CRITICAL STUDY

IN SEARCH OF AN INTEGRATIVE VISION FOR TECHNOLOGY

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In April 2006, I was invited to present a discussion paper at a conference of the Centre for Philosophy, Technology and Social Systems (CPTS). The Centre is one of the few initiatives where reformational philosophers and engineers meet to discuss issues of Science, Technology and Society. The main actors in this network are Sytse Strijbos (Vrije Universiteit Amsterdam, The Netherlands) and Andrew Basden (University of Salford, United Kingdom). Recently, the results of this longstanding cooperation between the members of this Centre were presented in a solid work entitled *In Search of an Integrative Vision for Technology: Interdisciplinary Studies in Information Systems* (2006) (S. Strijbos and A. Basden (eds), Springer, New York). In this book an integrative vision has been developed from a Dooyeweerdian perspective. Therefore, it is worthwhile to introduce this group and its main lines of thought. In this critical study I introduce the CPTS (section 1), highlight some main ideas of this study (section 2), discuss the use of the Dooyeweerdian ontology (section 3), enrich the idea of human practices (section 4), explore directional perspectives in relation to society and organisations (section 5), and draw some conclusions (section 6).

1. *Introduction*

The Centre for Philosophy, Technology and Social Systems (CPTS) was established in 1996 to formalise cooperation between scholars from several universities and institutions in various countries. The participants are: the Faculty of Philosophy of the Vrije Universiteit Amsterdam (The Netherlands), the School for Business Administration and Social Science of the Technological University of Luleå (Sweden), the Information Systems Institute of Salford University (United Kingdom), the School for Philosophy of North-West University – Potchefstroom Campus (South Africa), and the Institute for Cultural Ethics at Amersfoort (The Netherlands). The members agreed to cooperate with the following objectives (xi):

- to carry out an interdisciplinary research programme into management and design of technology and social systems giving high priority to ethical and other normative issues;
- to promote the practical application of the research ideas developed at the Centre and vice versa to learn from the input from practice for further research work;
- to make available an international and interdisciplinary learning environment for doctoral students of the participating organisations.

The main activity of the Centre has been its annual working conferences at the beautiful venue of the Emmaus Priory at the river Vecht in Maarssen, The

Netherlands. During these conferences — in 2006 the 12th conference took place! — the participants have developed a conceptual framework that can be characterised as a 'Dooyeweerdian based systems approach'.

Why to develop an integrative vision? Why to propose an interdisciplinary approach? The members of the Centre answer this question from three different perspectives. First, from the perspective of a technologist an integrative vision is needed in order to develop a view on technology that takes 'into account the social-technical context' in which technical artefacts are used (3). Second, from the perspective of system methodologists an integrative vision is required to break through the dominance of hard systems thinking and to develop 'a new approach in which room is given to human values' (4). Third, from a philosophical point of view the gap has to be bridged between an 'internal approach' that takes its starting point in technology itself ('engineering philosophy of technology') and an 'external approach' that analyses the relation between technology and society without opening the black box of technology ('humanities philosophy of technology') (4).

How to develop such an integrative vision? On what to base an interdisciplinary approach? The members of the Centre integrate two different lines of thinking. First, the systems approach as developed by Checkland, Scholes and others. Second, the theory of modal aspects, individuality structures, and ground-motives as developed by the reformational philosopher Dooyeweerd. Based on these lines of thinking they have developed a conceptual framework about the relationship between 'technology' and 'society'. They distinguish between three concepts of technology (6). The lowest level is a 'narrow concept of technology' that covers technological artefacts that are constructed from basic technologies. The next level is the level of 'socio-technical systems' that recognises that technological artefacts function no longer as stand-alone systems but are part of a (world wide) system. Especially, such systems change the societal environment of human being. The highest level is an 'integrative vision for technology' that situates technology in the normative context of human and societal aspects. It is focussed on human practices (structure) that are developed under guidance of religious perspectives (direction). The book uses information technology as an exemplar.

