. The challenge for the technological human as standing reserve, enframed within Web 2.0, is to resist the ordering of it as a means of creating an artificial social context. Web 2.0 has the appearance of being nihilist but to follow its 'natural' instinct, the technological human stands apart from the technological system. The person seeks to satisfy the urge to stand apart by gathering itself to itself in an anarchic nihilism, by aggregating with others in a social milieu. A third option is for the technological human to adopt the persona

[22] Russian anarchism, according to Masaryk (1938/1971), is what is referred to as nihilism by Turgeniev in *Fathers and Sons*. Dostoievsky shows how the absolute 'ego' comes to proclaim itself as God but as such what is there for it to do? The 'ego' is weak and inept, it is fragile and cannot create of itself. Dostoievsky's anarchists proclaim that "all is permissible," and Alistair Crowley crows "Do what thou wilt," till there is nothing left for it but to denounce and destroy. Thus comes revolution and terror, Crowley's beast, and violence, the last recourse of the nihilistic deity in *reductio*.

of agreeable acceptance while privately playing the role of anarch. That does not remove the element of the social milieu, but does eliminate nihilism in the individual.

The technological system provides the framework. While it is the role of society to serve and protect the members of a community, Web 2.0 changes the nature of the relationship by redefining what is meant by security and personal ownership. The productionist enterprise seeks to gain traction in Web 2.0 by commandeering the means of ordering and establishing for its own ends, the power of truth. Through its means, the technological human is co-opted through a perception of misplaced trust. The element of trust, the trust that the person places in society as the moral and ethical guide for their beliefs and actions remains, but the constituents of what is morally correct and ethical are based now in commercial and economic exigencies. Commercial exigency has been extended to the online community, such that the person blithely hands over their private information simply because 'society,' represented by the technological artefact of a website, requested it. The trust of the person in the 'society' is instinctual. Would 'society' do anything other than serve and protect? It is as naïve as it seems. The person is a paradox where they are, on the one hand, the standing reserve while at the same time providing the mechanism for emancipation. It must be in the collective response that the technological system is challenged.

8.4 Socialisation enframed

Comprehension of the relationship between individualism and collectivism and the explanation of how the individual becomes a social being, lies at the core of enframing as socialisation. Bentham (1823) said the community is a fictitious body composed of individuals, and that individuals have their own mores and ethics that may run counter to that prescribed by 'society.'[23] Bentham promoted utilitarianism and for him the presences of tight-knit rural communities were an obstruction that needed to be cleared on the way to a bright industrial

[23]Utilitarianism is the ethics of utility, of profit. That usefulness as advantage ought to be the goal of every action and is determined by pleasure, well being, and happiness. Thus an aspect of utilitarianism is hedonism, or the ethics of pleasure. The satisfaction of pleasure has an individual response: My own advantage and only my advantage is the object of my efforts. Compared with the collective response: Not merely my own gain, but that of the greatest number of people. Bentham says that a person strives for their own pleasure to avoid suffering whereas Mill (1965) says that there are qualities ascribed to pleasures (his was a moral stance). Bentham's person is an 'egoist' who seeks for pleasure for himself, alone. Mill demands self-sacrifice of the individual for the greater good whereas the 'ego' may see work as a succession of small an unpleasant tasks. To escape this view, Work is given a romantic edge. Workers become heroes who perform great deeds, they stretch themselves out across the landscape and lay down their lives for the sake of it. Utilitarianism puts the worker to task, completing first what is essential to facilitate life, the daily chores that must be completed (Masaryk, 1938/1971, pp. 52–57).

future. The breaking down of communities of ill-educated masses produced workers who were easier to control, but it also became a necessity to ensure that those masses remained down at heel. There could be no participation in the management of terms and decision making processes. His view was authoritarian, not democratic. For Bentham, the establishment of trade unions were a significant threat to the maintenance and distribution of power.

Pre-industrial society provided more than a set piece for genealogical reproduction. It was a small scale democracy where society held to rules of belonging, behaviour, joining, and exclusion that had been built up over time. Individual communities were often culturally as well as socially unique, even with their own dialect and accent. For the worker to have been wrought by this and then torn from it was both dislocating and opening. The worker felt the need to belong because they always had; it is a part of the beingness of the person, their Dasein, their nature. To materialist industrial economics, the beingness of the person is irrelevant, insisting instead that the purpose of the person is nothing more than the provision of labour, with suitable recompense.

Seemingly stripped of its humanity and socio-cultural group, the nihilistic technological human was set adrift in the technological system. Over time, the technological human has learned that it is either framed by the technological system or that it must gain mastery over the ordering of the standing reserve through socialisation where ordering involves the common sharing of information. That deliberative democracy provides both a sense of freedom and socialisation and where the class hierarchy of the future will be defined by those who are best able to establish power by their mastery over the standing reserve.

Modern technology, in this instance Web 2.0, provides the framework through which the technological human is challenged to reveal the standing reserve. Thus, from has been said before; power is truth and truth is power, and they who are able to reveal knowledge and information as truth gain mastery over the technological system. The Work of the technological human is to reveal truth and to use that to gain power. The building of commonly shared understandings and knowledge, facilitate democratic processes where deliberation becomes the means by which agreement is made on what is to be the truth and decisions are made based on the power of that.

As a concept, Web 2.0 tools vary according to need and use. Whereas productionist thinking is firmly tied to the idea that maximum production is only possible when repeated processes are put in place, the socialised computing environment permits greater autonomy

from the person, and allows them the opportunity to make decisions up to a predefined level. This is seen in the characteristics that O'Reilly (2005/2009) attributes to Web 2.0. That the standing reserve is the driving force, it maintains an architecture of participation, the means of development is participatively democratic through the open source community, content and service syndication provides the means for the educative enrichment of the mass of technological humanity, and the cycles of evolutionary development are never ending. The greater freedom to discuss and decide, offers the opportunity for a shift in attitude away from the dispossessed. The interplay between workers in their deliberations is likely to cause periods of friction and possible discord. This in a 'natural' human context is normal, just as in pre-industrial societies there were disagreements and conflicts that needed to be resolved for the sake of the long-term survival of the group. It is from such forces that innovations and creative solutions are revealed and the success of these provides the groundwork for greater success. Kane and Fichman (2009) use this in their argument where they propose the use of wikis that allow editors to make better informed decisions in the journal review process. If reviewers can respond to each other's comments, they say then, the period of open dialogue is a better use of the reviewers' time. They can find agreement if they have to decide whether to accept a submission for publication or make suggestions for improvement.

The temptation for the enterprise is to see this as an opportunity to create an artificial social context, and then impose arbitrary rules that limit access, content, and use. This was the case at BT (§4.4.3) and IBM (§4.4.2) where there was a fear that social media might change what people did in their Work or that they would use this as a platform for grandstanding and airing complaints. Of course, work practices change, but productionist thinking, locked into that which focusses solely on the streamlining of processes and placing no trust in their workers, finds it difficult to conceive that people do not necessarily inherently hate their work just because that was the environment Bentham inculcated. Contrary to the 'powers' ' reservations, staff at BT used the social media channels in a positive way and IBM found the social media tools to be very beneficial to the company's long term success. Society has shown through the ages that it is quite capable of building itself up to be stable, resilient, trustworthy, moral, and ethical. The 'natural' human has a tendency to align itself with these attributes and not to attack and destroy its socio-cultural group, in this case, the enterprise. The apparent tendency toward fear and mistrust that exists in the enterprise is the fruit of productionist metaphysical

materialism, (whether it is called capitalist or communist) but Work, reframed, places socialisation of the workplace as the moral and ethical guide for the beliefs and actions of workers.

8.5 A shift in attitude toward Work

In §8.5, I argue that the technological human is reframed by the system. However, technological humanity is called upon to regain its lost sense of self, and this places the technological system under threat. The threat is not one of frontal attack, but rather from technological humanity re-approaching what it means to do Work. There is a shift in attitude in technological humanity that the system cannot address while technological humanity continues to deliver what is required of it. The attitudinal shift is not so much in what people do but in how and why they do it. For example, new entrants into the workplace take time to find themselves and adjust to the conditions where they work. Complex information systems make this more difficult because most institutional knowledge is held by those who are already there, and so new entrants face a period of anxious learning until they 'get it right.' For example, McKellar (2008) report current attitudes of new entrants to the enterprise, those enter with the expectation that they will have access to real time data, by using various, non-standardised devices.

The technological system reframes technological humanity and provides allowance for participation in ordering the standing reserve. Under productionism, the destiny of the technological human is determined by the demigods of industry. The demigods' state what the person must do, how it must behave, to what it can or cannot respond. Even as the appearance of the technological human, the person has managed to retain those properties that make the person unique. The technological human is part of nature despite the fact that the economic juggernaut has wrenched its soul. For the technological human to come to know itself as participant in the system means the person has come to be intelligent about, and understand the technological system. Then, when turned to human purposes, the technological system becomes an object of knowledge and the technological human becomes the standing reserve.

The technological system is rational, and as standing reserve, the technological human comes to know the effect of changes that have been wrought upon it and to know intimately its relationship with the technological system. As changes are made to the technological system, so those changes are reflected in the standing reserve, which now includes the technological human and all that existed previously. Whereas innovation was perceived to be the result of

the interference of the gods or the product of divine inspiration, now it is the ordering of the standing reserve and comes under the control of the technological human as is shown in the case of IBM where there is a culture that is focussed on innovation instead of production. As a result, social networking has become integral to the core business strategy at IBM, where participative democratic processes of deliberation and collaboration are a primary focus.

New graduates are entering the workforce with the expectation that they are able to utilise tools and applications they have become accustomed to using throughout their lives (McKellar, 2008). The general view is that mobile technologies are pervasive and becoming increasingly ubiquitous (Ben Mokhtar et al., 2008). While these are merely changes at a societal or cultural level, they are reflective of how the technological human is preparing it to become an equal participant in the technological system. Does that mean the technological system is close its cybernetic goal? Whether the technological human is cybernetic, that much is far from being realised since that part of the human that is core, essential, at its spirit, remains human.

8.6 Conclusion

Dewey (1938) said change in the human occurs only at the cultural or societal level. The examples discussed show this to be case, where the technological human craves social connection and is not content to merely be a cog in the industrial plant, bent on production. The challenge for the technological human is how to prepare to meet the challenge of new technologies as they are revealed. What is revealed provides new opportunities, but the technological human must have the capacity to participate and be open to the possibilities offered.

Productionism is an attempt to limit change as the basis for creating stability, uniformity, and therefore conformity. It requires only that workers opt not to conform that the system begins to collapse. Processes are normally designed in such a way that they optimise the use of resources, but the downside of this is when the system is left vulnerable to unanticipated changes to the internal and external environment. When these changes are wrought by people frustrated by their unexpressed desire to gain mastery over the system and their immediate environment, then the risk of destabilisation becomes paramount. The refusal of workers to conform to the dictates of the technological system results in an unstable work environment. The threat of this is at the root the fear and mistrust the enterprise regards its employees. This is not to say these

are typically the intentions of the worker, or that any evidence of this should exist.

Democratic processes are fundamental to the success of Web 2.0. They translate in the enterprise as improvements for the participative process of the person where their effort is recognised and encouraged, so that they see that their concerns are valid, recognised, valued, and appreciated. Conflict and disagreement are a natural part of socialisation. Such activities are not be feared, and where technology provides the means through which opposing views can be resolved, not as a mediator but by providing suitable channels through which data are able to inform, then both the enterprise and the person benefit. However, the person, individually and collectively, provides moral and ethical direction through mediation, not the enterprise. The process does not mean any group or individual must lose their identity, but instead, participation provides opportunity for improvement and to create new frames within the technological system.

In chapter 9, it is argued that the technological human adapts to the changing socio-cultural environment while at the same time, the technological human is an agency of change and affects the enterprise. As a participant and an agency of change, the technological human fulfills the role of worker, through Work. However, the association presents a highly dynamic environment and managerial contrivances to ensure business outcomes create conditions for the technological human to adapt in new and innovative ways.

Chapter 9

The changing face of Work

> "Man is a rational being who does not like sacrificing his safety to theories. Placards come and go, but the wall they are pasted on endures. Theories and systems pass over us in the same way."
>
> Jünger (1977/1994, p. 121)

9.1 Introduction

In chapter 8 Work was argued to be spatiotemporally dependent and to possess the property of inertia (resistance to the effort required to effect a change in state),[1] thus, the qualities of Work change when effort has effected an alteration to the qualities by which Work is identified. Work is also the amount of effort applied to the material properties of an object to the point where inertia within the object is overcome and change results. Work is the transference of intention, quality, purpose, emotion, and Will of the worker, so that Work exerted will effect change in an object. The effort of the Work exerted by a worker can be observed as the formation of states of emotion in the worker and one of these is the sense of emotional attachment through their Work, thus a person may say that they love their work.

Work that the technological human exerts is a response to the challenge to gain mastery over the ordering of the standing reserve. The technological human is challenged by modern technology such as Web 2.0 through its ordering power to reveal the standing reserve. The

[1] See §8.2, p. 176.

standing reserve that is ordered through Web 2.0 becomes, for the technological human, information, which can be used in the democratic process of deliberation and decision making. Democracy in the technological system is more than just a game of political power brokerage; it becomes a means by which the standing reserve is ordered.

The technological human responds to the challenge by exercising innovation and creativity. The reveal process forces the technological human to negotiate the formation of their ego against the needs of society. There is a constant battle for supremacy in which individual and collective desires rub. The reframing of society in a business model offers the technological human a new challenge as standing reserve. Enframed in Web 2.0, the technological human is challenged to resist ordering as a means of creating an artificial social context, while for those tasked with providing the corporation with efficiencies in labour, resource allocation also seek to resist the artificiality imposed on them as collective units in the technological system's production chain. The technological human, in response, stands apart from the technological system, but then must choose to fulfill the urge to gather itself to itself in an anarchic nihilism or aggregate with other in a social milieu.

In §1.4, the case is made that the human is a spiritual substance that does not need to be planned and programmed and that society (the collective expression of what it is to be human) naturally aligns itself with positive attributes such as stability, resilience, trust, morality, fidelity, and ethics. Treating the individual human and the society from which it emerges with fear and mistrust is a hang over of productionism described in §6.2 but Work, as it has been reframed, places socialisation of the workplace as the moral and ethical guide for the beliefs and actions of the workers.[2] The moral and ethical guide of productionism is fixed in commercial and economic exigencies where, for example, the competitive struggle for scarce resources and the battle to rise up the evolutionary ladder of corporate conquest are promoted as a social good. In this, there is no place for trust, except to those who provide much needed fiscal support. Yet, the worker is expected to offer trust in a situation where they are not trusted in return, thus the challenge to the worker is to gain mastery over the standing reserve.

