Chapter 8.

A FRAMEWORK FOR UNDERSTANDING INFORMATION TECHNOLOGY AS ECOLOGY

Compared with the concerns of the previous four areas of research and practice, this area is much broader. It concerns itself with how information (and communication) technology as a whole (ICT) relates to humanity as a whole. The communities that contribute to research and practice in this area include those working in social theory, history of technology, philosophy of technology, society and technology studies, social shaping of technology, gender studies, globalisation and the environment, and many more.

This area is not so much concerned with the set of all the ICT users in the world, the set of all IS developments, the set of all technologies that have been created, nor even with averages or other statistical analyses of these, but rather with something deeper and more structural. It is not primarily concerned with the collective result of a billion individual results from each of the previous four areas (though it does have an interest in that); rather it is characterized by a very different type of relationship between human beings and ICT. In the other areas, humanity is 'outside' the technology, as its original conceiver (chapter 5), its creator (chapter 7), its applier (chapter 6) and its user (chapter 4). But in this area the human being is 'inside' the technology. ICT is a kind of ecology in which modern life takes place. We have created it, but it also creates, or at least deeply affects, us.

This area is concerned with what Lyon [1988] called the information society and Castells [1996], the network society, and it is in this area that such things as globalisation are considered [Walsham, 2001]. It reflects on society's perceptions of what it means to be human in relation to ICT - our assumptions, aspirations, habits, lifestyles, and so on: our life-and-world-views, such as exhibited in what Schuurman [1980] calls technicism.

An everyday stance to this type of relationship, such as exemplified in Vignette 5 in the Preface, can generate several questions. Three will be the focus of this chapter:

- # Is ICT valid as a endeavour for humanity, or should we close down technological development and even use? What is the true destiny for ICT?
- # What the nature of the ecological relationship between humanity and ICT-as-ecology?
- # Why have things gone wrong? What is the root problem, and what should be done about it?

This chapter explores how Dooyeweerdian philosophy might throw

light on these questions. Unlike previous chapters, where other ideas were discussed first, this chapter will introduce Dooyeweerdian thinking immediately, making reference to other thought afterwards.

8.1 ON THE VALIDITY AND DESTINY OF ICT

Western life-and-world-views and ways of living are spreading throughout the world, driven by globalization on the one hand and pulled by aspirations of non-Western peoples on the other. Does this mean the destiny of humankind and indeed the whole world to be forever 'inside' ICT, controlled by it?

Our everyday attitude stridently rejects such a possibility. But that might just be the content rather than the structure of the everyday attitude, and thus might be mistaken. (It might also be the very structure of everyday attitude if Dooyeweerd is correct about the supra-temporal, religiously-rooted nature of the human self; that, as far as this author knows, is a discussion yet to take place.) But most who reflect on this possibility recoil in horror, and, even before globalization came on the scene, thinkers like Heidegger and Ellul wrote of the dangers of ICT as such. Were they wrong or right? Should we, as some maintain, resist globalization and ICT and abandon research in them?

Nevertheless, this is one area where Dooyeweerd's awareness of the religious root, cosmic dimension, as well as his own exploration of the CFR ground-motive, are important. Throughout his writing one meets the notion of Destiny: destiny and mandate of humankind, and destiny of the cosmos. The religious root of the cosmos implies a Destiny as such, and CFR implies a particular kind of Destiny. Though human life is now 'inside' ICT, human destiny -- and that of the cosmos, including the cultural cosmos -- transcends ICT. Humanity is still responsible for the long-term direction that ICT takes and what impact it has on human and other life as a whole.

Thus it is right that the first question to address is whether technological development is valid at all as a human endeavour. Schuurman [1980] has made extensive use of Dooyeweerd to discuss this, and his conclusion is that it is valid but that current directions of development are wrong. He first examines the views of two sets of thinkers, of what he calls transcendentalists -- Jünger, Heidegger, Ellul, Meyer -- who were largely pessimistic about technology, and of what he calls the positivists -- Wiener, Steinbuch and Klaus, and to some extent, Habermas -- whom he finds largely optimistic. After a lengthy and careful analysis of these views (to which the reader is referred for detail), he criticised both sets of thinkers [1980,p.314]:

> "The views of the transcendentalists and the positivists alike imply an unpromising, somber future. The reason for this, as I see it, is that both categories of thinkers espouse an autonomous philosophy or, as is the case witl Ellul and Meyer, an attempted synthesis with autonomous thought in science and technology. In the autonomy of thought lies the ground of the tensions that pervade their philosophies, as well as the reason for their inability to indicate a way of escape from the real problems that modern technology entails."

In contrast to both the pessimistic and optimistic views of technology, Schuurman works out what he calls a 'liberating vision for technology', and discusses what might 'disrupt' this vision. Interwoven with a brief explanation of Schuurman's vision, to which the reader is referred, are comments on how it relates specifically to information and communication technology (ICT).

8.1.1 Dooyeweerd's Theory of Time, Destiny and Progress

Dooyeweerd's theory of time is complex and most of it does not concern us here. At one time he thought in terms of four 'dimensions' of existence: the subject, law, time and religious root. We have already seen (§2.4.4) that the subject dimension -- subject-side actuality -- always depends on the law dimension. The law dimension in turn depends on that of cosmic time, and all in turn depend on religious root. So 'theory of time' is a misnomer, since we can never actually make a theory about it.

However, Dooyeweerd did discuss several features of cosmic time. One is that cosmic time expresses itself in every aspect. What Westerners habitually think of as time, clock time, is physical time. But two other types of time concern the discussion here, formative time, which is historical events that result from our formative functioning, and pistic time, which is concerned with the entire temporal being of the cosmos, from beginning to end.

Pistic time involves the Origin and Destiny of the whole cosmos (and makes sense especially under the CFR ground-motive). Aristotle's 'final cause' might be seen as an echo of the Destiny, but Dooyeweerd's notion is richer and allows for dynamic response. What is relevant here is that humanity, and all else in the cosmos, has a mandate, a Destiny.

This is related to formative or historical time. History, Dooyeweerd believed, has a normative direction. The mandate, or 'normative task', of humanity is to 'open up', 'unfold' or 'disclose' the aspects and their potential especially in relation to other aspects.

In our current state of modernity humanity has 'unfolded', among other aspects, the analytic aspect as, and via development of, science and critical thought, the formative aspect as technology and technique, and the social aspect as differentiated institutions, the economy as money and markets, and the juridical via democracy.

If, as argued earlier, the leading aspect of information technology is the lingual, then we can see its development by humanity as an opening up of the lingual aspect. Whereas speech opened up the lingual aspect's propensity to communication, writing opened up the persistence of symbols, poetry and literature opened up its aesthetic potential, and print opened up its potential in the public sphere, information technology has begun to open up its dynamism and ability to respond meaningfully to each individual human situation. Thus the Destiny of ICT is bound up with the opening of the lingual aspect; Schuurman develops this further below.