2. *Highlights*

In Search of an Integrative Vision for Technology consists of five parts: (1) Artifacts and their Development, (2) Socio-Technical Systems, (3) Human Practices, (4) Directional Perspectives, and (5) Critical Reflections. I would like to outline the main themes of these parts and to highlight the core ideas developed in this study.

Artifacts and their Development. Andrew Basden, Birgitta Bergvall-Kåreborn, Mike Winfield and Anita Mirijamdotter show that the Dooyeweerdian ontology can be used to develop information technology for human use. Based on this ontology they develop methods to support knowledge representation, to identify

different aspects of knowledge, and to model reality. Especially, they elaborate the idea of multidimensional structure of reality to develop information systems.

Socio-Technical Systems. Sytse Strijbos shows that basic technologies and technical artefacts have become a socio-technical system. They do not function anymore as local and independent technical or material structures but are integrated in a network of technical artefacts and form an infrastructure that enables or constrains the way people live today. Jan van der Stoep shows that one of our major socio-technical systems — the world wide network — is the product of a worldview in which people are seen as free and independent individuals driven by a longing for unlimited accessibility. He points out the danger of hyper communication, that is, an overdose of communication that reduces the meaningful interaction between people. Van der Stoep pleads in response to post-modern thinkers for a normative development of communication systems. In this plea especially attention is given to the lingual and social aspects of communities.

Human practices. Albert Vlug, Johan van der Lei, Darek Eriksson and Andrew Basden investigate the use of information systems in human practices. Eriksson and Basden use the Dooyeweerdian ontology to evaluate information systems in daily practice. Vlug and Van der Lei point out that this ontology gives some powerful concepts but is not usable to evaluate systems from a methodological perspective.

Directional perspectives. Darek Eriksson investigates the ground-motives of systems thinking. He shows that 'hard', 'soft' and 'critical' systems thinking is based on the humanistic ground-motive of nature and freedom and that multimodal systems thinking is based on the creation-fall-redemption ground-motive. Sytse Strijbos explores the idea of 'disclosive systems thinking'. He argues that individuals are gradually superseded by complex systems. This reality challenges us to develop a normative systems ethics to support human responsibility. He pleads for an 'ethics of response and disclosure'. He stresses that disclosive systems thinking is based on the idea that various systems receive their meaning from a pre-given order of which these systems are a part. Human action has to be a response to this intrinsic normativity. He identifies four major normative principles that may guide human action (245):

- 'the opening or disclosure of everything in accordance with its inner nature or its intrinsic normativity';
- 'the simultaneous realisation of norms guided by the qualifying norm for a particular area of human life';
- 'disclosure results from a multi-actor process in which experts bear the responsibility to build a framework of co-operative responsibility for human action';
- 'in building such a common framework the expert needs a critical awareness of the social-cultural context'.

Critical Reflections. Gerald Midgley — a well-known representative of the critical systems approach — reflects on the interdisciplinarity of the CPTS model. In his view the main strengths of this model are the value of explicit philosophical theory, the incorporation of ethical considerations, the systems approach, the applicability to a broad range of technologies, and the incorporation of a wide range of disciplines. The most important critiques are the absence of the level of ecosystems and the dealing with conflicts over normative beliefs. Carl Mitcham — the author of the first standard work on the philosophy of technology: *Thinking through Technology. The Path between Engineering and Philosophy* — argues that systems thinking always threatens to lose sight of individual values such as freedom, dignity, and intentionality. In addition, he criticises that the model works up from technology at the bottom to the directional perspectives at the top. In his view, religion and ethics have to be at the bottom so that technology can be founded on them.

In summary, this study offers a model to develop an integrative vision for technology and a number of case studies in which the different features of this model are refined. Without any doubt, this study is an important contribution to the development of a responsible technology.