In chapter 9, I argue that mastery for the technological human means that it must come to know itself as participant in the technological system. The technological human must be intelligent about the system so that when turned to human purposes, the system becomes an object of knowledge and the technological human becomes the standing reserve. The

[2]See §8.3.

technological system is supra-rational[3] and the technological human, as standing reserve, comes to know the effect of changes that have been wrought upon itself and to know intimately, its relationship with the system. As changes are made to the technological system, so those changes are reflected in the standing reserve, which now includes the technological human and all that existed previously. Recognition of change acts as a signal for the technological human to an environment that is subject to constant change and Web 2.0 provides for constant technological change.

In §4.1, Web 2.0 is described as being unfixed and is in a state of change from which socio-cultural groups (communities) are formed. In this state of seemingly perpetual change, the technological human transcends productionist barriers that were built between the person and the collective. Through the iterative development of modern technologies, while still in their infancy, a period of social variation with greater levels of democratisation, knowledge sharing, power and influence is evolving.[4] In chapter 9, it is argued that evolution for the technological human is by way of adaptation to a changing socio-cultural environment, where variation occurs in terms of epigenetic responses to stimuli such that the technological human, is the agent of its own evolution. Building technological artefacts provides the means by which socio-cultural variations occur and these are made manifest as the technological human fulfills its role within the scope of its Work. The direction of evolution is not a fixed trajectory and efforts to contrive outcomes fail, as unforeseen variations cause the technological human to adapt in new and innovative ways.

To bring order to the discussion on the nature of change for the technological human, change is described as a concept in §9.2. The argument is presented that there exists for the technological human a state of perpetual change, but by taking a materialist conception of perpetuousity an objective interrogation; the notion of change is undertaken. In §9.3, the technological human is represented as an agency of change, both to itself and to the society of which the person is part. Then in §9.4, I present the argument that the causes that drive the technological human to participate in its own evolution also entail power asymmetries between status levels and access to information. Also, the desire for security and independence, the social and moral imperative to address economic imbalances, inclusion in decision-making processes, social integration permitting the sense that the person is involved in something greater than themselves, the elevation of the dignity of labour, and the shift of Work towards

[3] See §1.8, p. 25.
[4] See §7.4.

it becoming an enriching and educative process. Finally, in §9.5, I conclude that drivers that motivate the technological human are related to person's humanity and that effort to limit these through productionism result in disease. Work, for the technological human, is social and benefits passed on to the person must therefore be social in origin.

In chapter 1, the anarch is introduced in relation to the classification of people who have been born into an age of advanced communication technologies, the Millennials. In chapter 8, the anarch is described as the internal response to a productionist environment by building a persona that is agreeable, but disconnected. In chapter 9, the anarch is further described as a by-product of productionism (alongside the technological human) and that it is a natural response to an unnatural (rational) phenomenon.[5] A distinction is made between the anarch and technological humanity where the anarch is subject to many of the same forces as technological humanity, but the inner struggle is different.[6] Despite that the anarch may be a means of escape from the juggernaut, it has problems of its own. The need to internally reject the technological system also has the effect of rejecting others that are of technological humanity.[7] Thus, the anarch experiences solitude. To expel the sensation of aloneness, the anarch seeks confirmation.[8]

In chapter 9, the first new argument is that both technology and the technological human are in a state of change. Change in society and the technological system are related to the metaphor of the river: an enduring social artefact used to represent an object that is subject to internal change.[9,10] The argument progresses, that change that is caused has material form, but with conditions. That is, change in chapter 9 refers to causal temporal change within society.[11]

The second new argument in chapter 9 states that there is a distinction between alteration and change in an object. Alteration in an object are those insubstantial variations to its internal form that are distinguishable but do not substantially effect overall variation in the body of the body.[12] Change is either the combined substantive effect of multiple alterations, or the result of significant singular or multiple events that have occurred during some period.[13] In society,

[5] 200:29–201:9.
[6] 200:5–200:8. 200:9–200:14. 200:15–200:28.
[7] 201:21–201:24.
[8] 201:26–201:29.
[9] As the river is a recurrent metaphorical theme, so too is the conception of the cybernetic overlord who has unfettered control over legions of mindless humans. In this context, they serve to represent the armies of technological humans who are subjugated to lives of tedium. The technological human is called upon to make its escape from the cybernetic juggernaut, but that cannot be achieved through onslaught. Escape from the juggernaut must be in its sight, and Jünger suggests the means is by adopting and cultivating the persona of the anarch.
[10] 194:10–194:17. 199:2–199:11.
[11] 194:18–195:5.
[12] 195:25–195:28.
[13] 195:25–195:28. 197:6–197:8.

events occur that lead to alteration in society, and there are others where the affects are more dramatic.[14] Changes in technology and society's operations create the conditions for alteration and eventual change.[15] Evidence of alteration and change in society exist from the earliest human records. Some periods of significant change are given names and are identified with specific alterations.[16] Reflecting on these periods has allowed the construction of comparative contextual frameworks,[17] where application of frameworks to other cases provides retrospective analysis of alterations.[18]

Furthering the second argument, I assert that humanity's efforts to construct technological artefacts, for example, the IT artefact, have had the effect of enlarging what is possible.[19] That is, humanity is capable of causing evolutionary change in society.[20] However, not all change agents act for the benefit of the greater good.[21] Planned change, that which is founded on the rationality of ideology, is not natural. Natural change is irrational and evolution is an example. More specifically, the appearance of a natural response to the technological system has been slow because the right combination of conditions and events were required to engender a suitable mass for a small alteration in human behaviour to be manifest as cultural and societal change.[22]

Therefore, in the third new argument, I argue that the technological human becomes the agent of change in its own evolution, where drivers for change include the recognition of power asymmetry in social relations, desire for security, satisfaction of social and moral coda, feelings of inclusion and integration, and new opportunities.[23] Additionally, technological humanity is aligned to the four causes, in which the technological human is the efficient cause.[24] While the form of technological humanity is caused by what it created (the barber's paradox), the substance is no different from natural humanity.[25] The appearance of human nature allows it to be described[26] and leads to the argument that the evolutionary path for humanity is not one that can be led by ideology, thus contrived societies have (almost universally) failed.[27]

[14] 196:2–196:14.
[15] 197:6–197:8.
[16] 197:10–197:20.
[17] 197:21–197:28.
[18] 197:29–198:2.
[19] 198:8–198:15.
[20] 198:16–198:26.
[21] 198:27–199:1.
[22] 201:10–201:10.
[23] 202:2–202:7. 205:28–205:28.
[24] 202:8–202:15.
[25] 202:16–202:26.
[26] 204:2–204:11
[27] 204:12–204:13.

Furthermore, through the incorporation of modern communications technologies (in the form of Web 2.0), the appearance of the technological human and indefatigable human nature: the technological enterprise can be defined.[28] Within the technological enterprise, the participatively democratic group should need minimal control and government.[29] This holds true for both civil and commercial groups. Attempts at forcing control emphasise entropy, which leads to unwanted phenomena.[30] The technological enterprise, instead of being a mono-cultural autocracy, is a more complex but supportive organisation.[31] The benefits may be shared by both the enterprise and its employees[32]

9.2 What is change?

The technological human's relationship with the technological system appears to represent a state of flux in which both are engaged in seemingly perpetual change, much like the waters of a river that flow, where each time a person steps into the river the waters are different, but the river remains the same river (Graham, 2005). Indeed, a unique river that is named often comprises the water flowing into it from its head waters and down to the river's mouth. Like the river's relationship with its waters, both the technological human and the system appear to be constantly changing, but any changes are in terms of the socio-cultural variance that is acknowledged as society.

Change in society that is caused suggests a materialist perception of form, and one is tempted to include society in that notion and refer to it as materialist, however to do so, negates Peirce's (1998b) pragmatist acceptance of metaphysics. While I do not automatically subscribe to a materialist ideal of society, for example as espoused by Marx, conceptualising change in the outset as an object helps in understanding the causes and effects of change. Generally, when considering questions regarding cause and effect in society, notions of difference or non-identity emerge (Mortensen, 2002/2006), but in any case of measurable difference, there must be some agreed to scale, for example in the physical sciences, velocity is measured as a rate of change of position over a given distance in a given time frame. Such usage of change refers to spatiotemporal variances and since societies tend to occupy the same space over time, the

[28] 203:29–204:1.
[29] 204:15–204:17.
[30] 204:19–204:29.
[31] 205:2–205:6.
[32] 205:10–205:19.

concentration is on temporal change and is separated into cause and time. A typical discussion on change would also include motion but looking at society as an object shows that it does not display external motion (that it is not seen moving about the place), instead, this discussion refers to change within society. It is the internal structure of society that changes and not the society itself.

To interrogate the concept of internal change in society I offer a metaphorical case. Briefly, think of society as though it were a stationary object, like a ball bearing. In a ball bearing there are atoms and sub-atomic particles that are in motion but from the observer's point of view, the ball bearing has a continuous and smooth appearance. Over a short time frame, nothing much seems to change on the surface of the ball bearing, but with the presumption that there is a movement of internal material, because when time is extended the surface of a ball bearing often shows evidence of change as pitting, surface discolouration, and so on. External forces will affect the ball bearing, such as those imposed by chemical reactions with the atmosphere. These forces serve to trigger internal reactions that are seen as changes, and it is those internal changes within the ball bearing that have a manifest change in the ball's whole structure. When the internal changes are observable then one perceives there is change. Society is not a ball bearing but from the outside a society appears as a distinct and observable object,[33] while internally, there are components that are in a constant or perpetual state of change. Eventually, change manifests in society as something different from before. I hesitate to use the word motion since that relates to the material properties of a substance, and I have recourse to include the metaphysical properties of society since it is the context and the entity of society that undergoes change, thus it may merely be considered a Cambridge change.[34] If change in society is metaphysical and internal, then some property of society has undergone change. This represents an alteration to society and change internally.

To effect an alteration is to make something appear to be different. However, unlike change that represents a substantive change to the properties of an object so that it is essentially different from what it was previously, an alteration means that variations to the form or character of an object have been effected so that it remains essentially intact. A Cambridge change may be an

[33]Through Symbolic Interactionism, Blumer (1986) provides the concept for treating material and non-material phenomena as objects. In the pragmatist tradition, even if phenomena are not directly observable, their effects presuppose their existence. If their existence is held to be true, then experiments that include them as phenomena are held to be valid. Therefore, such phenomena may be symbolically regarded objectively and subjectively.

[34]Geach (1969) says a Cambridge change is one in which there are changes to the properties of an object while not providing so much that the object itself changes. For example a ball at one time may be red then at another it is not-red, however the ball is still a ball. If a predicate is true of an object x at a time t, but not true of x at a later time, then x has undergone a Cambridge change. Under modern science and formal semantics this concept finds little favour.

alteration since time and some property is involved in the variations that have been effected. The gradual evolution of technology within a society that effects variations in behaviour is an alteration to society. A government can alter the fabric of society by passing legislation to control some aspect of peoples' lives. Tastes in clothing alter according to seasonal trends, regional differences, economic climate, and so on. The election of an electoral party in a democracy that changes the political intent of a government reflects an alteration in the expectations and desires of voters. A revolution to overthrow the leaders of a society and install a new form of government is not an alteration to governance. A nation that is invaded by another in which the invaders impose their version of society on the defeated is not an alteration. The dramatic effect of advanced or new technologies when introduced to a society that has had no experience of such technology previously is not an alteration. Over a long period, the culmination of variations to society may lead the observer to conclude that society has changed. The combined effect results in the essential character of society being recognisably different to what it was at some earlier point in history.

Aristotle described four causes (Falcon, 2006/2008): (1) A *Material cause* describes the material out of which something is composed. The material cause of a computer is plastic and metal. It does not refer to action and so it does not mean the pressing of a button to turn the computer on. (2) *Formal cause* is the arrangement of matter that gives something its form and by that it is recognised. Identification of a thing is through its definition, form, pattern, essence, synthesis or archetype. When using this cause, the language relates to the whole of the thing as principles or general laws. In the case of the whole being, the cause of its constituent parts is called whole-part causation. In effect, formal cause is the planned intent that exists in the mind of the creator, and is used to model the material form. The planned intent is embodied in the form the material takes and so the essence of the form is transferred from the creator to the thing. The information system exists as an artefact that is definable in the sense that it is a technological object. Orlikowski and Iacono (2001) defined the information system as: those material parts and cultural properties that are recognised as having the form of an information system. (3) *Efficient cause* is also called the 'primary source.' It is that from which the change, or the ending of the change, first starts. It refers to the effects of agents of change of all kinds, living and non-living, which are the cause of change, movement, or rest. That thing sets another thing in motion, or to cause a thing in motion to stop. Gane and Sarson (1979) refer to the efficient cause of an information system when they refer to the 'user community' and the 'programming

community.' (4) The *final cause* is the purpose of some thing and why it exists or done, thus an action may be purposeful. It serves some end. It includes psychological causes like volition, need, motivation or motives, rationality, irrationality, ethics, and all those things that give purpose to a person's behaviour. For example, the information system is provided to facilitate Work and the final cause for an information system is the Work that it is designed to facilitate.

Within the fabric of society, the socio-cultural artefacts of the technological human and the technological system exercise tensions that result in alterations to society itself. Accumulated alterations are manifest as substantive change when sufficient have occurred.

9.3 Technological humanity as agency

Throughout the history of Western society, there are periods of apparent change. Periods draw reference from technological developments and they have been given names. The Enlightenment was a period when increased public access to printed works shifted the balance of power away from the Church. The Industrial Revolution marked a significant shift in the make-up of societies as regional demand for human labour resources grew. The Machine Age accelerated the effects of industrialisation from the evolution of steam powered machines to the internal combustion engine. In the current the Information Age, in which computers supposedly release societies from government control and corporate dominance over the retention of information, making information freely available to all, and marking a shift from the end of the industrialisation of society to a new economic model, based on the manipulation of data as a resource.

The description of human history as periods or ages allows a person to create a contextualised framework so that they can compare what they know now with the remnants of what they see from the past. From their comparison, the person may have the opportunity to preserve icons of events and be educated. In essence, this is the purpose of the museum where artefacts are put on display so the person can marvel at the uniqueness and handiwork of their forebears, or perhaps the person may consider the artifice involved and attempt at reproducing the artefact. Alternatively, the person may attempt to link psychically and emotionally to the time from whence the artefact was revealed.