What Habermas means by system may be seen in Dooyeweerd as functioning of institutions in the formative mode of getting things done, especially in the economic and juridical fields. Like Habermas, Dooyeweerd saw no incompatibility between modernity and life-world meaning and normativity. But the reason modern life has meaning and normativity is not primarily Habermasian critique of validity claims but that it, along with all else, is enabled by a law-framework that is Meaning. What critique of validity claims does is to contribute to concrete entity-side attributes of meaning.

There is, however, a normative direction to progress and modernity as such [Dooyeweerd, 1984,II,p.275]:

> "The subjective individual dispositions and talents intended are not themselves to be viewed as the normative standard of the disclosed process of cultural development. They ought to be unfolded in accordance with the normative principles implied in the anticipatory structure {of the historical law-sphere}."

That is, (1) what has actually happened might not be what should happen, and (2) progress must never be for its own sake, but for the sake of other aspects. Therefore ICT as it has developed is not necessarily how it should have developed; it should have been guided by the norms of, for example, justice and ethics, more than it has been.

Problems of modernity may be seen as arising from 'closing down' rather than opening up aspects and their relationships. Habermas' [1987] notion of colonization of lifeworld by system may be seen as the 'closing down' of the lifeworld around the formative aspect (instrumental functioning). The formative aspect is elevated above others and shalom (§3.4.3) is prevented.

8.1.2 Schuurman's 'Liberating Vision for Technology'

Schuurman's 'liberating vision for technology' [1980] is an expanded version of Dooyeweerd's theory of progress, based on what he calls the 'meaning-dynamis', which is his term for what we have called the aspectual law-framework in §2.4.4. It has seven elements.

First, drawing on Dooyeweerd's theory of progress above, he sets out a vision of what humankind's project of technology is: it is meaning-disclosure. Technology should contribute to the opening up of the aspects. This echoes Heidegger's notion of technicism as 'revealment'.

Second, technological development of itself is utterly insufficient. It must be led, not by its own inner meaning and dynamic, but by that of other aspects. "A liberating perspective for technological development opens up when it is understood that the specific meaning of technology ought to be led by the normativity of the various postcultural aspects of our reality, namely, the lingual, social, economic, aesthetic, juridical, ethical, and pistical aspects." [Schuurman, 1980,p.361]. It may be noticed that in every other area for which we have developed a framework for understanding the

emphasis has been on giving due attention to every aspect, especially the later aspects.

Third, when this occurs, we can expect a deepening and enrichment of meaning as it is experienced within society and cosmos. Technology is no longer demonic, predatory, counter-productive, as the transcendentalists feared it is, but can be a blessing rather than a curse. The unexpected benefits accruing from Elsie, and the 'existential joy' in technology, and the 'joyful mission' of technology shaping, mentioned in chapters 4, 6 and 7, may be seen as such blessing. The reason it is often a curse is largely because we ignore or distort aspects of use, development or shaping.

Fourth, "the future of technology is in fact not determined, but open." [ibid.,p.361]. The postcultural aspects are normative (§3.1.4) so "it follows that technological meaning-disclosure as deepening of meaning is not rigid in character." This implies a deep denial of the 'technological imperative' and stresses that humanity has responsibility for the way technology is developed.

Fifth [ibid.,p.362], "the key to modern technological activity is to be found in designing -- more particularly, in the engineer who does the designing. The engineer designs -- or rather, projects -- laws that are related to the fashioning of technological things and facts. This designing is also called the postivizing of laws or norms." Echoing Heidegger's stress that technicism is a verb rather than a noun, a process and functioning rather than a thing, Schuurman takes this further by focusing on the human being who undertakes that process, a Dooyeweerdian subject responding to the law-framework.

Sixth, this implies a quality criterion for the engineer's technological activity: "The more finely attuned he is to the meaning-dynamis and the better he thus understands the normative principles which are given him to be worked out, the more adequately he unfolds this normativity." [ibid.,p.362]. The importance of being sensitive to the aspectual law framework was stressed in previous chapters.

Seventh, the problems with technological activity are likewise explained with reference to the engineer's response to aspectual norms. "Should the engineer fail to attain a correct insight, either because he surrenders, self-sufficiently, to absolutizations and thus shuts the whole process off, or because of shortcomings or shortsightedness, then meaning-disruption will arise and, as we have observed, prevail." [ibid.,p.362]. The discussion in previous chapters suggests, however, that it is not only the engineer's response that causes problems, but also that of users and IS developers.

8.1.3 Disruption of the Vision

Schuurman then outlines three absolutizations that have caused us problems -- of technological-scientific thought, which "closes off all further technological meaning-disclosure", of social disclosure, as in Marxism, which results in a "leveling and stiffening of technological development", and of the economic aspect of technological

development, as in capitalism that makes profit maximization its key norm, "at the cost of overlooking the dangers to the environment" [Schuurman, 1980,p.362-3].

Later he expands on this, discussing five assumptions that disrupt this vision: technology seen as applied science, as handmaiden of economic life, as neutral instrument, as the will to power, and as technology for its own sake. All these disruptions are clearly visible in ICT.

Schuurman traces a Dooyeweerdian-style religious root in the disruption that is common to all 'technology as' absolutizations [ibid.,p.359]:

> "The deepest ground of the disruption of technological meaning is religious in character. Meaning-disturbance, which arises under the leading of various motives, is occasioned in the first instance by humanity's refusal to bow before the true meaning-dynamis of the creation, that is, by humanity's refusal to offer itself in freedom and responsibility."

A concern of Weber and Habermas is that, in modernity, all meaning is lost to our experience. To Dooyeweerd (and Schuurman), this is because Meaning always refers beyond, first to other aspects, then ultimately to the Divine Origin of Meaning. So when something is absolutized, such as the formative aspect, its referring-beyond relationships are severed both from other aspects and from the root of all Meaning. Since it is relative and cannot be Meaning in itself, we experience loss of meaning.

A strong implication of this is that those who contribute to 'progress' -- and this includes all who research, develop and use ICT and IS -- should live in the light of this multi-aspectual responsibility, in which all aspects are opened up rather than closed down and the relationships between them are respected and enjoyed. That is, taking a multi-aspectual (life-world) attitude in our research and development is no mere option, but essential to humanity's task in researching and developing IS, ICT. This recognising and opening of all aspects has been a recurring theme in all chapters 4 to 7.

8.1.4 Implications of Schuurman's Vision

Therefore, if we consider the overall story of technology, "The one essential condition for humanity's going on its way in freedom in technological development is that people submit in belief to the meaning-dynamis as normativity for the meaning-disclosure of creation." [Schuurman, 1980p.361].