3. *Use of Dooyeweerdian philosophy*

A pitfall in the use of the Dooyeweerdian ontology is to use this philosophy as a mould to shape reality instead of a framework to investigate reality. The best method to prevent this pitfall is to take the starting point in the field of study and to use the framework in a flexible way. Most authors of the book indeed practice this policy.

   The editors of the book notice that the different authors do not use the Dooyeweerdian philosophy in the same way. They suggest that the variability in interpretation of this philosophy can be used to tailor the needs of the philosophical practice. Basically, I agree with this statement. In empirical research such a philosophy can be used in an 'instrumental way'. However, a too creative use can deprive the investigator from vital insights and can limit the depth of the philosophical analysis. I give two examples of case studies where the analysis could be deepened.

   Birgitta Bergvall-Kåreborn (39 ff.) uses the idea of a qualifying function as a perspective to develop different conceptual models to investigate the various (normative) dimensions of a societal system. She investigates the creation of new work opportunities through self-deployment in a small municipality in the north inland in Sweden. She analyses this case from the historical and ethical perspectives. She convinces the reader that the use of different modal perspectives enriches the analysis of a system. Also, she convinces the reader that such an enriched picture is of utmost important for systems modelling. However, she does not harvest the full potential of the concept of qualifying function. (The same holds for the critique and refinement of Checkland's soft systems methodology by Anita Mirijamdotter and Brigitta Bergvall-Kåreborn (79 ff.).)

Three main characteristics of this concept are: (a) the qualifying function characterises the internal structure of an artefact or a system, (b) the qualifying function plays a leading role in the development of artefacts and systems, and (c) the qualifying function characterises the specific use of artefacts or systems. In my opinion, the qualifying function of the labour market is the economical dimension. So, the first question would be how the labour market can be developed under guidance of the economical aspect so that new work opportunities will created. From this perspective the question has to be asked how justice can be done, for example, to the historical and ethical perspectives as presented in the study. This approach honours the economical qualification of the labour market fully and force the various parties to develop the internal structure of this system in such a way that historical and ethical norms also will be met.

Darek Eriksson gives a multimodal analysis of the implementation of a new computerised information system in a business practice (165 ff.). The business organisation under investigation was a vegetable, fruit and flowers sales department at a wholesale dealer that belonged to one of the largest food distribution companies in Sweden. The motive for the implementation of the new system was to co-ordinate existing business processes and to make them more efficient. The new system indeed resulted in a reduction of the operative running costs of the wholesale dealer. However, the process re-design led also to unanticipated and unwanted consequences. The ordering behaviour of the buyer changed so that the amount of goods they ordered per business contact decreased significantly, leading to a reduction in total turnover and in a reduction in profit. A detailed analysis of the case showed that the implementation of the new system replaced the buyer-salesman relation by a buyer-system relation. As a consequence, the ordering behaviour of the buyers changed. Eriksson shows by a multimodal analysis where and how the changes in ordering behaviour arose. In my opinion, the analysis can be sharpened by showing that subject-subject relations in the old system were replaced by subject-object relations in the redesigned system. Already, before implementing the new system, the question could be asked what the effect of such a replacement would have been on the economic performance of the business organisation. In addition, starting from the economical dimension as the qualifying function, the decision makers did fall in the pitfall of redesign by reducing 'economy' to 'costs'. The economic qualification of a business organisation highlights that all processes have to be developed in agreement with the typical nature of that qualification.

In general, the Dooyeweerdian philosophy offers a lot of concepts that have to be developed for different systems and practices. The book gives a first exploration. More fruits can be reaped by a further elaboration of concepts like structure, direction and context, qualifying functions, subject and object functions, disclosure, and enkaptic structures.