Society is caused to be in a state of continuous alteration, so that it is only in retrospect that a person can appreciate what those alterations were and what effect they had either at

that time, or some time later. Alterations have a cumulative effect on the psyche of the person and on humanity. The effects of alterations on humanity may be localised or generalised. For example, while the Work that gave rise to ARPANET[35] had an intensive effect, it was localised to academic and military circles (Hauben, 1994). Subsequently, the World Wide Web became a global phenomenon, the release of Web 2.0 applications, such as social networking, caused generalised alterations across societies where it is permitted and where the supporting infrastructure exists (for example, Mathews, 2010).

Technology permits greater facility in the human, and this promotes the human into a greater realm of capability and possibility. The mind of the technological human is not so different from what has always existed except that the technological human can use technology to reshape itself as standing reserve. The mind is bordered by its own limitations, imposing on experience, no limits (C. I. Lewis, 1929/1956). Drawing from the work of Mead (1934), I assert that the mind is shaped by the experiences of the technological human and technology has allowed it to build a form where the socially constructed networks of connections throughout humanity transcend physical, national, political, and ethnic barriers.

Society, as the product of collected minds, is defined by morals, ethics, politics, geography, status, economics, religion, and climate through social interaction. Where the mind of the technological human is permitted to cross those barriers and enter new territories, then those causes are brought back into society from whence the mind went. That causes alteration in both the mind of the technological human, individually, and in society. Cumulatively, this amounts to change in society. Therefore it is not technology that changes society but the mind of the technological human. The technological human is the agent of self change and where change is the product of adaptation to external influence then it is regarded as evolution. Therefore, change in a society that was brought into being by the technological human that obtained of external influence is regarded as evolutionary. A technological human such as this is an agent of evolutionary change.

Not all change is for the good, and not all human agents act for the benefit of society. As an agency, the nihilist technological human weakens permissions that technological causes might effect. It is through the democratic option of choice that the collective Will of technological humanity, mounted to overcome obstacles as it beckons to the future, takes mastery over the

[35] Advanced Research Projects Agency Network

standing reserve and thus itself. Only a collective will can override the nihilist preference.

Numerous commentators have presented views of the future that is bleak and dominated by some cybernetic entity or other. While the human is represented as one that is enslaved, there is always the hero who breaks their bonds and escapes into some bright future (for example, Cameron, Hurd & Ellison, 1984; Chaplin, 1936; Lang, Pommer, & von Harbou, 1926; Lucas & Copolla, 1998). The hero overcomes obstacles, particularly by human qualities that are absent in the cybernetic form. The cybernetic creature resembles the human, often portraying more negative aspects of human nature such as a megalomaniacal desire to gain dominance over the entire industrialised world. Reflecting the Taylorist and Marxist dreams, the cybernetic form is represented as armies of mindless and subservient humans who exist in a state of totalitarian materialism, stripped of humanity and their souls. Opposed to the portrayal of the subservient human is the anarch. The anarch is self-determining and while accepting in itself the technological system, it is capable of overcoming the system in itself without seeking to change the system because, by its very nature, the anarch is not of the same mettle.[36] Jünger (1977/1994) talks about the anarch from the first person, referring to himself, saying:

> They found no mischief in me. I remained normal, however deeply they probed. Also, straight as an arrow. To be sure, normality seldom coincides with straightness. Normalcy is the human constitution; straightness is logical reasoning. With its help, I could answer satisfactorily. In contrast, the human element is at once so general and so intricately encoded that they fail to perceive it, like the air that they breathe. Thus they were unable to penetrate my fundamental structure, which is anarchic.
>
> That sounds complicated, but it is simple, for everyone is anarchic; this is precisely what is normal about us. Of course, the anarch is hemmed in from the first day by father and mother, by state and society. Those are prunings, tappings of the primordial strength, and nobody escapes them. One has to resign oneself. But the anarchic remains, at the very bottom, as a mystery, usually unknown even to its bearer. It can erupt from him as lava, can destroy him, liberate him. Distinctions must be made here: love is anarchic, marriage is not. The warrior is anarchic, the soldier is not. Manslaughter is anarchic, murder is not. Christ is anarchic, Saint Paul is not. Since, of course, the anarchic is normal, it is also present in Saint Paul, and

[36] It is by connection to the Judeo-Christian trees of knowledge and life, and with an intimate knowledge of the cybernetic system, the anarch has tasted the forbidden fruit of choice, self-knowledge, and self-determination.

> sometimes it erupts mightily from him. Those are not antitheses but degrees. The history of the world is moved by anarchy. In sum: the free human being is anarchic, the anarchist is not. Jünger (1977/1994, p. 41)

The anarch seemingly opposes that other human tendency Tannenbaum (1952) refers to: to join together and find strength and purpose in the collective. The technological human is part of the system, not separate and distant. The anarch seeks to follow the tenets of being in the world but not part of it, to be seen to participate in achieving the goals of the technological system but in actuality to subvert the appearance of the system in themselves, as Evola (1961/2003) says, by retaining their own sense of being; self differentiated and apolitical. The anarch is akin to the nihilists but who is not yet convinced of their own superiority. The anarch is a human response to productionism and exists because the person is lost in the technological system, where absence or non-participation is not noted. The crushing dehumanising effect of productionism leads to a psychology of retreat, as represented in the anarch, in which the person withdraws into themselves, inwardly subverting the manipulative power of the technological system.

Societal barriers that affect society also affect on the anarch. The anarch experiences inner turmoil as the anarch tries to find rational arguments for their engagement with society. The anarch does not reject the technological system in their life but rather the imposition of ordering that acceptance of the system's conventions entails. The only means of escape for the anarch from the conventional is to learn deeply about itself and the roles that must be played in order to be seen to be a participant in the system while at the same time remaining detached. Gaining knowledge of itself as participant means the anarch must be intelligent about the system, which becomes a dangerous game where emotional engagement leads to loss of the anarch's carefully constructed self. Being participant, as is the technological human who is of the standing reserve, differs from the anarch. Instead of rejecting barriers imposed on society, the technological human gathers them with it into a socialised collective of ordering power over the system. The natural instinct of the human to be social and to collect into social groups overrides any attempt to create a disjointed rationalisation. In the end, even the anarch must come to accept he or she is a participant in the technological system.

Without the ordering of the standing reserve, there could be no anarch. That is, the anarch is the by-product of a dystopian productionist system from which the identity of the person of the anarch is forged from the understanding that they are unnaturally ordered.[37] Extending

[37] See §6.3.

Masaryk (1938/1971), the person who had in them no place for productionism had little recourse than to create in themselves the anarch or to retreat back into nature. Productionist metaphysics is formed of greed and avarice and some found no place in them for that amoral code. Where, for the anarch, Work is a series of tasks that must be done but that are relegated to an inconsequential status, then Work represents a rubbing stone that drives the anarch to regard itself as something different and non-conformist. That is, Work provides for the anarch a means by which the person can seek anonymity through non-disclosure of self and motive, and through that non-disclosure, the anarch has the opportunity to construct a self of their choosing. The agreeable self of the anarch is tested every time anonymity is threatened.

It has taken decades of technological advancement and human reaction to it for the human to begin to return to what it means to be truly human. What we in society are now witness to with Web 2.0, as systems are integrated and the standing reserve is reordered in unexpected ways, is a natural human response. The human is doing what has always been done, the technological human groups together to do or share things using technology, in this case with Web 2.0 applications. Dewey (1938) reminds us that human nature has not changed in the form of the technological human. Participation in the technological system, through application of the deliberative processes of Web 2.0, provides resolution to questions, doubts, and antagonisms in the corporate environment, and permits the introduction of an autonomous and anarchic reason to Work. A social community is strong and enduring where the membership participates in its own governance.

However, the anarch fails to apprehend that it is part of a social group in which others of its kind seek companionship, empathy, recognition, respect, and those other properties that are regarded as the basis for a moral and ethical good in the person. The anarch does not seek its future in the lives of those around it and thus, for the anarch, evolutionary opportunities are lost because for the human, beingness is confirmed by proximity to others of its kind (Heidegger, 1972/1993b). Instead, the anarch looks for confirmation in shared behaviours, acts, responses, memories, principles, standards, morals, loves, hates, ideals, dreams, passions, and purposes. The human is caused to be through socialisation, thus the future of the technological human is firmly tied to others of its kind.

9.4 Causes of technological and socio-cultural evolution

In §9.4, I argue that the causes that drive the technological human to participate in its own evolution entail: (1) Power asymmetries between status levels and access to information.[38] (2) A desire for security and independence. (3) Social and moral imperative to address economic imbalances. (4) Inclusion in decision-making processes. (5) Social integration so that the person feels they are involved in something greater than themselves. (6) Elevation of the dignity of labour. (7) A shift of Work towards it becoming an enriching and educative process.

The technological human is the efficient cause that discloses the material of the information system and then as specific applications of Web 2.0. The information system is what is to be brought into being, caused by the technological human, and in the presence of the system, the technological human is recognised. Zimmerman (1990) refers to the technological human as the embodiment of the Gestalt of the worker in the technological age. The expression of technological humanity, as the efficient cause, is to produce ever more technological devices to satisfy the technological system's Will to Will. The final cause of the technological system is the Gestalt of the technological human, and in that, technological humanity finds its own purpose.

The form of the technological human is caused by the technology it has created. The substance of the technological human is no different from a natural human. Like any other human, the technological human needs to be viewed as a unity. The mind and emotions of the technological human adapt to meet the demands of technology, with the result that socio-cultural institutions become more dependent upon technological production. Just as the human is a social animal, so too is the technological human. Under productionism, the technological human is enslaved to the notion of producing more for sake of more production, which has led to conceptions such as the anarch. However, modern technologies incorporating Web 2.0 applications enable the technological human to make alternative responses to productionism by providing facilities through which the technological human can express human traits and incorporate those into its Work.

Work is an expression of the social standing of the person. Where the enterprise is the place of Work; that is where the person employs their time. The enterprise is a microcosm of society (Pateman, 1970) such that forms of governance in society are reflected in the enterprise. While it may be true that many enterprises are autocratic by nature, many governments are too.

[38] See also §7.2.

Autocracy is seen where democracy is merely a means for the voting population to decide on who is going to have decision-making power. However, if having the right to vote exercises the power of the person to make decisions and where there is access to information, then an educated public is likely to take advantage of this. An uneducated population is less able to make informed choices about who ought to make decisions on their behalf. The choices they make may be made against attributes that irrelevant to the role of the selected decision maker. An apathetic population may be composed of a largely uneducated mass, but this is required for this form of democracy to be successful, so that the votes of those who do vote will have more impact. An educated population that is less apathetic and more likely to vote makes this kind of democracy no longer viable. If there are too many dissenting voices, then decision making becomes harder to achieve and more complicated means for offering choices are employed.

Modern technologies such as Web 2.0 can facilitate democratic processes in an educated society. Processes are facilitated by providing a means for the distribution of information, a platform on which decision making can be undertaken, forums for deliberation and argument, the means for both small and large scale publishing, and the ordering and reordering of data to reveal new information and create new content. Already, there are instances where Web 2.0 has shaped social contexts and forced alteration in societies. When changes occur in the macrocosm, they occur in the microcosm too, for example in established enterprises. This has been shown to be the case at IBM, where Web 2.0 has become a cornerstone in the company's projections. The deliberative power of Web 2.0 is well supported and opportunities are made available for those who have specific experience can mentor newer employees, which lead to an educated population who can make better decisions.

While dissent within a population may be expressed through Web 2.0 applications. In a participatively deliberative democracy, those who do not support dissent also have a voice and may balance disquiet. BT feared dissenters would gain a platform but their fears were unfounded and instead it was found that the naturally occurring collectivity inherent in the technological human served to create an environment in which decisions were made clearly, succinctly, and of which there was a full record, which might not have been the case otherwise.

The inclusion of democratic processes in the enterprise through applications of Web 2.0 technologies gives rise to the technological enterprise. The form of the technological enterprise is the cumulative effects of technological change and its effect on it as a microcosm of society. The technological enterprise is founded upon human nature and is the product of human

characteristics. E. Wilson (1998) says human nature is a collection of epigenetic rules that comprise patterns of mental development. Cultural phenomena such as rituals are not human nature but the capacity to create them is. The appreciation of art by humans is part of its nature, but pieces of art are not. Apparent automatic responses to stimuli such as a fear of snakes, is part of human nature because fear has manifested in the human. Other responses to stimuli such as favour, love, hate, or indifference, just as with fear, represent the passage of characteristics that have developed as successive human generations have evolved. Such variations through the generations represent alterations in the human, and the technological human is representative of a collection of influences that have manifested as societal change. Societal change and evolutionary manifestations are not planned; at times challenging rationalisation although this allows them to be studied empirically.

Efforts to contrive societies based on utopian ideologies have been only moderately successful. For example, centrally governed socialist states have found that societies tend to be complex and government from large centralised bureaucracies provide impediments to economic and social reform (Goodin & Pettit, 1995). As a liberal view, it is more efficient to allow people to govern themselves within prescribed guidelines. In the same way, efforts to create management contrivances in large enterprises are marginally effective. Global enterprises have had to learn that localised management can pay dividends (in particular, Osegowitsch & Sammartino, 2008; Dunning, 2008). The technological human as agency manifests unplanned and unforeseen variations in its nature that are the result of adaptations to a volatile environment, made increasingly unstable with rapid changes in technology. The technological human finds technological solution to problems, which accelerates technological change and this, increases the demand for novel adaptations in the technological human. Such an evolutionary path, if it is to be considered natural, must be allowed to adapt freely to new environmental constraints. Contrived governance serves to distort and restrict possible variations that may emerge when the technological human is faced with a new problem. A naturally forming society has restrictions based on naturally occurring human characteristics, whereas the enforcement of contrivances designed to create a human form forged on a utopian ideal is, while rational, unnatural. Naturally evolving human characteristics are not subject to great variation over time.

9.5 Conclusion

In §9.5, I conclude that, while the technological enterprise ought to employ management practices that best suit its needs, it also needs to acknowledge socio-cultural objects formed within technological human contexts. Where permission is granted for the existence of socio-cultural objects built by collective technological humans, then their emergence may be fostered through the provision of supporting infrastructure. The approach taken by IBM provides an example of the management of socio-cultural objects through their corporate social networking, where it became necessary in order for their large workforce to stay connected and to integrate age-based social strata.