Schuurman recognises the gross disruption to society, environment and individuals that technology has given rise to and, rather than simply bemoaning this and making the above general visional points, he continues with:

> "What needs investigating is the extent to which the lopsided and crooked condition into which things have fallen can be straightened out. It is possible that we will have to pick up -- in a new way -- some of the old and forgotten traditions in the history of technology. In this connection, the so-called

alternative technologies (the small technologies) should be given more than passing consideration. ..." [p.363]

But this is no mere romanticism. In his exposition of this idea he demonstrates how this approach is likely to facilitate a host of aspects (identified by us in brackets):

> "... Modern technology should not be exclusively massive and gigantic, there should be room for a high degree of differentiation {analytic} and diversity {aesthetic} as well. Worthy of consideration in connection with this objective are technological products of greater durability {economic} that might be made with little capital investment and a minimum of energy {economic} -- with natural energy and natural materials to boot {harmony-aesthetic}. Personal individual production yields satisfaction in labor {sensitive, pistic}, products reflective of settled cultural patterns {social}, and a minimum of pollution {biotic}. These forms of technology, despite their small scope, are decidedly difficult to realize. They require a great deal of technological fantasy and imagination {formative}. Cultural stability {social} depends on these forms of technology, however, both in developed and in developing countries." [p.363]

Schuurman than proceeds to look at the last four of Dooyeweerd's suite of aspects in more detail. Aesthetic disclosure should result in harmony among all persons and authorities, in selection of materials, and between nature and technology. Juridical disclosure involves legal institutions that see to it that technology is promoted, while at the same time people and environment are protected. Juridical disclosure also involves making compromises among the various stakeholders. We might also add that we must ensure that the technology infrastructure enhances rather than detracts from what is due to all. Ethical disclosure -- love -- "will express itself in a good choice and a proper use of available materials and objects and in a good, artisanlike finishing of technological products." We might also add that we should ensure that using and developing and dwelling in I.T. makes us more not less generous and self-giving, and technology infrastructure is set up in such a way as to promote rather than hinder these. Finally, pistic disclosure means that "humanity is called to the task of technology, and that people are obliged to accept this mission as a responsibility before God [i.e. not just to themselves, their accountants, shareholders or peer]. ... belief ought to anticipate the fulness of meaning and thereby be directed to the Origin of meaning." [p.365]

8.2 INFORMATION TECHNOLOGY AS ECOLOGY

Schuurman presents a normative vision for technology based on Dooyeweerd's theory of progress. But we must turn to parts of Dooyeweerd's theory of entities to understand the structure of the relationship we have with technology as an environment in which we live, and understand why it is not just an extension of the relationships we have with technology in the other four areas.

In the other four areas -- usage of IT artefacts, the nature of computers, IS development and the shaping of information technologies explored in chapters 4 to 8 -- it is a law-subject-object relation with information technology which is of interest. But in this

area, it is a relationship of correlative enkapsis, in which we are denizens of an Umwelt. Moreover, we also form and constitute that Umwelt.

Whether the Umwelt is information itself, ICT or society in which these play a large part, does not need to be resolved here; what follows can be applied to either of them.

8.2.1 Correlative Enkapsis and Umwelt

An Umwelt is an environment that is constituted of the very things that are its denizens. A forest is Umwelt, to trees, insects, etc. Society is an Umwelt. An Umwelt has no leading aspect. In this way, society (Umwelt) may be distinguished from the state (a social entity led by juridical aspect).

Unlike an organization, an Umwelt has no parts. Nor is it constituted of aspectual beings. Its being is that it engages in a correlative enkaptic relationship with the entities that make it up. Correlative enkapsis is the relationship that exists between a forest and its denizens (trees, other plants, animals, insects, fungi, etc.) that constitute the forest but also live in it and because of it. They could not live as fully as they are intended to if not within their proper Umwelt. Likewise, a community cannot exist without people, and people do not flourish as full human beings without community.

An Umwelt is not static, nor pre-determined in its shape, [Dooyeweerd, 1984,III,p.648]:

> "But we can only speak of an 'Umwelt' (environment) in connection with a living organism. In this enkaptic interwovenness the environment exhibits an objective biotic or objective psychic qualifying function, only opened as such by the subjective structure of the living organisms. In this sense this structural function has a dependent character."

An Umwelt is of "a particular radical type" [Dooyeweerd, 1984,III,p.648], and radical types are defined by a particular aspect. Though Dooyeweerd discussed mainly the ecological environment, of a biotic-psychic radical type, the notion seems useful for any type of environment that is constituted of correlative enkaptic relationships. It is reasonable to suggest that the information society is an Umwelt in which the lingual aspect is key.

8.2.2 ICT as Umwelt

Because an Umwelt is not static, we must expect the information society to change over the years. To understand this change requires an understanding of both the structural relationship and also of normative direction [Strijbos, 2006]. The normative direction is set by Schuurman's liberating vision, above. The structural relationship, which is correlative enkapsis, is a circular one:

Humanity creates this Umwelt, the information society. Some refer to this as 'inscription'.

The information society also shapes humanity, influencing the way we live and our expectations, aspirations and world-view.

This is not unlike Giddens' [1993] Structuration Theory, with its notion of the duality of structure (social structure enables and constrains human action; human action produces and reproduces social structure). But the Dooyeweerdian approach has several advantages. One is that, because both structure and normative direction arise from the framework of meaning-and-law that is the aspects, they cannot be separated, and each informs the other. Another is that Dooyeweerd provides a basis on which to differentiate this societal relationship with technology from the various subject-object relationships discussed in previous chapters, and also relate them. A third is that Dooyeweerd would see the process associated with this circular relationship as being, not above all other societal processes as controlling them or forming a basket in which they are carried, but as just a couple of aspectual functionings among the many; specifically, the formative, lingual and social functionings should not be elevated above the economic, aesthetic, juridical, ethical and pistic.

A fourth is that Dooyeweerd does not allow us to consider this relationship in isolation from other enkaptic relationships. In [1984,III,p.652] Dooyeweerd gave the example of a farm, in which cows form various biotic enkaptic relations with each other (copulation, mother-with-young, etc.) while at the same time relating correlatively with their natural environment -- and also all these relate with human structures related to the economic functions of the farm, and beyond these to the social and other relations that obtain. Therefore, we must always beware of treating the correlative enkaptic structure of the 'information society' in isolation from all other structural relations in society. While some writers recognise this, Dooyeweerd, in identifying a number of types of enkapsis, might provide a more precise framework by which we may examine such complex interlacements as we find among state, industry, media, education, etc. all correlatively within the Umwelt of the information society.

8.2.3 Technological Determinism versus Social Shaping of Technology

The two arms of the circular relationship have been treated by some as dialectic between technological determinism and the social shaping of technology, for example as discussed by MacKenzie and Wajcman [1999]. To see technological deterministic and social shaping views in dialectical opposition presupposes the Nature-Freedom ground-motive. Technological determinism clings to the Nature pole, while social shaping clings to the Freedom pole.

To acknowledge insights in both, in a way that does not contain inner antinomy, requires shifting to a different ground-motive.