The technological enterprise of the future is one that relies heavily on the loyalty of its employees; it requires its employees to make an emotional investment in the success of the technological enterprise. But the expectation of such an investment by employees is potentially weak because, in the technological human there lays the anarch, the tendency to retreat and keep ones' own counsel, while outwardly working for the benefit of the enterprise. For the technological enterprise, a fundamental requirement is that the socio-cultural artefact that is the collective of technological humans and their shared qualities is the part they play in ordering the standing reserve. While their commitment is to themselves as standing reserve, the technological human may still be attracted by other benefits, such as having the opportunity to express themselves through the social network or participating in the process of ordering.

Productionism has shown that monetary reward is not sufficient to satisfy the requirements of people. Remuneration is only the medium of exchange that compensates for the time that is given over to Work. It does not compensate for loss of socio-cultural integration, loss of power, but is the distancing of the person from their sense of Dasein. The technological enterprise, through fostering of technologies, is able to offer the infrastructure the technological human can use to build its own social networks, such as those at BT. This then, becomes as valuable as remuneration and provides an opportunity for the employee to invest emotionally in the purposes and intentions of the enterprise.

Drivers that motivate the technological human are social in origin, such as the need for security, love, belonging, recognition, and so on, representing its human characteristics (Maslow, 1954). Efforts to restrict expression or create contrivances fail when unforeseen factors occur and cause the person to take a different route towards resolving mental or emotional disturbances.

A driver for the person is to seek peace and the process of resolving problems brings that sense. The absence of peace is sensed as disturbances in the mind and emotions and these are not always rational, thus resolutions to disturbances may not be rational either. For the technological human, many of its fundamental and social needs can be met through modern technologies like Web 2.0, in particular, those related to socio-cultural interactions. Where mental and emotional peace through self-actualisation is the goal, then this has a direct impact on the way that the technological human regards its social network and therefore its Work. It becomes more than a means to monetary reward and incorporates motivating drivers where the technological human is willing to order itself with that goal in mind.

Chapter 10, is a summary of the main arguments, leading to a formal representation of Work and the Work System. Work, the System, and the Work System are described in natural language before their representation as a series of semantic statements.

Chapter 10

Semantics of Work in the Work System

10.1 Introduction

In chapter 10, Work and Work in the Work System are formally defined. In §10.2, the principal arguments about the concept of the 'system' are summarised. The mind of the person builds artificial systems. That while in modern usage, the term 'system' conveys the meaning of a complete complex union of processes and functionaries, the concept also carries an active role. Thus, it serves our purposes, to treat the 'system' as an object so that it can be considered in isolation. In §10.3, the concept of Work is summarised. Work provides more than just a means of monetary reward; it is also a means toward a sense of fulfillment, the facilitation of life's requirements and legitimises doctrines and ideals. Work is part of the human agency and expression of its being. Work is the purposeful transformation of items through assigned tasks. Work represents the gestalt of the worker. Finally, the appearance of Work is influenced by factors that surround it.

In §10.4, The Work System is defined in abstract terms in §10.4.1, objectively in §10.4.2, and subjectively in §10.4.3. So that in §10.5, the Work System is defined contextually in relation to Taylorist principles, its redefinition in the field of IS, and how that has been applied in application

through the lens of the modern technological development of Web 2.0, as a representative of an IT artefact.

In §10.6, the System, Work, and the Work System are formalised as natural language statements. In some cases, their truth-value is relative to their use. In cases where the truth-value is false there must be an alternative approach permitting the formalisation of those statements that cannot be expressed using standard Kripke semantics for modal logic. In these cases a hybrid form of modal logic is used (Braüner, 2006/2008) by adding to modal logic a second sort of propositional symbol called a nominal, where in the Kripke semantics each nominal is true, relative to exactly one point. The basis for the temporal logic used in the latter part of this chapter is from Allen (1984). Allen states that while the semantic structures described are designed for use with Artificial Intelligence (AI), they may be applicable to philosophy and linguistics. They have been selected because they provide a means for describing relations with variable time and space objects. The Work System is fundamentally concerned with action and the intention or purpose of the participants involved.

In chapters 1 and 2, the argument is made that the human is an entity that has mind and that it is the mind that simplifies complex relationships through building artificial abstraction. In chapter 10, I argue that a function of the mind is to categorise and organise stimuli by creating objectifications that have relationships.[1] The object is a product of the human mind. Therefore, an objective view of Work must make the presumption that it has relationships with other objects. Objectification is a fluid idea that ranges in scope from the individual and unique, to encompass the very large. This permits the mind to encapsulate very large and complex arrangements of objects without being overwhelmed.[2,3] In Chapter 5, artificiality is defined as an imitation of reality that enables naturally occurring phenomena to be applied in varying ways. In chapter 10, Work, the System and the Work System are regarded as abstractions and defined in accordance with Peircean pragmatist categories; where the abstract definition seeks to define the Work System as a first, the objective definition as a second, and the subjective definition as a third.[4]

Further, a different level of abstraction is reached through the application of formal logic statements. However, the usual use of logic semantics do not allow for complex relationships

[1] 210:7–210:13. 213:9–213:9.

[2] This view is affirmed by referring to the etymology of the word and considering how it may be applied in the field of IS.

[3] 210:14–210:23.

[4] 207:13–208:2 and213:25–214:6.

that exist between elements that are subject to spatiotemporal variation and state changes.[5] A solution to the limitation is found in the application of a state and event-type reification of temporal logic.[6]

In chapter 5, mechanism is defined as the doctrine that all natural phenomena are explicable by material causes and mechanical principles, and so nature has this as a feature. In chapter 10, This definition is applied to the argument that a system has mechanism and purpose and that a distinction is made between the system and the material it produces or uses.[7] Therefore, the concepts of Work as a human expression,[8] Work and its relationship with humanity as an agency,[9] and the scope of Work[10] are presented.

Therefore, in chapter 10, objective relationships are defined between Work and System,[11] human and Work,[12] and Work and technology.[13] The abstract definition of the object, Work System, brings the previous objects and their relationships together with the requirement of purpose[14] and as an object; the abstract Work System has relationships with other objects.[15] This allows a subjective appraisal of the Work System concept and provides the opportunity for scrutiny and the acquisition of new knowledge.[16]

Subsequently, objective arguments provide the basis for subjective reasoning.[17] I argue that: a Work System may always be improved,[18] the worker ought to be reconceptualised as a participant in the technological system, rather than as a victim,[19] and that the view in IS that the IT artefact is the most important element ought to be challenged. Instead, I argue for a 'human and technology' conceptualisation.[20,21]

[5] 208:3–208:6.
[6] 208:12–208:14. 219:2–219:3.
[7] 210:25–210:28.
[8] 211:8–211:20.
[9] 211:21–212:1.
[10] 212:6–212:16.
[11] 214:8–214:11.
[12] 214:12–214:19.
[13] 214:20–214:21.
[14] 214:22–214:24.
[15] 214:26–215:26.
[16] 215:15–215:18.
[17] 216:8–216:13.
[18] 215:19–215:23.
[19] 215:24–215:28.
[20] 215:29–216:7.
[21] Note that such a conceptualisation differs from the socio-technical concept. Socio-technical theory positions the worker as subordinate to the system, whereas I argue that the system is an expression of human creativity, as the enabler of its capacity to build technical solutions to perceived problems. Once tasks have been completed, technology has served its purpose. Therefore, the system is disposable and secondary to the human.

Furthermore, subjective reasoning provides a reconceptualisation of the Work System.[22] At the forefront of the reconceptualisation of the Work System is the human, as an agent of change in both itself and society.[23] In the reconceptualisation, rather than as a solution to the productionist dilemma (make more with less input), the Work System is an enabler (what are the goals; how might we achieve them).[24]

10.2 The System

Human perception and its focus are fleeting, so to understand complexity, the mind compartmentalises and categorises objects as natural phenomena. Relations can then be made between objects in which attractions, repulsions, flows back and forth, giving's, and takings can be observed and measured. The naturally occurring objects are categorised and ordered according to their relations, which gives rise to the conception that complex relations may be considered as a system. The concept of the system permits the mind to comprehend parts of the whole and build up an appreciation of it without having to grasp the system's entirety.

The ancient Greeks referred to the system in relation to the verb *sunìstemi*, which means the act of uniting or putting things together (*Strong's Greek Dictionary*, 2010). The word 'system' is normally attributed to mean 'total,' 'crowd,' or 'union' and so the word itself does not refer to a singularity but a multiple that has been collected together into a unity, so that the system can be regarded as one object, bringing the system-object within the scope of human comprehension. Thus a system includes objects of any kind, whether they are organic or synthetic, that may be real or imaginary, and may be infinitely large or small. Systems are recognised by giving them names and labels, so that systems are regarded as objects and related to other systems. A cog within a clock that is used to measure the passage of time is a complete component, but is not a system. Alter (2002a) reminds us that a single computer software package that is limited in its scope or influence is not an information system, while it might be used in one. Data are not systemic and while they may occur throughout the entire system, they are not causative. Naturally occurring phenomena, are not systems, but systems of naturally occurring phenomena may be conceived so that they can be observed as exclusive processes, objects, and relations.

[22] 217:12–217:23
[23] 217:24–217:28 218:22–218:29.
[24] 218:1–218:7. 218:8–218:21.

In the sense that to produce is a revealing or disclosure of the standing reserve,[25] and nature is challenged to store and order that which was revealed (Heidegger, 1954/1993c), then the ordering of the standing reserve that is set upon nature is an artificial overlay. The system is the means by which production facilitates the disclosure and ordering of the standing reserve through technology. The artifice of building the system as an extension of the mind is the means by which the standing reserve is ordered, so the mind may perceive the standing reserve.

10.3 Work

Paraphrasing A. Smith (1776/1937), Work is the real price of everything. Work is the energy expended to cause something to be and to disclose its objective usefulness from its occurrence in its natural state to some other thing that is wanted or desired. As a human act, Work fulfils more than just an economic prerogative but is used to justify social and moral stances too.[26] Work is a means by which a human can lay claim to the belief that they belong to something greater than themselves, a greater something that they might refer to as being more real, purposeful, useful or creative. The ends that Work provides are measured by the economic gain it provides, the sense of fulfilment afforded during the act of it, the facilitation of life's requirements, and the legitimisation of religious doctrine or utopian ideals.[27] I would therefore argue that a child ought not to have a conception of Work. For the young child, learning, experiencing, and other activities are surrounded as play. When play is fun, much can be learned but when it is no longer fun, it becomes boring for the child. Moreover, in this learning process of fun/not-fun activity, the child learns what it wants to do or not.

Work is wholly part of the human agency and expresses its being; physically, emotionally, psychologically, and spiritually.[28] Work allows the human to attach itself to an industry in a way that is symbiotic. Work benefits the human by confirming their beingness and identity on the one hand, and it benefits the industry by providing the power to meet the challenge of storing and ordering. The human ordered and categorised through Work such that their efforts are held in store, allowing redundant patterns to emerge.[29] When those patterns do not match requirements, the volume of required resources (number of humans) may be increased or

[25] See Heidegger's definition of standing reserve on p. 164.
[26] See Tannenbaum's comment on p. 105, the reference to socialisation of Work on p. 180, and as a driver for change in Work on p. 202.
[27] In particular p. 106.
[28] See §9.3 on p. 197.
[29] For example, §7.4 on p. 161.

decreased as needed. The human was reframed as standing reserve reaching an extreme in the West. The scientific method provided the opportunity for industrialists to build a conception of Work where space and time were reframed such that for the worker, Work was their only reality; where reality would be time spent working or otherwise 'unemployed' and out of work (Heidegger, 1931/1981) and became work for the sake of more work (Zimmerman, 1990).

I assert that the human is not wholly defined by its Work. Just as Work is a means of expression; there are acts that are not Work. The acts required to bring about life sustaining goods are Work while not-Work acts have no such purpose. Works acts are purposeful where not-Work acts have no purpose in sustaining the life of the human. Work acts prescribe what the human must do, how it must behave, what it may respond to or not. These conceptions are materialist and do not acknowledge the human as a metaphysical being. Not-Work acts are those that engender inspiration, awe, love, wonder, and joy. The absence of not-Work acts leaves the human indifferent and apathetic, therefore to keep the human engaged demands more than streamlined processes and ever more efficient transactions, they need to balance the various parts of their lives. Without stimulus, the worker is subject to the meanness of their tasks, the result of which is frustration and fatigue.

To illustrate the assertion that Work must entail more than the performance of assigned tasks, from the field of management where Work is defined as the purposeful transformation of items through an assigned task. Trist and Bamforth (1951/2000) describe a 'whole task' as one which encompasses those attributes that define a task's activities, outcomes, participants, inputs, work allocations, timing, and effort. When a group is assigned a whole task, its members accept responsibility for the successful completion of the task and they experience all aspects of the task's operations. This assignation brings the task within the notion of minimal critical specification where, while the members of the group know *what* is to be done, rarely is it important to define *how* the task is to be completed. For this approach to be successful, it is important that the group accepts its autonomy and make decisions based on local conditions. As the group is assigned new tasks, it gains experience and can apply what it has learned to new situations (Rice, 1958). Any group in this conception is dynamic and is not exclusive in its working environment.

For Jünger (1932/2007), Work is the representation of the Gestalt of the worker, where Gestalt is the beingness that anchors entities within the domain of humanity.[30] The Gestalt of the worker

[30] See p. 106.

ensures humanity is printed in accordance with the requirements of the predominating system. When people and things appear, it is their beingness that stamps them; thus at different times, their appearance varies. Variations are relative to the qualities they are stamped. Therefore, it is by virtue of their stamping that entities are attracted to or repelled from each other, thus movements or waves of appearance are caused by the relations between mutually attracted or repulsed entities. As a being, the human is not fixed and it is through Work that the human reveals insights, variations, and new possibilities. This tendency in the human sees technology being applied in new ways.

Work as an object, is influenced by factors that surround it. For example power asymmetries such as race, gender, class and position, access to authority and information, economic power, social and political influence, degrees or lack of respect are maintained by management to ensure compliance for decisions that have been made (Barenberg, 1994; Bowman & West, 2007).[31] However, while the traditional approach in industry has been to employ command and control styles of management, the influence of modern technologies such as Web 2.0 have caused some enterprises to incorporate more democratic methods in the decision making processes at mainly operational levels. To illustrate, the Millennial[32] is a by-product of the technological system where the system has become a significant part of the consciousness of the person. Millennials enter the workforce with the expectation that they can make use of social networking tools just as the previous generation used instant messaging and before that, email (Majchrzak et al., 2009). Millennials bring into phase their personal and Work life by creating a technological bridge of information flow, they see their role in the enterprise as actively participating in decision making processes and providing governance both to themselves and the enterprise (Strauss & Howe, 2000).

10.4 The Work System

In §10.2, the concept of the System was defined and in §10.3, the concept of Work done by the human was defined. In §10.4, these are brought together as the definition of the Work System. The definition has three attributes: abstract, objective, and subjective. The abstract definition of the Work System (in §10.4.1) positions Work and its relationships to the human through the performance of tasks that have specific goals or objectives and technology that is

[31] See in particular p. 129.
[32] See definition on p. 21.

used to achieve those goals. The objective definition of the Work System in §10.4.2 treats the Work System as a substance with properties so that the Work System can be considered as the product of the human mind, such that the human is it treated as a substance.[33] The subjective definition of the Work System in §10.4.3 positions the Work System as a substance that exists in the interval between the human and technology. That is, it is subject to spatiotemporal variations from either external influence.

10.4.1 The abstract Work System

Work provides the means so that change may be exercised upon an object, where that object may exist spatiotemporally or as an abstraction. Work in a System is any conception of Work that is limited to exertions of humans or their extensions, within the bounds of a system. Work in a System may influence or effect causes on objects outside the System.

Humans are related to Work through the effort they express in the performance of a task and humans are related to other humans in the system through tasks. A task is the specific Work that is done by the human within the System, with or without the aid of technology, to achieve a goal or objective. A task is completed within spatiotemporal limitations. A task may consist of sub-tasks and may have dependencies for its successful completion. The human-task-human relation is the socio-cultural context in which tasks are undertaken. The effort expressed to complete tasks may be disclosed as planned processes or as naturally occurring ad-hoc events where a single human or group has greater autonomy.

Work that is facilitated by technology is an extension of the intention and purpose of the mind of the human. Technology is an extension of the mind to facilitate Work.

A Work System includes humans and technology. It may include single or multiple groups of humans and technologies but the purpose is focussed. If there are multiple or competing purposes, these are represented as multiple Work Systems within a greater whole.

10.4.2 The Work System object

The properties of the Work System include humans, technology, and processes or operations. Humans perform tasks through systematic or a-systematic processes or operations to organise or distribute resources so that the tasks may be completed. Processes or operations incorporate

[33] See the discussion on the human in §1.4 and the rationale on p. 24.

technology to facilitate production or ordering of the standing reserve. The Work System provides means and ways so that production can facilitate the disclosure and ordering of the standing reserve. A Work System may be considered a substance where the property of the human brings with it the properties of mind. The Work System functions as an extension of the mind, so that the standing reserve may be ordered and the mind perceive. It is useful to think of the Work System as a unity that performs Work to produce, reveal, or disclose. Work in the Work System is a human expression of its beingness and production is a revealing of the standing reserve. An IT artefact has properties found in a Work System and may be used by humans, but it is not a Work System. A group of humans who engage in Work may complete tasks without the aid of computers but if they also use other technology to facilitate production or ordering, then the system in which they are engaged may be considered a Work System. Humans who use no technology in their Work may complete tasks but they are not involved in production or ordering of the standing reserve.

10.4.3 The Work System subject

Regarding a Work System as an object and a substance permits observation of its properties. Observation of its properties allows analysis of them within their relative environments and factors that influence those properties. Adaptations to Work System properties (human responses to change) may be observed if the influence from external factors vary.

A Work System may be less effective than expected. That is, the Work System may be altered and improved to be more productive, efficient, or cost-effective. Whether a Work System may be improved is dependent upon its purpose. Any aspect of a Work System ought to be measurable and its performance compared with an ideal, to historical accounts, to an exemplar, or with other Work Systems.

Work is wholly a human expression but the human is not wholly defined by Work. The human desires order and control, and the systematic ordering of Work in the socio-cultural context permits it the opportunity to participate. Thus, the human becomes a participant in Work, and they are given permission to engage in processes that involve other participants and technology.

In IS, the technological artefact is of paramount importance but in this, the human element is lacking.[34] The Work System provides a participative conception of the human-technology

[34]Examples of how the technological artefact is treated may be seen on pp. 37, 41, 50, 112, 141, *163*, 167, and 196.

relation but is devoid of social and political agendas, and economic and industrial imperatives. Instead, the Work System positions Work as a natural human expression that, when aided with technology, enables far greater results from effort applied and is the principal driver for change. The Work System is revealed as the means by which change is made systematically, for the distribution of tasks, and the definition of processes. The Work System provides an environment in which relations can be objectively mapped between participants, processes, tasks, and technology.

A Work System exists where there may be other Work Systems. The properties of a Work System may come under the influence of, or gain influence over another Work System. External factors may cause change or alteration to occur in a Work System, and alterations within a Work System may effect change in the system as a whole, with the cascading effect of successive alterations or changes in other Work Systems. A Work System may be designed, or it may have evolved and been subsequently revealed through analysis of a discrete situation.

10.5 The Work System reconceptualised

For Taylor (1911) the Work System is a process that, through the application of scientific management principles to the piece-work system, can be improved upon. More can be produced from the same amount of human labour, he says, than when workers are left to determine their own work practices. His solution is to plan and project the efforts of each worker involved in production and thus to maximise on input. In sociotechnical theory, there is a shift in emphasis away from the analysis of an individual's performance in a Work System towards teams or groups, and provides a strategy for breaking down the traditional hierarchical organisational structure (Trist & Bamforth, 1951/2000). J. R. Wilson and Whittington (2001) build on the work of Trist and Bamforth and describe how self-managed work teams differ from the traditional concept of a work group such that planning, organisation, prioritising and staffing are undertaken by the team rather than by a supervisor. The team will usually take responsibility for an area of work and the level of autonomy may vary. Activities are normally interdependent and team members may be multi-skilled to enable transferral between them. As well as having those attributes that have been mentioned, the team is identifiable with defined boundaries within a larger social system and the member roles are differentiated (Hackman, 1990). Alter (2002a) uses the Work System in a conceptual sense when he describes the Work System as a

method for understanding, analysing, and improving systems in organisations, whether or not IT is involved. Mumford (1983) suggests that a Work System is spatiotemporally defined (as opposed to a set of scientific processes or a conceptual framework) where people can come together and share knowledge and experience for the benefit of the greater whole. Bostrom and Heinen (1979b, 1979a) say that a Work System is a means for allocating work tasks to workers in a defined sub-system within an organisation, for example, a department. Davis and Taylor (1979) say that Work Systems are a social construct that exist within social systems and that a person has the power to create or otherwise organise those social systems. Trist (1981), while acknowledging that a Work System is both discreet and inter-linked, tries to link the Work System to technology when he says that multiple Work Systems include more than one face-to-face group along with others in matrix and network clusters.

The purpose of any Work System is determined through a combination of properties that comprise the Work System and the reason for its existence. For Taylor (1911), that means the scientific selection of workers, the equal division of labour and the training and development of workers. Mumford (1983) has it as a set of activities contributing to an integrated whole, not as a set of individual jobs that should be regulated by its members and not by external supervisors. However, Land (2000) claims that the prime aim of implementing a Work System is to improve the quality of working life. The element of control must take into account known and unanticipated change. Alter (2003) acknowledges that models are spatiotemporally dependent, and thus, changes occurring within the environment that a Work System models, will eventually be reflected in the model itself. That is, while it may be regarded as a Cambridge change, a conceptual model maintains a singular form during a particular time interval and changes in a Work System may be required during that interval without significantly changing its form.

The human is the principal agency of alteration in its self and society.[35] Technology, as an extension of the human mind, is a second agency of alteration in the human psyche. Alteration, when viewed cumulatively, amounts to change in the socio-cultural fabric of society. It is not right to suggest that technology causes change in society; the human causes alteration using technology.[36]

[35] See in particular §9.3 on pp. 197 and 204.

[36] For example the spread of printed bibles in sixteenth century Europe promoted in a proportion of the population a desire to be better educated, so that they could make decisions about what they chose to believe rather than having access to knowledge restricted and arbitrarily released on occasion. In that case the technology of moveable type printing enabled the distribution of knowledge in printed works much more effectively than by the usual method of copying line by line or carving every page on wood blocks.

Whereas the Work System was first conceived as a solution to the apparent problem in the industrial setting: of how to achieve a controlled and standardised production environment with built-in safeguards. In recent years, society has altered, arising from the uptake of modern networked technologies, for example Web 2.0. In some cases, the uptake has resembled the occurrences of sixteenth century Europe where the distribution of knowledge that had been previously inaccessible has allowed people to decide what they choose to believe, but Web 2.0 is more effective in its role as an enabler of ordering.

Web 2.0 enables the participant human to order the standing reserve. (1) It obtains of *immediacy*. Sophisticated search algorithms and indexes built on web ontologies. (2) The proliferation of devices that are able to communicate on the Internet means that it is *always available*. (3) It is relatively easy to build applications that provide multiple means of keeping in touch, which means one is *always contactable*. (4) The communities that arise are *inclusive*, that is the online community reflects the "old order" communities that existed prior to the Industrial Revolution in that there are shared morals, ethics, produce, and so on. People are self-excluded from these communities. (5) Through standardisation and the success of applications, there is a general trend towards unification, which provides *reliability*. (6) Applications must guarantee *security* where the infrastructure is insecure. (7) Barriers represented by time, money, effort, knowledge availability and acquisition are *increasingly lowered.* (8) For *morals and ethics to be respected,* social norms, customs, and traditional values need to be built into systems. (9) *Ownership* must be resolved and constantly monitored. Issues include: personal space and possession versus collective access, use, and appropriation.

The Work System, regarded as a socialised system in which Work is facilitated by technology, and in the Web 2.0 context, entails democratic processes. Where the human participates with technology to order the standing reserve then the attribution of power in the enterprise is altered and the participant as technological human is reframed. That the technological human is reframed causes shifts in power asymmetries within the enterprise such that through deliberation, the power of decision making in the enterprise is redistributed toward operational levels. Redistribution of power in decision making provides new opportunities both for ordering of the standing reserve and for the development of new strategies at the enterprise level.

10.6 Work in the Work System: a formal ontology

In §10.6, Work and the Work System are defined using a state and event-type reification of temporal logic.[37] Hofweber (2011) says "formal ontologies are theories that attempt to give precise mathematical formulations of the properties and relations of certain entities" and that representational formal ontologies are used to describe a domain of entities, in this case Work, the System, and the Work System. The statements in §10.6 provide the basis for a representational formal ontology of Work and its relationship to the System and the Work System in which the statements are representative of systematic formal descriptions.

The statements in §10.6.1 provide axiomatic representations of first order predicates that describe Work as an object and the manner in which change occurs. The statements in §10.6.2 provide systematic representations of the relationships between objects previously identified. For reference, the following conventions have been used:[38]

$\wedge$ Conjunction

$\vee$ Disjunction

$\neg$ Negation

$\Rightarrow$ Implication, it implies[39]

$\Leftrightarrow$ Equivalence, it is equivalent to

$\forall$ Universal quantifier, for all or in the case of any occurrence of

$\exists$ Existential quantifier, there exists or it may exist

$\in$ Set notation, inclusion

$\textbf{HOLDS}(p, t)$ A property holds during a time interval

$\textbf{OCCUR}(e, t)$ An event occurs during a time interval

[37] Refer to pp. 19, *73–74*, 76, and 208.

[38] See Table 3.1 on p. 76.

[39] Quine (1982) objects to the symbolic meanings "implies" for $\Rightarrow$ and "equivalent to" for $\Leftrightarrow$; preferring instead "if p then q" for the former and "p if and only if q" for the latter.

10.6.1 Predicates

The statements in §10.6.1 provide axiomatic representations of objects related to the conceptions of Work and System.

Predicate 1. An object is appreciably present in an abstract form or exists as a substance.

Thus for any object to exist, it must have some property.

$\exists o, o(p)$

Predicate 2. Change is a substantive alteration to an object's properties.

$\exists o, o(p, p')$

Alternatively, the statement may be expressed as

$\text{CHANGE}(o, p, p')$

Predicate 3. Work is done if an only if some object has been changed over some period.

$T \in (t_1, t_2)$

$\text{WORK} \Leftrightarrow \text{OCCUR}(\text{CHANGE}(o, p, p'), T)$

Predicate 4. Intention is the act of focussing the mind and maintaining a sense of purpose.

Thus, it holds that during an occurrence, the mind is focussed on an object with a sense of purpose (an event, e) for the period.

$\text{INTENTION} \Leftrightarrow \text{HOLDS}(o, \text{OCCUR}(e, T))$

However INTENTION implies some cause of the event and requires an agency to effect the cause, that is to make the intention manifest.

$\text{INTENTION} \Rightarrow \text{ACAUSE}(\text{AGENT}, \text{OCCURRENCE})$

Predicate 5. Work is done if and only if there is an agent present to carry out some intention.

$\text{INTENTION} \Leftrightarrow \text{WORK}(\text{ACAUSE}(\text{AGENT}, \text{OCCURRENCE}), T)$

Predicate 6. A process is a specific series of Work steps that are completed until an intention is matched.

A process has a disjunctive relation with its intention.

$\text{PROCESS}((\text{SUB-WORK}_n \wedge \text{SUB-WORK}_{n+1}), T) \vee \text{INTENTION}$

Until such time that, the intention is met.

$\exists o, \text{CHANGE}(o, p, p') \Leftrightarrow \text{INTENTION}$

Unlike an event where the number of times it has occurred can be counted as they occur, the repetitions of a process cannot be counted. Instead, they are treated as a continuous occurrence of a single process.

$\text{HOLDS}(\text{OCCUR}(e, t)) \Rightarrow \text{OCCURRENCE}(e, t)$

Predicate 7. A task is systematic Work that causes change to be effected by an agent.

A task, like an event, may be repeated indefinitely or for as long as it is required.

$\text{TASK}(e^n, T)$

$\exists \text{WORK} \exists \text{INTENTION}, \text{TASK} \Rightarrow \text{CHANGE}(o, p, p')$

$\Rightarrow \text{WORK}(\text{ACAUSE}(\text{agent, occurrence}), T)$

Predicate 8. In a system, objects are changed.

$\text{SYSTEM}(\text{CHANGE}(o, p, p')) \Rightarrow \text{INTENTION}(\text{WORK}(\text{TASK} \wedge \text{PROCESS}))$

Predicate 9. A human is a substance that may be individual, in a group, or in a group of groups.