Neither pole of the NFGM offers satisfactory grounds for normativity and responsibility with regard to society's relationship

with ICT. The Nature pole either dismisses normativity as a category error in a determined universe or reduces normativity to control of human beings, by coercion and by reducing responsibility to the following of rules. The Freedom pole roots normativity and responsibility in the autonomous human ego and, to escape pure individualism, must resort to notions like social contract or socially constructed shared beliefs and values. Neither pole offers an adequate basis for discussing the normativity and responsibility of technological ecology. The issues encountered in this area are long-term, and so we need an approach to normativity and responsibility that will outlast currently fashionable paradigms. While views centred on the NFGM might seem to allow us to discuss short term normativity, in the way that Soft Systems Methodology [Checkland, 1981] does in the context of immediate decisions about action to improve human activity situations (see chapter 6), they provide no basis for this longer-term normativity which transcends society's current preferences.

Again, it is likely that we need to move to a different ground-motive. It is Dooyeweerd's espousal of the Creation-Fall-Redemption motive that has enabled him to escape these dichotomies, and adopting this ground-motive opens the way to considering the circular relationship aspectually.

8.2.4 The Nature of Both Relationships

To Dooyeweerd, human life, including social and societal life, is never absolutely determined. Therefore the impact that ICT (its prevailing shape and uses) has on us is to be understood not as something that determines us absolutely, but as something we respond to. Appearance that ICT determines how society works is explained by the fact that human response involves social and post-social aspects, and most of us will, much of the time, respond in the way the rest of society does.

How we respond to ICT is diverse, a subject-functioning in a variety of aspects -- we get angry (psychic), write letters to the newspapers (lingual), seek changes in the law (juridical) and some might be willing to sacrifice themselves (pistic). What we actually respond to is also governed by our ground-motive (usually NFGM) and by our aspectual life-and-world-view (LWV). If we adhere to the Nature pole, we might get angry at ICT's failure to order life. If we adhere to the Freedom pole, we might get angry when our freedom is threatened by ICT. But which particular freedom exercises us depends on which aspect(s) we value -- religious freedom, emancipation from injustice, artistic freedom, economic freedom, social mobility, freedom of expression, etc.

Our LWVs are not static, especially when understood in terms of aspectual profile (§3.3.8), but can themselves be impacted, including by the ICT Umwelt. Among many other influences on our LWVs, when ICT benefits certain aspects of our lives, those aspects can increase in importance to us, while others decrease, changing our aspectual profiles.

But that ICT itself is shaped by us, and becomes 'inscribed' with our LWVs and ground-motives. Inscription with our LWVs can occur as a myriad of people, in whom certain aspectual profiles prevail, shape technology, develop artefacts, use those artefacts and believe something about the nature of computers, as discussed in chapters 4 to 8. The influence of ground-motive is broader.

Up to the 1980s, ICT was shaped by the Nature pole of NFGM and its theme of control in all four areas:

Its use was largely for controlling industrial or administrative processes.
The machine nature of computers was emphasised in comparison with human beings.
Its development methodologies were those that emphasised control, such as the Waterfall Model.
The shape given to individual building blocks of technology assumed formal logic.

From the 1980s there began a dialectical reaction, and a shift to the Freedom pole:

The use of computers was increasingly aimed at freeing and empowering the individual, whether in business thinking, the home, or by means of computer games, with user interfaces that gave the feeling of greater freedom.
Seeing humans as like machines became less fashionable.
IS development became iterative and contingent.
The types of technological building block developed were for the technologies of freedom, such as graphical user interfaces, virtual reality, the Internet and the ability to cope with dynamic, uncertain information.

Thus two of the types of religious root mentioned in §2.4.1 are seen to exercise a central, critical control over both areas of the circular relationship by which humanity shapes, and is shaped by, the ICT Umwelt, the information society. A third, absolutization, is discussed below. But before that, a useful practical device will be outlined.

8.2.5 Practical Device: Aspectual Analysis of the Circular Relationship

Brandon and Lombardi [2005] used Dooyeweerd's suite of aspects as a means to defining what sustainability is (they restricted themselves to urben sustainability). They base their approach on the shalom principle (q.v.), which states that if we function in line with the laws of all aspects then things will go well and flourish, including socially over the longer term, because the repercussions of the later aspects are socially mediated and take a long time to reach their full impact. Therefore sustainability is not just physical (climate change), biological (pollution, depletion of rainforests), but also social (in how we relate to each other), economic, juridical, ethical and pistic (for example in the morale and vision of society). In particular, idolatry of technology -- or of anything else that technology might serve -- is

negative pistic functioning, and can undermine the whole enterprise.

A similar approach is possible for understanding the 'ecology' that is the information society. If we function well in each aspect then the society is likely to prosper and flourish, and lead to our flourishing in every way. But any negative (anti-normative) functioning in any aspect will jeopardise this. Therefore, both relationships may be understood as multi-aspectual in nature [Lombardi and Basden, 1997].

MacKenzie and Wajcman's [1999] examination of the inscription process supports this view. They uncovered "technical, economic, organizational, political, and even cultural aspects" [p.11] and they drew attention to the impact that "obdurate physical reality" [p.18] has on inscription. The first four are, of course, closely related to Dooyeweerd's formative, economic, social and juridical aspects ('cultural' is ambiguous), and the 'obduracy' speaks of the pertinence of the early aspects. They also mention 'attitude', which might be ethical aspect, and desire to do something 'monumental', which is probably the pistic aspect.

We can go beyond merely pointing out that our ICT is inscribed, to say that it is inscribed with our assumptions about each aspect. We can go beyond merely pointing out that our information society impacts on our lives, to say it impacts in each aspect. Table 8.2.4 give some examples of these. This analysis must, of course, be deepened before it can truly inform research in this area. But it does at least indicate that aspectual analysis can remind us of aspects that might otherwise be overlooked, help us link disparate issues in new ways, and question many assumptions.

Table 8.2.4. Aspectual Inscription and Societal Impact

Aspect	**Inscription of I.T.**	**Impact on our lifestyle**
Lingual	Graphical user interface > text The World Wide Web.	Email and mobile phone as the standard communication media.
Social	Email, Mobile phones	Increasing time spent on relating via Internet.
Economic	Dominance of Microsoft. The rush to e-Commerce.	We willingly keep purchasing the newest versions.
Aesthetic	Priority of website appearance over accessibility. Mobile phone as fashion item.	Emailed Christmas cards. Downloaded music.
Juridical	Copyright issues. Privacy issues.	Legal structures altered to support I.T.
Ethical	Security issues. The Open Source movement.	We have become more individualistic, seeking the 'best deal' for self
Pistic	Freedom pole of NFGM	Convenience is a basic right.

8.3 ABSOLUTIZATION AND IDOLATRY IN ICT

Dooyeweerd traced many of the long-term problems in society to religious dysfunction. Those related to the dualistic ground-motive of

Nature and Freedom (NFGM) and to life-and-world-views have been discussed above. A third is absolutization of that which is not absolute. The term 'absolutization' itself will be used here mainly of aspects (law side), while absolutization of something on the subject side will be referred to as 'idolatry', and here will apply especially to ICT.

Absolutization of aspects leads us to deeply assume that only certain things are meaningful, important or Good, while other things are to be ignored, dismissed or even shunned. This is not a matter of individual belief: since we function in all aspects and because of foundational dependency (see chapter 3), while individuals hold beliefs, they cannot do so in complete isolation of other people or their community because the pistic aspect is post-social. Wherever reductionism holds sway in a community of thought and practice, we are likely to find aspects ignored.