$\exists h, h(p, q)$

$\forall h, H \Leftrightarrow \in (h_1, h_2, \ldots h_n)$

$\forall H, H^n \Leftrightarrow \in (H_1, H_2, \ldots H_n)$

10.6.2 Propositions

The statements in §10.6.2 provide a representational ontology of the conceptions of Work, System, and the Work System.

Proposition 1. Work is the means by which change is exercised upon an object where that object may exist either spatiotemporally or as an abstraction.

$$\forall o \forall p \forall p', \text{OCCUR}(\text{WORK}, o(p, p')) \wedge$$
$$\in (o(p, p') \Rightarrow \neg \text{ OCCUR}(\text{WORK}, o(p', p')))$$

Proposition 2. Work within a System may effect changes in objects in other systems.

$$\exists \text{SYSTEM} \exists \text{SYSTEM}' \forall o \forall p \forall p', \text{OCCUR}(\text{WORK}(\text{SYSTEM}(o, p, p'))$$
$$\wedge \text{ OCCUR}(\text{WORK}(\text{SYSTEM}'(o, p, p'))))$$

Proposition 3. Work in a System is any conception of Work that is limited to exertions of a human h or its extensions h' within the bounds of a system.

$$\forall h' \forall h, \text{WORK} \Rightarrow h; \text{WORK}(h, h')$$
$$\exists \text{SYSTEM}, \text{SYSTEM}(\text{WORK}(h, h'))$$

Proposition 4. A task is the specific Work that is done by a human within the System, with or without the aid of technology, in order to make its intention real.

$$\exists \text{SYSTEM} \exists \text{WORK} \exists \text{INTENTION}, \text{TASK} \Leftrightarrow$$
$$\text{WORK} \in (\text{OCCUR}(\text{SYSTEM}) \wedge \text{HOLDS}(\text{INTENTION}))$$

Proposition 5. A task is spatiotemporally defined.

$$\forall \text{TASK}, \text{OCCUR}(\text{TASK}(\text{CHANGE}(o, p, p'), T))$$

A task may consist of sub-tasks and may have dependencies for its successful completion.

$$\forall T, \neg \in (\text{TASK}, T) \Rightarrow \text{HOLDS}(\text{TASK}, T)$$
$$\exists T, \in (\text{TASK}, T) \wedge \neg \text{HOLDS}(\text{TASK}, T)$$
$$\therefore$$
$$\text{HOLDS}(\text{TASK}', T) \Rightarrow \neg \text{HOLDS}(\text{TASK}, T)$$

and

$$\text{HOLDS}((\text{TASK}')', T) \Rightarrow \text{HOLDS}(\text{TASK}, T)$$

Proposition 6. Tasks, processes, and technology are properties of a Work System.

$$\text{HOLDS}(p, \text{WORKSYSTEM}) \Leftrightarrow$$
$$(\forall \in ((\text{TASK}, \text{PROCESS}, \text{TECHNOLOGY}), \text{WORKSYSTEM}) \Rightarrow$$
$$(\exists \text{TASK}, (\text{TASK}, \text{WORKSYSTEM}) \wedge$$
$$\exists \text{PROCESS}, (\text{PROCESS}, \text{WORKSYSTEM}) \wedge$$
$$\exists \text{TECHNOLOGY}, (\text{TECHNOLOGY}, \text{WORKSYSTEM}))$$

In a Work System, Work is divided into tasks or processes.

$$\text{OCCUR}(\text{WORK}, T) \wedge \ \in (T, T') \Rightarrow \neg \text{OCCUR}(\text{WORK}, T')$$
$$\text{OCCUR}(\text{WORK}(\text{TASK}, \text{TASK}'), T) \Rightarrow$$
$$(\exists t_1 \exists t_2, \text{MEETS}(t_1, T) \wedge \ (T, t_2) \wedge$$
$$\text{HOLDS}(\text{TASK}, t_1) \wedge (\text{TASK}, t_2)) \wedge$$
$$(\forall T', \in (T', T) \Rightarrow$$
$$\neg(\exists t_3 \exists t_4, \text{MEETS}(t_3, T') \wedge \text{MEETS}(T', t_4) \wedge$$
$$\text{HOLDS}(\text{TASK}', t_3) \wedge \text{HOLDS}(t_4, \text{TASK}'))$$
$$\text{OCCUR}(\text{WORK}(\text{PROCESS}, \text{PROCESS}'), T_n) \Rightarrow$$
$$(\exists t_1 \exists t_2, \text{MEETS}(t_1, T) \wedge \ (T, t_2) \wedge$$
$$\text{DURING}(\text{PROCESS}, t_1) \wedge (\text{PROCESS}, t_2)) \wedge$$
$$(\forall T', \in (T', T) \Rightarrow$$
$$\neg(\exists t_3 \exists t_4, \text{MEETS}(t_3, T') \wedge \text{MEETS}(T', t_4) \wedge$$
$$\text{DURING}(\text{PROCESS}', t_3) \wedge \text{DURING}(t_4, \text{PROCESS}')))$$

Note that Work may be disclosed as a planned process or task in the Work System, or Work may reveal itself as a naturally occurring ad-hoc event if the human participant has autonomy.

Proposition 7. A Work System may include single or multiple humans, or single or multiple groups of humans, and technology.

$$\text{WORKSYSTEM} \Leftrightarrow \ \in (h, H, \text{TECHNOLOGY})$$

Proposition 8. Humans are related to all other humans in the Work System through Work they do.

$$\text{WORKSYSTEM} \Leftrightarrow \text{OCCUR}(\text{WORK}(h, H))$$

However, not all humans are related to the humans in the Work System.

$$\forall H \exists h_1', \text{HOLDS}(h_1', H) \Leftrightarrow$$
$$(\forall h_1, \in (h_1, H) \Rightarrow \neg\text{HOLDS}(h_n, h_1))$$
$$\therefore$$
$$\text{HOLDS}((h_1')', H) \Leftrightarrow \text{HOLDS}(h_1, H)$$

Proposition 9. The human-task-human relation is the socio-cultural context in which Work is done in the Work System.

$$\text{HOLDS}(\text{WORKSYSTEM}, h) \Leftrightarrow$$
$$(\text{OCCUR}(\text{WORKSYSTEM}, \text{WORK}) \wedge \text{HOLDS}(h_1, H))$$

A working definition for 'culture' is that it is disclosed through human relations as a set of integrated patterns that are commonly recognised as knowledge, beliefs, and behaviour. 'Culture' is dependent upon the capacity of its participants to engage in symbolic thought and social learning in order to build accepted patterns, therefore it is a revealing of a set of shared attitudes, values, goals, and practices that may then be taken to characterise some institution, organisation or group.

The description is predicated on HOLDS and OCCUR as 'culture' exists both as an object and a process, thus

$$\text{HOLDS}(\text{OCCURRENCE}, T) \Leftrightarrow \text{OCCUR}(\text{HOLDS}(p, q), T)$$

The properties of 'culture' are those that once disclosed become fixed unless they are changed. In this instance the shared attitudes, values, goals and practices of KNOWLEDGE, BELIEF, and BEHAVIOUR of participants identify one 'culture' as being distinct from another.

$$\text{CULTURE}((p, q), T)$$
$$\text{HOLDS}(\text{CULTURE}(\in (\text{KNOWLEDGE}, \text{BELIEF}, \text{BEHAVIOUR}), T) \Leftrightarrow$$
$$(\text{HOLDS}(\text{OCCUR}(\text{KNOWLEDGE}(p, q), T) \wedge$$
$$\text{OCCUR}(\text{BELIEF}(p, q), T) \wedge$$
$$\text{OCCUR}(\text{BEHAVIOUR}(p, q), T))) \vee$$
$$\text{HOLDS}((\text{CULTURE}'((p, q), T) \vee \text{CULTURE}((p, q), T'))$$[40]

A Work System exists as a cultural artefact and is thus an object within a culture.

$$\text{CULTURE}(\text{HOLDS}(\text{WORKSYSTEM}, \text{OCCUR}(\text{WORK})), T)$$

[40]While noted as disjunction, the intention here is 'non-exclusive or,' as in 'p and/or q.'

Proposition 10. A Work System exists as a socio-cultural object in which technology is used to facilitate Work.

$$\text{CULTURE}(\text{HOLDS}(\text{WORKSYSTEM}, \text{OCCUR}(\text{WORK}(\text{OCCURRENCE}(\downarrow \rightsquigarrow (\text{CHANGE}(o, p, p'), T) \wedge \text{TECHNOLOGY})), T))$$

Proposition 11. Work that is facilitated by technology is an extension of the intention and purpose of the mind of the human.[41]

$$\text{INTENTION} \Leftrightarrow \text{ACAUSE}(h(\text{mind, purpose}), \text{OCCURRENCE}) \Rightarrow \text{WORK}(\text{ACAUSE}(h(\text{mind, purpose}), \text{OCCURRENCE}), T) \wedge \text{WORKSYSTEM}(\text{OCCUR}(\text{WORK}(\text{TECHNOLOGY} \wedge h(\text{mind, purpose}))))$$

Note: For the sake of coherence the human is treated as a substance of which 'mind' is a property. A human fulfils its purpose, technology is an extension of the mind's facilitation of Work.

Proposition 12. The purpose a Work System obtains is its human defined purpose.[42]

A working definition of PURPOSE is that it represents the object of an intention maintained as a guide to action.

$$\text{PURPOSE} \Leftarrow \text{HOLDS}(\text{INTENTION} \wedge \text{OCCUR}(\text{WORK}(p, q), T))$$

Proposition 13. A Work System ought to have one defined purpose.

$$\text{WORKSYSTEM}(\text{HOLDS}(\text{PURPOSE}(p, q)))$$

Where there are multiple or competing purposes, these are represented as multiple Work Systems within a greater whole.

$$\text{WORKSYSTEM}(\text{HOLDS}(\text{PURPOSE}_A \vee \text{PURPOSE}_B)) \Rightarrow \text{WORKSYSTEM}_A(\text{HOLDS}(\text{PURPOSE}_A)) \wedge \text{WORKSYSTEM}_B(\text{HOLDS}(\text{PURPOSE}_B))$$

[41] See 111:25.
[42] See 111:25.

10.7 Conclusion

In chapter 10, the question: "What are the semantics of Work in the Work System?" is answered. In §10.2, the concept of the system has been defined in general terms and then specifically ascribed to the Work System in §§10.4.1–10.4.3. In these sections, the Work System is defined as an abstract concept, then objectively and subjectively. With the three part definition, the Work System is then put into context in §10.5. Reference is made to the term since its first appearance; then throughout subsequent applications, reference is made to Web 2.0 technologies to represent the IT artefact. The condensation of conceptions permits in §10.6 a formal ontological definition of Work and the Work System through an application of state and event-type reification of temporal logic.

In chapter 11 the thesis concludes with a definition of Work in the Work System, summarising the semantic ontology. In §11.3, areas of possible future research that stem from the work of this thesis are briefly outlined.

Chapter 11

Conclusion

11.1 Introduction

In chapter 1 are stated the premise, plus concepts that are touched on throughout the thesis. Then in chapter 2, a review of literature relevant to the thesis is provided. In chapter 3 is an outline of the design of the study and the methodology applied, plus a rationale for why the method is used. Chapter 4 provides a real world perspective of the philosophical narrative with case studies and an overview of Web 2.0. In chapter 5, the notion of Work is detailed, and it's role in the life of the person. This leads on to chapter 6, in which the dystopian notion of productionism is detailed. In chapter 7 the person enters the system with the conception that the human is 'part of the system,' powerless in the face of significant power asymmetries. In this chapter, the person is provided with the means to rebalance power asymmetries with modern technologies (in the form of Web 2.0).

A shift in the balance of power provides the opportunity for the redistribution of decision making roles. In chapter 8, this is taken up through the argument that Work, referenced as an objective notion while related to the worker, is thus reframed. Thus, the scope for the socialisation of Work and is represented through a shift in attitude and intention in the worker, is provided. Then, in chapter 9, change as a subjective notion is presented, wherein the technological human represents the agent of change in both itself and the worlds it occupies.

In chapter 10, the question, what are the semantics of Work in the Work System, is addressed through a series of semantic statements representing a systematic formal description of Work and the Work System. In chapter 11, the System, Work, and the Work System are described in

natural language. The semantic ontology in §10.6 is summarised, leading to a definition Work in the Work System in §11.2. The chapter then completes with areas of possible research in §11.3.

11.2 Contribution to the field of IS

In §11.2, the contribution to the field is presented as the definition of Work in the Work System.

In this thesis I argue that the question, "what are the semantics of Work in the Work System," must first be addressed from the standpoint that Work is fundamental to the human and society.[1] Thus, that Work is fundamental to the processes of building ideas into systems (both of thought and as operational processes). Further, this knowledge of Work addresses the seeming paradox in which technology has both served the human and how human serves the apparently endless desire to create new technology. In §§6.3–6.4 is highlighted the dystopian world the human has built for itself, quelling the human will to be of itself, instead being something artificial. Nevertheless, the human spirit is not so easily crushed and that with technology (such as Web 2.0), systems of social organisation and decision making (participatory democracy) are shown to successfully redistribute power. Power redistribution emerges as socialisation in the workplace and this signals change in how Work is perceived, especially for new entrants to the work place and who are familiar with the use of modern forms of technology.

Therefore, it is proposed that Work is the means by which change is exercised upon an object where that object may exist either spatiotemporally or as an abstraction. That Work, within a System, may effect changes to objects outside the System. Work in a System is any conception of Work that is limited to exertions of humans' h or their extensions h' within the bounds of a system. A task is the specific Work that is done by a human within the System, with or without the aid of technology, in order to make its intention real. Any task is spatiotemporally defined, may consist of sub-tasks, and may have dependencies for successful completion.

Further, it is proposed that tasks, processes, and technology are properties of a Work System. In a Work System, Work is divided into tasks or processes where Work may be a planned process or task in the Work System or it may be ad-hoc. Any Work System may include single or multiple people, arranged as individuals or in groups, plus any supporting technology required to perform the Work. In a single Work System, all participants are related to all other participants through the Work that they do. The human-task-human relationship represents

[1] 'Must' is used to emphasise that Work is addressed as a human activity before consideration of applications. To do otherwise would assume that Work is *a priori* and risk the imputation of differing definitions.

the socio-cultural context in which Work is done in the Work System. A Work System exists as a cultural artefact and is thus an object within a culture. Therefore, a Work System exists as a socio-cultural object in which technology is used to facilitate Work and Work that is facilitated by technology is an extension of the intention and purpose of the mind of the human. The purpose of a Work System, then, is that which is obtained by the human purpose and a Work System ought to have just one defined purpose. Where there are multiple purposes to be made manifest, or there are competing purposes, then there ought to be multiple Work Systems.