Both type of religious dysfunction (ground-motive and absolutization) are intertwined in the way humankind relates to ICT/IS. Two examples will be presented, the critique of ICT from feminism and from a non-western viewpoint, followed by a discussion of the idolatry of technology. This section ends by discussing how the religious dysfunction might be overcome.

8.3.1 Critique of 'Masculine' Technology

Adam's [1998] Artificial Knowing: Gender and the Thinking Machine, makes a detailed study of one information technology, artificial intelligence (AI), showing how it is 'inscribed' with masculinity, and asks what a 'feminine' artificial intelligence would look like. In so doing, she examines two 'paradigm projects' in AI, Lenat's Cyc and the Soar project, both of which seek to represent knowledge.

A key indication of their 'masculine' inscription is the propositional form knowledge takes in both of them. As Adam argues, both projects are based on the presupposition that all knowledge that is likely to be valuable or interesting can be represented in propositional form. Non-propositional knowledge, such as experience and skills-based knowledge, is either not considered for represention within this technology, or is assumed to be reducable to propositional form.

But much of women's knowledge is exactly of this non-propositional type; propositional knowledge correlates with masculinity (though she makes clear that the correlation is not total). Not only is non-propositional knowledge deemed of lower status in a profession (e.g. "Male physicians who received medical training with no clinical component were authorized as more expert than the women midwives, despite the latters' considerable experience." [ibid.,p.114]) -- a fact that has been very widely noticed and commented upon -- but the way AI technology has been designed mirrors this attitude. In this way, AI technology is inscribed with masculinity.

It is also inscribed with masculinity by virtue of its emphasis on the mind rather than the body. Artificial intelligence, as indeed the vast majority of information technology, processes concepts and other things of the mind, rather than the body. As many similar writers do, Adam traces this partly to Descartes':

> "The relation of the female to bodily things, and the male to the life of the mind, is further reinforced by Descartes' transformation of the relationship between reason and method and the radical separation of mind and body. The life of the body is seen as inimical to the life of mind and reason. The hand that rocks the cradle is unlikely to be adept at the highest cognitive exercise of the mind, namely the mathematical and natural sciences. Descartes himself seemingly had no wish to exclude women from his method. What happened rather, was the crystallizing of a number of already existing contrasts in the mind-body problem, where the soul was identified with the rational mind and the non-rational was no longer part of the soul but belonged to the body." [Adam 1998,p.102]

Adam does discuss the possibility of a body-centred AI, in the form of robotics. But, as she points out [ibid.,p.180], though such a robot

> "is physically situated but it remains to be seen whether it can be culturally situated in the appropriate sense. The embodiment that such robots possess is of a rather limited form. Their wanderings in the world, removing drinks cans, finding the centres of rooms and so on is rather aimless. To paraphrase a popular saying, we might suggest that they 'get an A-life'. They might find more of a purpose to artificial life if they could learn to love each other, to care for and look after one another, or indeed look after us. In other words they could take on the forms of embodiment more usually associated with women's lives, i.e. the looking after and caring for bodies, young and old."

She comments "Looking at feminist visions of the future through intelligent technologies, the situation reveals some tensions. ... Feminist readings of popular cyberculture are ambivalent. It seems unlikely that the promise of Haraway's (1991b) earlier rendering of cyborg imagery can be realized through current manifestations of cyberfeminism."

"However," Adam continues, at the end of her book when we might expect her to be indicating her belief about the way forward [p.181], "further research on women's use of computing technology at least offers the hope of alternative, more promising readings." (my italics). The way forward might be to make sure that the use of computer systems and information technology artefacts, rather than their technological shape, is oriented towards female tasks and roles in everyday living. We can also detect an emphasis on use more than shape in such statements above as "to love each other, to care for and look after one another, or indeed look after us". If this is so, then the inscription of technology is not only in the shape it assumes but in the types of ways it becomes widely used in everyday living.

The reason why AI technology is like this, Adam suggests, is because it was originally given shape in research laboratories staffed by those assuming a "privileged, white, middle-class, male perspective," [ibid.,p.179]. "Soar too is based on a set of experiments carried out on unrealistically bounded logico-

mathematical problems carried out by a limited number of male college students in the 1960s and 1970s, with the assumption arising from this that their results can be extrapolated to apply to a wider domain of subjects and problem solving situations."

What is particularly damning is that "an assumption that this does not even have to be made explicit is a way of silencing other perspectives." In other words, inscription of technology occurs because of the perspectives held, usually without realising it, by those who shape the technology and those who define our expectations of use. These include the community of research and practice which concerns itself with technology shaping (chapter 7), that involved in ISD and usage (chapters 6, 4) and even those who lead us in understanding the nature of computers and information (chapter 5). These communities will hold various perspectives, often elevating different aspects to importance (see §3.3.8), but at a deeper level, these are all underlain by society's presuppositions with respect to ICT and IS.

8.3.1.1 A Dooyeweerdian View

Early feminist thought also assumed it had correctly diagnosed the problem as a masculine-feminine dialectic and proposed solutions based thereon, but more recent feminist thought is more nuanced about such claims. Whatever its own self-awareness, feminism may be seen from this perspective as highlighting two deeply-rooted types of religious problem, and trying in its own way to propose solutions.

One is dualistic ground-motives, which incite dialectic reaction of a religious kind. The predominant ground-motive is NFGM, and early feminists especially reacted within it against the Nature pole of control, to which early societal conception of ICT assumed that the main use of computers is to control industrial and administrative processes, and the main view of computers was as machine. But the dialectical swing from Nature to Freedom is not unique to feminism (as has been seen in the discussion in previous chapters).

Where feminism makes a more specific, and arguably more valuable, contribution is in exposing a residual presupposition of the Form-Matter ground-motive. Feminist thought dislikes the traditional emphasis on mind and rationality. Though they trace its roots to the Cartesian subject-object relation, we might see the problem as more deeply rooted, in the presumed opposition of form and matter, since it more adequately accounts for the solution feminism offers: a dialectical reaction in favour of body relative to mind; for example, Scheper-Hughes and Lock's [1987] notion of the 'mindful body'.

The other religious problem is absolutization of certain aspects. The 'masculine' world view may be characterized as absolutizing the economic, analytic (scientific) and formative (technical) aspects in particular. (Adam [2001,p.180] even speaks of 'aspects' in this way). She shows, for example, how the long experience of midwives, is held to be inferior to the 'knowledge' of qualified doctors. Theoretical, and especially propositional, knowledge is seen as superior to everyday knowing. 'Female' thinking is more diverse,

she says. Instead of theoretical or analytical thinking, intuition is emphasised, by which is meant diverse other ways of knowing which include bodily knowing, sensitive knowing, those involved in love and caring, and even aesthetical knowing.