11.2.1 Addressing the philosophical problem

The philosophical problem in this thesis is addressed as one that is pragmatist. Therefore, Peirce's pragmatist categories[2] establish an abstract definition that seeks to define Work and System as firsts, objective definitions of them as seconds, and subjective definitions as thirds.[3] Principal voices that inform the argumentation are from Peirce, Dewey, Quine and White.[4] The positions of these philosophers and others provide the means for argumentation and the creation of new theory. This is a usual philosophical approach.[5]

Throughout the thesis, selected themes are treated as abstract concepts. For example, the abstraction of human relations provides a means for modelling common understandings and behaviours.[6] Abstraction permits the disclosure of meaning that might otherwise be locked in instantiations and the rearrangement of abstract forms allows different insights and perceptions to unfold.[7] A common theme is that nature is regarded as an object of knowledge that represents aspirational human properties.[8] However, through science, humanity has exercised its dominance over nature; as the progenitor of humanity. Thus, this has enabled humanity to build a rational existence based on scientific discovery, supplanting nature as irrational.[9] There, as an object of knowledge, nature has had change effected upon it and this is reflected in humanity.[10]

As an entity, the human has the property of mind and it is a function of the mind to categorise and organise abstract objects. The creation of abstract forms and their relationships arises from

[2] 70:14–70:21. 110:23–111:5.
[3] 207:13–208:2. 213:25–214:6. 45:30–46:3.
[4] 48:2–49:27. 67:6–67:13. 126:19–126:21. 174:1–174:10.
[5] 207:3–207:12.
[6] 28:11–28:19.
[7] 28:21–29:4. 45:25–45:29.
[8] 136:11–136:17
[9] 128:7–128:17. 176:20–177:5.
[10] 25:25–26:4. 55:31–56:2.

internal and external stimuli.[11] Objectification is a fluid idea that ranges in scope from the individual and unique, to encompass very large groups and clusters. This permits the mind to encapsulate very large and complex arrangements of objects without being overwhelmed.[12] To facilitate ease of understanding in this thesis, abstractions are described with a state and event-type reification of temporal logic.[13]

Quine's principle of consistency[14] enforces the application of rules to prevent barriers to understanding.[15] For example, between philosophy and computer science there exist different conceptions of ontology. Both conceptions are used in this thesis.[16]

A distinction is made between alteration and change,[17] such that alteration applies to variations in a property or properties of an object, whereas change refers to substantive variation in an object. Variations may be cumulative to a point where they may represent substantive change.[18] When applied to society, a non-material object, the distinctions may be less obvious and are required to be viewed in retrospect.[19] However, it is in the nature of society that alteration and change shall be observed.[20].

For the human, alteration is a perpetual feature where the river metaphor provides the context.[21] Also relating to the river metaphor and where alteration in society is addressed causally, an objective stance may be taken,[22] allowing the four causes to be aligned to both societal change and technological humanity[23]

Nature has mechanism. Therefore, nature is observable, predictable (to a degree), but (as stated earlier) nature is irrational where rationality is a process of the human mind. Mechanism is often complex and not easy to discern *in situ*, so science observes from outside the natural environment to facilitate clarity of understanding.[24] Additionally, the problem with taking *ex situ* observations is that environmental factors cannot be completely removed. Observations of phenomena vary as contexts change.[25]

[11] 180:14–180:22.
[12] 210:7–210:13. 210:14–210:23. 213:9–213:9.
[13] 208:3–208:6. 208:12–208:14. 219:2–219:3. 219:9–219:11. 220:2–221:11. 222:2–225:23. 74:18–74:25. 75:12–75:15.
[14] 75:2–75:9.
[15] 28:21–29:4.
[16] 46:10–46:12. 46:14–46:17.
[17] 75:21–75:27.
[18] 195:6–195:24. 195:25–195:28. 186:28–187:2.
[19] 196:2–196:14.
[20] 197:6–197:8. 197:10–197:20. 197:21–197:28. 197:29–198:2.
[21] 194:10–194:17.
[22] 194:18–195:5.
[23] 202:8–202:15. 202:16–202:26.
[24] 112:7–112:16.
[25] 112:17–112:24.

In the field of IS, the concept of Work and the Work System are rational and *a priori*.[26] That is, the meaning of Work and systems have been transferred from the industrial setting to computing, with the result that the IT artefact is regarded as the most important object. However, modern information systems are held to be abstractions of the material worlds. Modern systems blur the lines between the social, moral, ethical, psychic, and motive. In this thesis, a distinction is made between the rationalism of productionism and the irrational appearance of the natural human. Therefore, the transformation of objective Work from *a priori* to one that finds its epistemological foundations in IS requires formal definition of the term.[27]

Barber's paradox is created where the technological system is the product of humanity's desire to create technology.[28] In doing so, all of humanity is drawn into the technological system,[29] such that the technological human (that person who has been drawn into the technological system) exists solely to exercise the will of the system.[30] The technological human's will becomes that of the system and the system's will is to produce. Therefore, the technological human expresses itself as the will to produce, or to Will to Will.[31] However, technological humanity is managed by those who wield power and somehow, but even they do not escape the system. In this regard, the technological system exists as a supreme cybernetic organism, feeding on itself. For humanity, the paradox exists as the entity that is both human and technical. The problem is how to escape that when the technological system is the perpetrator and all of humanity, the victim.[32]

11.2.2 Addressing the IT artefact

The IT artefact, Web 2.0, has been selected as a representation of an influential and widespread occurrence of a collection of modern information and communication technologies. It is a recent phenomenon, despite that the component parts have existed for some time prior.[33] While there is much said of the global importance of Web 2.0, I ere on the side of caution: reflecting on the many who have limited access to the technologies and sufficient bandwidth to facilitate access to Web 2.0 applications.[34] Additionally, there are social and moral issues that are not resolved.[35]

[26] 37:3–37:10. 67:24–67:27.
[27] 68:1–68:17. 71:3–71:11.
[28] 54:26–55:1. 186:16–186:25.
[29] 133:18–133:30.
[30] 128:21–128:26.
[31] 115:27–115:30. 118:21–118:26.
[32] 55:4–55:11. 178:27–178:31.
[33] 66:25–66:31. 141:12–141:20. 50:17–50:21.
[34] 85:18–85:21.
[35] 85:28–85:32.

The artefact is treated throughout the thesis as an abstraction, except in those instances where examples are used to illustrate certain points. Thus, a distinction is drawn between the system and the material it produces or uses such that the system has mechanism and purpose.[36] Further, a prevailing view in IS is that the IT artefact is the most important element. In the thesis, an alternative viewpoint is that the emphasis ought to be on the human relationship with technology.[37]

It is usual that the definition of an IT artefact is left to technologists who have expertise. Thus, when problems are identified in IS or other IT related fields, the response is to seek for a technological solution.[38] This approach selectively excludes irrational natural phenomena and ensures the technological system remains in supremacy[39] Therefore, if any natural phenomena are to be included, they must be described in technological terms (by adding to them purpose and function).[40] Additionally, the ease with which new technological developments and solutions are deployed sometimes means that developments are made available without due consideration of the effect they may have in the environmental context.[41]

Finally, IT systems in the enterprise tend toward entropy.[42] That is, efforts to maintain stable and secure systems from threats and risks create conditions that are, for the enterprise, entropic.[43]

11.2.3 Work as a property of the human

The human is a social animal[44] and culture is a property of the human.[45] Work is a socio-cultural object. Therefore, Work is a property of the human. As a socio-cultural object, Work provides a social good. To facilitate Work, the human creates technologies.[46] However, technology is not a property of the human.[47]

Work is purposeful directed action, with expressions that arise from the human properties of rationality and purpose.[48] Amongst others, the human expression of Work has as its appearance, a sense of social status and aspiration. However, humanity is the composition of individuals, thus it stands that as purpose changes, so too does Work. As Work changes, so too do its

[36] 210:25–210:28.
[37] 215:24–215:28.
[38] 162:7–162:9.
[39] 162:12–162:14.
[40] 162:14–162:17.
[41] 51:11–51:14.
[42] 115:3–115:15. 115:18–115:19.
[43] 143:18–143:26.
[44] 179:7–179:8.
[45] 179:9–179:15. 179:17–180:1. 180:23–181:5.
[46] §19. 17:25–18:6.
[47] 20:9–20:10.
[48] 111:16–111:23.

sense of fulfilment, aspiration, and purpose.[49] The reason to Work entails multiple criteria: economic, cultural, social, moral, ethical, doctrinal, and religious.[50] Work requires effort and is the expression of a humanity that has a goal to reach and a purpose to fulfill. To Work is to use energy to fulfill those purposes and reach goals.[51] Work may be stimulating or tedious.[52]

Work is expressed through all parts of the human but does not define, for the person, their humanity. The concept that Work is situational has persisted for as long as Work was conceived to be a specific set of activities, and I contend that technology is a factor in how the conception is situated.[53] The product of Work may be applied as a measure of the quality of Work, where Work is differentiated from the worker.[54] This means the qualities of the worker may be observed through their Work. Moreover, qualities inherent in Work have an affect on those of the worker.[55] Control may be exerted upon the worker in the form of policies.[56]

Work effects change, thus Work obtains of spatiotemporal qualities. That Work must be applied means that the object of Work obtains of inertia. The qualities applied during Work are transferred to the object of Work while it is undertaken.[57] Thus, Work is a means to production.[58] That which is made through production is artificial,[59] even humanity.[60]

Work has enabled the human to expand on its evolutionary capacity.[61] In time, the human has become reliant upon the technologies it created. As dependency has increased, technologies have begun to dominate the human to the extent that it seemingly no longer displays those other properties that identify humanity.[62] For example, the IT artefact, have had the effect of enlarging what is possible.[63]

Conceptions of Work and the Work System are largely founded in industrial processes.[64] Work is both material and immaterial. An objective conception of Work provides the means for a subject conception too.[65] Therefore, the scope of Work is defined.[66]

[49] 99:7–99:14.
[50] 105:1–105:7. 106:16–106:18. 106:26–106:29. 107:26–108:2. 108:3–108:6. 109:7–109:15.
[51] 108:15–108:17. 108:21–109:4.
[52] 109:5–109:5.
[53] 65:5–65:11. 65:15–65:19. 65:26–65:28.
[54] 174:11–174:17.
[55] 174:18–174:25.
[56] 174:26–175:3. 175:4–175:9.
[57] 176:3–176:8.
[58] 109:20–109:22. 110:1–110:9.
[59] 110:17–110:22. 111:12–111:15. 111:26–111:31. 112:1–112:3.
[60] 118:27–119:4.
[61] 20:6–20:7. 66:5–66:11. 180:2–180:11.
[62] 19:26–19:28.
[63] 198:8–198:15.
[64] 18:10–18:15
[65] 18:28–19:3.
[66] 212:6–212:16.

An important part of the thesis is the presentation of the concept of Work as a human expression.[67] Within the concept, the human is presented as the agent of change both in itself and in nature.[68] Work is linked to the social standing of the person and as a consequence, the election of leaders.[69]

11.2.4 Humanity is inculcated into the productionist system

Productionism, whether is it framed as Taylorism or Marxism,[70] is representative of the misuse of the scientific method.[71] Productionism is focussed on stability and conformity.[72] The securities afforded by systems design processes come under threat when unanticipated changes occur.[73] To illustrate the combined effects of productionism, the juggernaut becomes a core theme in the thesis.[74] In the popular Western understanding of the word, the juggernaut conjures a vision of some out of control behemoth, bent on destruction. The sense here is one of control over the mass of humanity, where all are assimilated into the body of the whole, and where individual identities are lost.[75]

With the establishment of productionism, humanity traded its apparent fruitless war against the forces of nature for the security offered by the technological system.[76] This created the conditions for the appearance of Heidegger's technological human.[77] All of humanity that is encompassed by the technological system is of the standing reserve, regardless of rank or function.[78] The technological human is enframed by the technological system to be of the standing reserve and the subject of ordering, while the technological human performs ordering functions on data.[79] In this context, representing the barber's paradox, the juggernaut appears.[80] The juggernaut is the material form of the cybernetic world[81] and humanity is compelled to submit, to satisfy the need for security.[82]

[67] 211:8–211:20.
[68] 211:21–212:1.
[69] 202:27–202:28.
[70] 139:19–140:4.
[71] 54:20–54:23.
[72] 187:21–188:1.
[73] 112:25–112:32.
[74] 132:23–132:26. 137:26–137:29. 138:6–138:13. 138:14–139:3.
[75] 59:10–59:12. 135:6–135:8. 135:11–135:14.
[76] 150:2–150:8. 127:26–127:27. 141:21–141:29.
[77] 126:22–127:2.
[78] 164:19–164:27. 127:7–127:9.
[79] 167:5–167:7.
[80] 59:22–59:27.
[81] 60:12–60:18.
[82] 61:19–61:28.