This clearly echoes the Dooyeweerdian notion of multi-aspectual ways of knowing outlined in chapter 3. Feminism's stress on 'non-Cartesian' ways of knowing may be seen as a call for reinstatement of various aspects of knowing other than the analytic. To Dooyeweerd, the 'Cartesian' way of knowing involves an analytic Gegenstand relation (§3.3.6), whereas to truly know a thing, event, etc. involves engaging closely with it in a law-subject-object relation in a way that leaves a lasting effect on the individual. Thus Dooyeweerd not only supports this 'embodied' knowing, but provides a way of celebrating its diversity.

In many ways, with his multiple spheres of meaning, multiple ways of knowing, multiple rationalities and multiple normativities, Dooyeweerd prefigured what is found in feminist writing of today. A Dooyeweerdian point of view would see this not so much as 'male' thinking, as that certain aspectual ways of knowing have been unduly elevated (namely, the analytical and lingual) while others, such as ethical, aesthetic, sensitive, have been suppressed.

Now that the message, that Cartesian or 'masculine' modes of thinking are not the only important modes, is well understood (at least in that community of thinkers), it might now be time to appeal to a Dooyeweerdian view in order to recognise and explore the diversity of non-Cartesian ways of knowing. (The radical difference between Dooyeweerd and Descartes was outlined in chapters 2 and 3.) Thus we can employ Dooyeweerd's ideas to contribute to feminism's critique. Dooyeweerd might also help it avoid becoming misled into the same error of which it accuses 'masculine' thinking, of absolutizing aspects (especially the biotic) and of adhering to a particular pole of each of the FMGM and NFGM ground-motives.

Dooyeweerd's stress on the importance of the ethical aspect of self-giving might resonate with much in feminist thought but allow that all human beings might partake of it. The ethical is one aspect which has been downplayed consistently in Western life and thinking, but which is still important in non-Western life, which will be briefly considered next.

8.3.2 Critique of Western Technology

Information technology might have potential to help developing peoples, requiring lower capital expenditure than industrial technologies. But Pacey [1996] shows how technology, as we experience it today and especially as it experienced in nations of the Two-Thirds World, is 'inscribed' with Western assumptions and values. He shows how information technology is seldom a blessing to those living in the Two-Thirds World, because its introduction has been informed by Western assumptions and values. He identifies five component assumptions [Pacey, 1996,p.152]:

"(a) assumptions based on academic specialisms and on boundaries between professions;"
"(b) the assumption that traditional communities outside the industrialized world have no technology of their own;"
"(c) a tendency to overlook opportunities for detailed improvements in maintenance and use and to go for technical fixes;"
"(d) failure to recognize the invisible organizational aspects of technology invariably developed by users of equipment;"
"(e) failure to recognize the conflicts of values and social goals which specific technological projects may entail."

The most common response to this is to call the imbalance between the rich and Two-Thirds worlds a digital divide, and deplore it. But that response presupposes that Western ICT is normative for the Two-Thirds world, and the critique from feminism gives us cause to question the validity of the form it has taken. Dooyeweerd supported that critique, but took it further. His thought can also challenge some of Pacey's assumptions and bring enrichment. To illustrate this, a response is made to each of Pacey's components above.

> "(a) assumptions based on academic specialisms and on boundaries between professions;"

But would Pacey recommend that we ignore the specialisms? Academic specialisms arise from scientific higher abstraction (see chapter 3), and Dooyeweerd believed that this is a proper task for humanity as long as no aspect is absolutized. The root of this problem is not the specialisms as such, as the assumptions, which, in Western thought, are rife with absolutizations and idolatry. Many aspects are not only ignored but actively denied any importance at all in business and public life, such as the ethical.

> "(b) the assumption that traditional communities outside the industrialized world have no technology of their own;"

The root of the problem is our arrogance that only the 'latest' technology is 'best' and an idolatry of technology (see below) shared by decision-makers in West and non-West alike. To Dooyeweerd, technology is a valid outcome of humanity's mandate to open up the formative aspect and thereby open up other aspects (see chapter 3), and a major problem is when the development, adoption and use of technology is no longer guided by the other aspects. Moreover, while one might observe a difference between modern technology, which depends on infrastructure, and technology in the pre-modern style, which does not, there is no normative requirement that makes the former superior to the latter. Thus Dooyeweerd, while supporting technology, provides a philosophical and normative basis for breaking this assumption.

> "(c) a tendency to overlook opportunities for detailed improvements in maintenance and use and to go for technical fixes;"

This can be attributed to two causes in combination: ignoring the multi-aspectual nature of everyday life, in which many possibilities are presented to us for creative and harmonious activity, and absolutizing the formative aspect of technical functioning or some

personal or group agenda.

> "(d) failure to recognize the invisible organizational aspects of technology invariably developed by users of equipment;"

While technology itself is qualified by the formative aspect, its use in human life (HLC) is multi-aspectual (chapter 4) and should be guided by the norms of all aspects (§3.4.3), especially, in this context, the social. But Dooyeweerd can take us further, by urging us to avoid collapsing the post-social aspects into the social. For example the pistic aspect of religion, which is so important in most of the world, has, until recently perhaps, been culpably overlooked by Western donors and businesses.

> "(e) failure to recognize the conflicts of values and social goals which specific technological projects may entail."

Participants in and stakeholders of a project all function pistically in being committed to their visions, as discussed in chapter 6. Because these are frequently centred on different spheres of law-and-meaning (aspects), which imply irreducibly distinct spheres of values, many conflicts cannot be resolved by rational discussion alone. Because they are pistic, many are deeply held, often tacitly. The Western, modern world-view elevates (even absolutizes) the economic, formative and analytic aspects, while some non-Western world-views elevate the pistic, ethical and social aspects. Thus conflict is most probable. As discussed in §4.4.3 a main way to overcome this is for all to function well in the ethical aspect of self-giving, generous-heartedness and willing to be hurt or taken advantage of. If this insight is correct, then competition, so universally applauded by the West, is anti-normative in this aspect, and so is the avoidance of personal risk.

Thus we see that Dooyeweerd can be used to understand more closely the assumptions that Pacey decries, especially by reference to what aspects are elevated or absolutized in the Western, modern world-view.

8.3.3 Reflections on the Two Critiques

The critique of 'masculine' technology by Adam and of Western technology by Pacey cannot, of course, be taken as fully representative but they are not untypical of their communities of thought. One common factor is plain: in both a major core problem is that some aspects have been elevated and even absolutized -- notably the analytic, formative and economic -- and others woefully disregarded -- notably the ethical. It is this aspectual imbalance that has 'inscribed' our ICT.

It might be no coincidence that both the type of feminism that Adam endorses, which she calls eco-feminism, and many in the development and anti-globalisation movements today align themselves with the environmental sustainability movement in which Brandon and Lombardi [2005] define sustainability in terms of shalom. These three movements all seem to point to the crucial importance, in our

day, of the shalom principle in society.

It might also be no coincidence that this has also been a recurrent theme in our understand of the other areas of research and practice in IS. Chapter 7 proposed that each and every aspect deserves a technology that is shaped to its law-framework, chapter 4 proposed that in usage we should consider every aspect, and chapter 6 likewise. Chapter 5 recognised the importance of every aspect in understanding the nature of computers.

This need not mean, however, a kind of vanilla-flavour aspectual democracy in which all aspects are equal. Instead, there should be inter-aspectual harmony, like that experienced in music, which is never static and never absolute. We human beings, functioning socially, pistically, and so on in society, always and continuously have the responsibility of not just maintaining, but orchestrating the aspects of a situation. Therefore we, humankind, are called to 'play a symphony' on information technology, so that in one decade or culture, one aspect may be more clearly heard, and in the next, another, but always such that every aspect may be heard as part of the long-term music. One thing that completely destroys any chance of this is idolatry.

8.3.4 Idolatry of Technology

Ellul, according to Schuurman [1980,p.145], speaks about 'worship' of technology. Shallis [1984] writes about the 'silicon idol'. Noble [1997] speaks of the 'religion of technology'. Humankind seems to treat technology as an object of religious functioning.

Noble finds rituals and myths in our attitudes to technology, which he argues are detrimental. His vision for technology is as something rational and empowering that even emancipates us from such religious attitudes, and therein he finds a paradox. From a Dooyeweerdian perspective, however, Noble's discussion seems limited. His view of what constitutes religion is rather narrow, being centred on the first of the types of religious root listed in §2.4.1. But what is perhaps of greater importance is that Noble's view can only offer a visionary direction and cannot offer a basis for understanding 'the religion of technology' in a way that is useful in research and practice.

Using Dooyeweerdian thought, Goudzwaard [1984] and Walsh and Middleton [1984] have developed a notion of idolatry that is quite serviceable in understanding movements of belief in everyday life in society at large. What aspectual absolutization is to theoretical thought, so idolatry may be to everyday living. Goudzwaard [1984,p.21] has characterised idolatry with:

> "Suppose we consider the worship of a wood, stone or porcelain image, a practice still common in the world today. This worship has several steps. First, people sever something from their immediate environment, refashion it and erect it on its own feet in a special place. Second, they ritually consecrate it and kneel before it, seeing it as a thing which has life in itself. Third, they bring sacrifices and look to the idol for advice and direction. In short, they worship it. Worship brings with it a decrease in their own power; now the god

> reveals how they should live and act. And fourth, they expect the god to repay their reverence, obedience and sacrifices with health, security, prosperity and happiness. They give the idol permission to demand and receive whatever it desires, even if it includes animal or human life, because they see the idol as their savior, as the one who can make life whole and bring blessing."

Not only a physical thing, but any type of thing, can be an idol, even an idea or cause. Goudzwaard then shows how this fits our attitude to technology. From the above passage and other writings by Goudzwaard and others (e.g. Walsh and Middleton [1984]), we can summarize that an idol:

- # is set apart in privileged place, is given special esteem,
- # determines the meaning of all else,
- # determines the value of everything, and what people aspire to,
- # determines whether a thing exists or is destroyed,
- # directs people's lives, and reduces their freedom,
- # has things sacrificed to it, or for it,
- # is protected at all costs,
- # is willingly submitted to,
- # is never questioned, and questioners are deemed heretics,
- # and often delivers the opposite of what it promises.

The characteristics of an idol may be applied to ICT in the following manner.

- # Set apart in privileged place, is given special esteem: Governments provide large budgets and concessions for furthering ICT, which are denied to other areas of human endeavour, and we, the public, aspire to obtain technological goods.
- # Determines the meaning of all else: Human activity is often deemed meaningless or boring if not technicized.
- # Determines the value of everything, and what people aspire to: All activities of everyday life -- of business, shopping, education, fun and even worship -- are deemed superior if they employ ICT.
- # Determines whether a thing exists or is destroyed: We seem happy to accede to environmental destruction that results from our use of technology, including ICT.
- # Directs people's lives, and reduces their freedom: Our life becomes shaped by ICT: social life by mobile phones, business life by e-commerce, teaching by Powerpoint, even when these things are inappropriate.
- # Has things sacrificed to it, or for it: The freedom, life-choices and even lifestyle of those without (certain forms of) ICT is curtailed, usually unwittingly, but when this is pointed out politicians and planners often deem it a sacrifice worth making.
- # Is protected at all costs: Large research and other budgets are directed at ICT.
- # Is willingly submitted to: We patiently endure the time it takes to download large emails, and feel inferior if we complain, and we no longer mind if email consumes 10 hours per week.

Is never questioned, and questioners are deemed heretics: It is extremely difficult to obtain a serious critique of whether new ICT is appropriate or justified; the debate, if any, is usually restricted to what kind of ICT to adopt.
And often delivers the opposite of what it promises: The 'paperless office', 'convenient' email, etc.

8.3.5 Overcoming Religious Dysfunction

Thus three of the types of religious root listed in §2.4.1 are manifest in our ecological relationship with ICT (all four if we include Noble's). Many today share Noble's view that a religious attitude to technology is a wholly negative thing. But Dooyeweerd would question that. Schuurman's [1980] 'liberating vision for technology' is at root a religious vision and would lose its central motivation and enabling force, and would dissolve into nothing more than a dream, if robbed of its religious aspect. The problem is not religion as such, but religious dysfunction. If we allow that religion can bring immense good as well as harm, we must face the question of how to overcome religious dysfunction, especially in relation to ICT.

The different types of religious root of our attitude to ICT each give rise to different types of dysfunction and demand different remedies. Elevation of aspects is no dysfunction as long as all other aspects are taken into account. Absolutization of aspects is what is dysfunctional. "Such absolutizations," remarked Dooyeweerd [1984,III,p.161] "cannot be corrected by other absolutizations." It may however be ameliorated by abandoning absolutization altogether, that is, by deliberately recognising this and determining to take all the other aspects into account as non-reducible to the absolutized one, and to explore the inter-aspect relations.

Idolatry of a subject-side thing like ICT may be reduced by recognising that the idol cannot be absolute in either importance or value to us and should be held in proper perspective. Frequently, however, this can only occur when a few brave souls recognise the idolatry and sacrificially work to overcome it: sacrifice of time, effort, reputation, income or anything else. The author has found that a sense of responsibility to the Creator can help enormously here.

A dualistic ground-motive leads us to locate Evil in the structure of the cosmos itself (see examples of ground-motives in chapter 2). Under such a presupposition, the remedy for Evil, and the appropriation of Good, is to be found in eschewing one half of the cosmos and adhering to the other. This is, arguably, what drives what at first seems to be a dualism into a dialectic, because human beings have an innate sense of Good and Evil, however it be labelled. The remedy for adhering to one pole of a dualistic ground-motive is not to be found in dialectical switching to the opposing pole, as occurred in the interpretivist reaction against positivism in IS. Attempts might be made to think together the two poles, as Hegel did, but the results are seldom sustainable. If Eriksson [2006] is correct in chapter 6, in seeing critical systems thinking as attempting that very feat, then it is unlikely to remain true to its aspirations of combining an interpretive stance with a transcending normativity. An

implication from Dooyeweerd is that the only answer to the problems of one ground-motive is to shift to another. 500 years ago such a shift was made once it had become clear that the problems resulting from the NGGM could not be resolved in its own terms of the opposing of secular and sacred, and the NFGM emerged. 500 years later, we have discovered many of the inner problems of NFGM itself and perhaps the time has come to shift to yet another ground-motive. Dooyeweerd offers the CFR. Much of the discussion in this book may be seen as an exploration of the philosophical implications for IS of Creation, Fall and Redemption, that is, transplanting our research and practice to the fertile soil of CFR.