This classification of humanity is not a homogeneous group;[83] it is complex and varied. With any complex organisation such as this, there will be variations in power distribution.[84] From a productionist standpoint, the enforcement of power asymmetry provides for a docile and obedient workforce.[85] The enforcement of power has a spreading effect, that is, as authority is administered, it becomes attractive. Those who perpetrate the administration of power find that only more power can assuage their desire to control, such that in the end, power becomes limitless.[86]

Productionism is rational,[87] such that an observer is able to view the system objectively.[88] However, for the observer to acknowledge the presence of both technological humanity and the natural person; it must reject one.[89] To be effective, the observer must accept that the technological system was first a product of humanity, second, that the technological human is a by-product of the technological system, and third, that the essence of humanity still resides. Thus, separation is essentially pragmatic: the person accepts the reality of their technological and naturally occurring human selves.[90]

11.2.5 Human response to the technological system

Heidegger's technological human is held as standing reserve, awaiting orders in the productionist system. In this thesis, the standing reserve is reconceptualised as data and the technological human performs functions on data. The technological human uses the information system as a machine for ordering the standing reserve and thus, itself.[91] However, the technological human is challenged to reveal its hidden Dasein,[92] which discloses a problem. Since humanity is a social animal, so too are the drivers that influence the technological human.[93] The technological human is so much part of the technological system: what is it that is being revealed?[94] When humanity chose the productionist system over its rural domicile, it

[83] 55:25–55:30. 178:20–178:25.
[84] 150:2–150:8.
[85] 151:4–151:5.
[86] 151:7–151:12.
[87] 140:9–140:16.
[88] 143:13–143:17.
[89] 128:31–129:2. 142:18–142:24.
[90] 129:11–129:13.
[91] 167:18–167:26. 205:30–206:9. 164:9–164:11.
[92] 139:5–139:8. 187:17–187:20.
[93] 205:28–205:28.
[94] 164:11–164:13

abdicated from its responsibility, opting instead for the security of an autocratic management structure.[95] Meanwhile, those who wield power in the technological system are no less consumed by it.[96]

The armies of technological humans that are subjugated to lives of tedium are called upon to escape from the cybernetic juggernaut. However, escape cannot be achieved through direct onslaught.[97] Instead, escape from the juggernaut must be within its sight and, Jünger suggests, adopting and cultivating the persona of the anarch enables an internal sense of freedom.[98] The anarch is subject to many of the same forces as technological humanity, but the inner struggle is different.[99] Like the technological human, the anarch is a by-product of productionism.[100]

An unexpected and irrational side effect of productionism is the sense of alienation that the person experiences. This may be expressed as non-responsiveness, ambiguity or contrariness.[101] The negative effect of productionism in an autocratic regime, acts upon the technological human as a constriction. Participative democratic processes allow entry into a greater freedom that demands engagement. For example, the person may have to face moral and ethical choices that had previously been decided for it. However, the possibility of success is improved in a heterogeneous population,[102] where mastery over the technological system may be achieved by individuals through their unique responses.[103] That is, to gain mastery is to know the essence of the technological system.[104]

Mastery over the technological system is achievable through the same mechanism provided to gain access to it. Through engagement, technological humanity finds revealed, the essence of the system.[105] Key to engagement is participation through education of the person and the creation of an environment that is enriching. When the person becomes part of a greater social organisation, other opportunities for enrichment and learning present themselves.[106] The mechanism of communication technologies provides opportunities for engagement and

[95] 164:13–164:18. 140:25–141:10. 151:21–151:31. 177:19–177:22. 178:10–178:17.
[96] 54:26–55:1.
[97] 132:27–133:15. 142:7–142:18. 142:30–143:1. 117:27–118:2.
[98] 199:2–199:11. 200:5–200:8. 200:9–200:14.
[99] 200:15–200:28.
[100] 127:15–127:20. 200:29–201:9. 128:5–128:6.
[101] 211:8–211:20. 211:21–212:1.
[102] §7.5. 154:12–154:16. 155:32–156:6. 141:32–142:5.
[103] 159:21–159:25. 160:15–160:20. 143:27–144:4.
[104] 162:3–162:6.
[105] 167:27–168:13.
[106] 168:14–168:23. 175:29–176:2. 154:5–154:10.

learning by positively affirming acceptable behaviour.[107] Deliberation through communications technologies strengthens inter-group relations.[108]

Web 2.0 applications provide opportunities for engagement, through the promotion of participative or deliberative democracy.[109] Within the enterprise, Web 2.0 technologies have been shown to facilitate participative democratic functions[110] and decision making processes through information distribution, retrieval, and storage.[111]

Despite these, the technological system seeks to provide that which the technological human requires in life, eradicating all others as irrational. However, the natural human property of socialisation and connection resists eradication.[112] Communication technologies are used to fulfill the social functions that being displaced from local communities, made almost impossible. Yet, the technological system takes that as an opportunity to reframe communication by turning to a means of production.[113]

The natural appearance of humanity displays an inexhaustible capacity for the unexpected.[114] This is seen in response to suppression by external agents. However, when people are only ever led or told what to think; when tested, they would rather be told.[115] The human response has been to retake command of technology, to further its own ends, rather than those of technology.[116] While the technological human is capable of causing evolutionary change in society, not all change agents act for the greater good.[117] I assert that the human, by nature of its divinity, is unfixed and is able to choose its own path and destiny. This is evidenced in the myriad ways that humanity has resolved seemingly intransigent problems and obstacles on its journey through time and space.[118] Representative of natural human expression is the technological enterprise. A technological enterprise[119] comprises a natural human exchange, that is built to suit the local context.[120] Instead of being a mono-cultural autocracy, the technological enterprise is complex, where benefits extend to both the enterprise and workforce.[121]

[107] 142:26–142:29.
[108] 168:28–168:32. 168:24–168:27.
[109] 155:18–155:24.
[110] §7.5. 154:5–154:10.
[111] 203:12–203:18. 203:23–203:25.
[112] 139:14–139:18.
[113] 136:18–137:25. 137:17–137:25.
[114] 57:1–57:8. 131:13–131:17. 136:3–136:7. 119:5–119:16.
[115] 24:23–24:25.
[116] 17:25–18:6. 18:17–18:19. 22:7–22:12.
[117] 198:16–198:26. 198:27–199:1.
[118] 212:30–213:8.
[119] 203:29–204:1.
[120] 204:2–204:11. 49:29–49:31.
[121] 205:2–205:6. 205:10–205:19. 205:20–205:27.

11.2.6 The abstract Work System

A large part of an abstract conception of the Work System has been drawn from the work of IS authors who have written about it.[122]

An abstract description of Work and the Work System entails the definition of relationships between: the human and Work;[123] Work and System;[124] and Work and technology.[125] Then the abstract definition of the Work System is presented[126] and brought into relation with other objects.[127] This process of building relationships provides the opportunity for new knowledge to be disclosed[128] and leads back to an objective re-appraisal of the Work System, which discloses that the worker ought to be viewed as a participant and not a victim.[129]

An objective appraisal of the abstract Work System provides the means for a subjective appraisal. Thus, a subjective definition is provided.[130] As the human is a core component of the Work System, a reconceptualisation of the Work System is presented with the human as an agent of change.[131] Thus, with the human as the agent of change, the Work System becomes an enabler for change to be effected.[132]

11.3 Areas for further research

11.3.1 The philosophy of IS

Establishing the semantics of Work in the Work System provides a platform for the development of a holistic philosophy of IS. The thesis touches on important concepts about the Work System, by necessity focussing on an area that is tightly focussed and distinct from other conceptions. This leaves a wealth of epistemic notions within IS that are effectively *a priori* are assumed to have valid epistemological and ontological foundations, but that have not been sufficiently tested through critical enquiry or their foundations clarified. Building on the approach taken in this thesis, other assumed objects of knowledge can be investigated and defined in relation

[122] 58:3–58:10. 66:12–66:25. 42:32–43:3. 43:27–45:7. 45:19–45:23.
[123] 214:12–214:19.
[124] 214:8–214:11.
[125] 214:20–214:21.
[126] 214:22–214:24.
[127] 214:26–215:26.
[128] 215:15–215:18. 134:27–135:5.
[129] 215:19–215:23. 215:24–215:28. 118:3–118:11.
[130] 216:8–216:13. 217:12–217:23.
[131] 217:24–217:28. 218:22–218:29.
[132] 218:1–218:7.

to IS, with the ultimate aim of building a philosophy of IS that are unique and provide for the field, epistémi.

Thus, this thesis forms a part of a larger body of thought and application that requires investigation and discussion. At this time, there are seemingly divergent schools of thought within the field and that creates a problem for practitioners, researchers, and students.[133] While it is unlikely that there will a point at which all will agree, there still needs to a core set of knowledge objects. Examples of those that need further investigation are: the concept that the information system is a technological artefact, whether IS should remain within the realm of business schools and colleges or if the spread of systems that thread throughout society means that IS has outgrown that.

Additional to this is the question of research approach and method versus some other approach the building of knowledge in the field. It has been apparent in the performance of this thesis that the field has become fixated on method and is thus defined by Nietzsche's condemnation that "it is not the victory of science that distinguishes our [field], but the victory of scientific method over science" (Nietzsche, 1968, p. 262). On the one hand the field falls victim to its own preoccupation with methodological solutions to questions where the answer to a question is as important as the methods selected to find it, and on the other the field must find itself through the creation of its own methodological approaches to finding answers to questions. Through the development of a heuristic-based approach to a philosophy of IS, the field has built a solid core of epistémi that is further protected by a phalanx of ancillary theories (Lakatos, 1970).[134] Extending Lakatos *in reductio*; in the first instance researchers approach all problems with the same myopic set of possible 'solution-finders,' their methods, and in the second, a well tested structure of methods protects the field from the nihilistic vicissitudes of errant researchers.

11.3.2 Identification of epistémi

In this thesis, Work is chosen as the epistémé for the reason that it is a central part of the life of the person and that it is something that sets the human apart from other known life forms.[135] Other objects of knowledge exist. These ought to be formally defined in light of their present

[133] For example, page 18, footnote 20.

[134] For example, see Litchfield, Baloch and Cusack (2011).

[135] As it was said in footnote 19 on p. 17, "Work is not done by a dog because the dog does not engage faculties of conscious determination and mind to order its surroundings."

and future use. The implications of data and information collection and use need updating. There have been attempts to place controls such as patents, copyright laws, and corporate policies. The human-computer interface is undergoing significant change; how it exists in the mind the person needs to be better understood. The definition of an enterprise system; whereas enterprise systems are historically relatively well defined in terms of function and scope, with the increased adoption of widely distributed and outsourced applications and platforms, how such systems are defined needs to be readdressed.

The field is large and widespread and there exist other possible epistémi to be identified. The rationale for picking on each will vary according to its present application and environment. Once each has been identified, then it is subject to redefinition as its circumstances change. The approach to each object will be dependent upon the context in which it is found.

At this time it is proposed that all objects within IS are subject to investigation. All objects of knowledge in IS are socially produced and as socially-mediated worlds change, then so too must those objects that were produced from them if they are to remain relevant and integrated. Such work is the work of the philosopher, and together they go to build a philosophy of IS. There is a vast scope of possible development within which rational argumentation is applied to objects of knowledge in IS.

11.3.3 Further development of logics in IS

To test the statements in §10.6 and to build philosophical foundations in the field of IS, further investigations will be focussed on two areas:

1. The semantic statements in §10.6 open the pathway for extensions into the considerations of the semantics of data management, for example, to build a relational logic that enables cloud-based databases to efficiently transact queries and analytics from cloud-based applications. Thus, resolving the dilemma that relational databases on "the cloud" require excessive transactional overhead. That relational databases on "the cloud" means they are widely distributed through networks and this adds latency to the flow of data that impedes transaction performance.
2. To find semantic notations that represent core statements or objects of knowledge within IS. The event type reification of temporal logic applied in this thesis may not be applicable in all circumstances and it may be necessary to find those languages that are. To test the

statements, in a pragmatic sense, requires that the abstract notions in §11.1 are conceived through experimentation and experience (Peirce, 1878/1992–98), thus one is then able to classify them according to the predefined criteria in §§10.3–10.6. This approach provides the opportunity to develop both logical formalisms and methods for experimentation.

11.3.4 The impact of Web 2.0 technologies on Work

In §8.3, the worker is reframed by the Work that they do when they are given the opportunity to build a socialised workplace, in this case through the application of Web 2.0 technologies. This in turn creates a new definition of Work and in turn, implies that the aims and intentions of the worker shift when they are given technological tools that enable them to reframe their existence. Thus, it may be demonstrated that Web 2.0 technologies can have significant impact on Work. However, it is a theory that has yet to be tested in any meaningful and practical way. While formalisms have been developed in §10.6, these now need to be measured empirically.

The formalisms in §10.6 have been expressed as a definition in §11.2. These provide the basis for hypotheses that will be subject to validation or rejection and Lakatos (1970) says they must be severely tested, if they are to be accepted as core theory in IS. The approach for testing ought to be, where possible, quantitative and as stated, empirical, which satisfies the philosophical pragmatist. However, theories also include metaphysical notions that the person is the embodiment of personality, will, soul, spirit, mind, emotion, and intelligence.[136] Thus, they become a challenge to the methodological positivist and the socio-materialist, who envisages that systems are the temporary, interstitial, representations of the technological artefact.

11.3.5 The influence of technologies on the lives of people

While possibly fitting in line with aspects of Human Computer Interaction, that technology influences the lives of humans, also brings into question the ethics of IS development and the effects that IS applications have on the person and society. Examples of the ethical use of systems emerge in such groups as SIGGreen, whose aim is to build an ecologically sustainable society with information technology. However, as an aspect of research there must be an empirical set of methods that measurably demonstrate the nature and extent of influence that technology has on the lives of the person and society as a whole.

[136] See §1.4.

While numerous examples of applications of technology during episodes of societal upheaval may be cited, the question of whether the relationship between technology and societal upheaval is causative is not so easily demonstrated. Take the proposition: technology causes change in society. Further, if it is true that technology has a causative relationship on the person and then it is true that technology has a causative relationship on society (with the assumption that a society represents a collection of individuals whose relationships with each other presuppose that a technological influence is possible). It must hold that if the question is true, then it is true that there is some state change that is measurable in the person because of their interacting with technology.

However, it is not sufficient for change in the person to be short-lived, momentary, or transitory. Nor is change something that culminates in a state that is naturally occurring, such as feelings of joy, anger, satisfaction and adequacy. It is not sufficient for the change to be simply represented as a change in view or perception. Change needs to be of a more permanent or long lasting nature. It needs to produce a change-state that is new or not previously observed in the person or societal group. The change-state needs to be distinguishable from other states and it needs to be shown that the state could not have arisen from other interactions or sources. The change-state may have physical, emotional, psychological, and spiritual characteristics. Thus, to perform such a test satisfies the demands of the philosophical pragmatist provided the experiments do not exclude metaphysical phenomena.

A change-state may occur rapidly and hold permanently, it may occur rapidly and hold for a short period but repeated iterations of the change-state result in a semi-permanent or long term change, or it may occur slowly but with the two variations of holding intermittently or permanently. A method that incorporates processes capturing these phenomena needs to be identified. The selection of method will depend upon the technology identified and that is compatible with both the change that is expected to occur and to meet the specific characteristics of the person or society that is the subject of the experiment. To apply such an experiment to a societal mix provides significant scope for poor application of method and misinterpretation of data. Such an experiment must be conceived with care and validated on execution.

11.4 Conclusion

Chapter 11 highlights that IS is a field that is firmly tied to the human and that the human lives a life that is socio-technologically mediated. In §11.2, the definition of Work in the Work System is provided. The definition provides scope for further research in §11.3. Expanding from this thesis and continuing to build a philosophy of IS, which means identifying specific areas within the field and defining them as epistémi, building a language of logic to define the semantics of IS epistémi, testing the logic in real-world cases, and determining the extent of the influence of the epistémi.

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