The Creation-Fall-Redemption motive is non-polar. Creation implies that there is irreducible diversity and coherence, and that the whole of the cosmos is, at root, Good, and nothing is to be despised nor eschewed. Evil and its remedy are located elsewhere.

But CFR also contains a solution to the third type of religious dysfunction, absolutization. Fall implies that the root of problems lies not in one or other polar halves of reality (e.g. control or freedom as such) but in us. The heart of humankind, the supra-temporal self (§3.3.4), is orientated towards either the True Absolute or some pretend, false absolute, which becomes for us either our idol or our absolutization. All evil (distorted intuition, false perspectives, harmful functioning in practice, detrimental repercussions in all aspects, distorted research questions, distorted quality criteria, etc. follows from false orientation. The remedy for religious dysfunction cannot be found in economics, art, law, ethics, and certainly not in 'ideal dialogue' and the critique of validity claims as suggested by Habermas, even though these will all be involved. The remedy, which must underlie all others, can only be religious. The remedy is a re-orientation of the self toward the True Absolute. If this is so, then it is important to know how to shift our religious standpoint.

Redemption implies we need God's help to remedy this. Coming from a Dutch Calvinian tradition, Dooyeweerd believed that, ultimately, only God can effect such a change, but other religious (including Christian) traditions believe we might have some agency in this, by means of repentance and 'conversion'. This is beyond rational assent; Lonergan [1992] speaks of three-fold conversion: religious, moral and rational. Conversion is a re-orientation of the self towards a different Absolute. If Dooyeweerd is correct, then only the Divine Origin (God) is such an Absolute, and all others will eventually let us down.

However, thinking philosophically rather than theologically, if the self is trans-aspectual and supra-temporal, then we can never know its dynamics nor present a theory about re-orientation of the self. We can however listen to people's stories of their experience of this change, even though they are overladen with cultural manifestations and expectations. This is one more reason why a lifeworld approach is so important in both research and practice in any area of information systems.

8.4 CONCLUSION

8.4.1 Overview of Framework for Understanding

The starting point in this area was that a different relationship holds between humanity and information (and communication) technology: 'inside' the technology rather than, as in the four previous areas, 'outside' it. This invites what is sometimes seen as a broader, societal view, which considers humanity as a whole and ICT as a whole, over a long timescale. The everyday experience of this must therefore take a different form. Three main questions were addressed, each of which contribute to understanding this area and its research and practice.

The first question is the validity of ICT as a human endeavour: should we resist or accede to its continued development? Schuurman [1980] has already undertaken a comprehensive study of this question from three points of view: those generally optimistic, those generally pessimistic, and Dooyeweerd. He appealed to Dooyeweerd's theory of history and progress to propose a 'liberating vision for technology', for which the main principle is, for us:

ICT may be seen as part of humanity's long-term opening-up of the lingual aspect, disclosing and developing its potential for blessing.

But the norm that should guide this is not that of lingual aspect of ICT, nor even the formative aspect of technology generally, but those of all the other aspects:

ICT should be developed in such a way as to serve all the other aspects; it will thus bring blessing to the cosmos.

The second question concerns the nature of the relationship by which humanity is 'inside' ICT rather than outside it:

The relation between humanity and ICT is that of Umwelt and correlative enkapsis, in which we generate ICT and it 'generates' the way we live and see ourselves.

This accommodates and integrates the insights from both technological deteminism and the social shaping of technology, which are usually assumed to be dialectically opposed. It allows closer inspection of the dynamics and quality of both arms of this relationship:

This relation has two religious roots (§2.4.1): religious ground-motive and the deep commitment that is a life-and-world-view; these are both inscribed into the ICT that humanity generates, and both affect how we respond to living 'inside' ICT, including how we change our life-and-world-views themselves.

A practical device was offered: life-and-world-views operative in both

arms of the relationship may be analysed to obtain aspectual profiles (§3.3.8), and the shalom principle (§3.4.3) may be used to guide what we do.

The third question concerns what has gone wrong, or could go wrong: what could disrupt Schuurman's 'liberating vision for technology' and the ecological relationship? The answer is religious dysfunction. The two religious roots above are involved. But a third is the deepest:

Religious absolutization of ICT or some other factor leads to idolatry, which paradoxically enslaves and delivers the opposite of what it promises.

The solution to religious dysfunction must be religious in nature: the putting away of absolutization of aspects and repentance from idolatry.

The benefits of this framework are that provides better strategic direction, because it provides critical understanding of the place of ICT as part of modern society and life-and-world-view, whether Western or non-Western. It provides hope for ICT and yet a fulfilling challenge. It overcomes the dialectic between the opposed positions of technological determinism and social shaping of technology, allowing the insights afforded by both to be integrated into a single view. It strikes at the very root of the problem that afflicts our society with regard to ICT.

8.4.2 The Challenge

"The choice is ours." Leer [2000,p.169] concludes, "Whatever course and decisions we choose to take, future generations will live with the consequences. Let's hope wisdom will prevail and that our legacy will be a good one, for never before has humankind had such a great opportunity to further democracy and build a truly global village." We might argue about the precise form for her vision, but the question that most needs posing is: On what may she base her hope?

The understanding developed in this chapter goes some way towards 'wisdom', especially Schuurman's 'liberating vision for technology'. But if we look over the whole of our discussion of how we might use Dooyeweerd to help us construct frameworks for understanding the five areas of research and practice in IS that we have looked at, Leer's use of the word 'wisdom' would seem appropriate to all. Dooyeweerd does in fact allow us to define 'wisdom' in a way that is useful in both research and practice: in terms of shalom, or harmonious functioning in all aspects. This has been a major part of the theme in every area.

We can go a long way with that. But if we want to follow the path that Dooyeweerd has begun to beat all the way then perhaps we need to consider afresh the religious stance that he adopted but which has been rejected from theoretical thinking for 500 years and, arguably, for 1500 years. Interwoven into his philosophy is the

Biblical (I do not say 'Christian' though he does) notion of creation, fall and redemption. What God has created is diverse and good. It is we who have turned away from God. Yet, Dooyeweerd believed, God has acted to redeem both humankind and indeed the whole of creation by coming into the world in the person of Jesus Christ, in whom, at the end all creation, and all our technological activity will find its completion and Destiny, which is to be released to function as it was intended to in a completely renewed cosmos. But this vision, which sustained Dooyeweerd, and also sustains this author, is not to be completed this side of the eschaton.

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