4. *Human practices*

The third part of the book is called 'human practices'. It is remarkable that in this part no references are made to the work of Alidair MacIntyre. MacIntyre (1984, 187) defines a human practice as a "coherent and complex form of socially established co-operative human activity through which goods internal to that form of activity are realised in the course of trying to achieve those standards of excellence which are appropriate to, and partially definitive of, that form of activity, with the result that human powers to achieve excellence, and human conceptions of the ends and the goods involved, are systematically extended." Jochemsen and Glas (1997) have elaborated this view for the medical practice from a Dooyeweerdian perspective. They distinguish between a constitutive side and the regulative side of a professional practice. The constitutive side consists of the (normative) rules and principles that constitute a practice and provide the norms to evaluate the performance of that practice. The regulative side reflects the mindset, motivations and beliefs of people to interpret the rules and principles that constitute that practice.

The Dooyeweerdian reinterpretation of the concept of a human practice as developed by MacIntyre appears to be a fruitful track to explore the inter-action between and the interlacement of information systems and human systems. In the first place, the Dooyeweerdian philosophy gives a very suitable tool to analyse the nature and character of human practices by means of the qualifying function. Information systems that are in use in that practice have to support the primary process of that practice. That means, the development of these systems has to be guided by the qualifying function of that practice. In other words, the qualifying function of a practice determines (better: has to determine) the qualifying function of an information system in use. E.g., an information system in a medical practice is qualified by the moral dimension. In the second place, the Dooyeweerdian ontology enables a structural analysis of human practices resulting in a number of normative principles that consti-tute that practice. These normative principles can have an influence on the development of an information system. For example, in a medical practice the regulations with respect to privacy are quite strict. These regulations strongly determine the authorisation of users of the system. Finally, the Dooyeweerdian idea of a ground-motive (or directional perspective) strongly influences the disclosure of all information systems and social structures of a human practice. For example, the basic beliefs about death and life will influence the way procedures will be developed and information systems will be used.

As said before, it is remarkable that in the part *Human Practices* no attention is given to the reformational reinterpretation of the concept of human practice of MacIntyre. Especially, now that this reinterpretation is also published in the English language (Jochemsen, 2006), a new perspective arises that can be used to analyse information systems.

5. *Directional perspectives, society and organisations*

Strijbos and Van der Stoep show convincingly that the *condition humaine* has been changed definitively. Technology is the 'house' in which we all dwell today. Technology determines the public and the private space of our existence. Human life unfolds itself in a completely new environment of systems and networks.

Strijbos develops an 'ethics of response and disclosure'. On the one hand, he takes his starting point in basic ideas of reformational thought. On the other hand, he develops these ideas one step further by using the perspective of a systems approach. Strijbos stresses that an ethics of disclosure requires a closer look at the system. Who are the responsible actors? What responsibilities do they have? How are these responsibilities related? I explore these questions briefly, because this topic is almost not addressed in the study. For example, Noreena Hertz points out in her book *The Silent Takeover* (2002) that many multinational corporations are now as big as many nation states. Three hundred corporations now account for 25 % of world's assets. The annual values of sales of each of the largest multinational corporations is now exceeded by the gross domestic product of only twenty-one states! She shows that the balance of power between politics and commerce has shifted radically. The state has become a corporate state. Democracy is endangered by a silent takeover. Especially, in the United States of America politics and multinational organisations are so strongly interlaced that democracy is threatened. See also, for example, Goodman (2004).

I cite these data to emphasise the developments at the highest levels of the model proposed by CPTS. To understand the shift from artefact to environment, the seemingly autonomous character of western technology, the pace of societal developments, the increasing influence of financial markets, we have to investigate the pact between technology, organisation and economy. This pact comes especially to the fore in the modern multinational organisation. The modern organisation is the place where human power, technology and economy meet. It is the place where technology is developed under guidance of directional perspectives. The modern organisation is the place where opening or closure of normativity takes place. It is the place where decisions are made with respect to a simultaneous realisation of norms. Finally, the modern organisation is the place where multi-actor processes take place.

However, the interests of these organisations are so immense that they create their own dynamics that seems to be fully impermeable for ethical reflections. These organisations are an expression of and actively express a certain 'directional perspective'. This perspective is dominated by the values of the open market (control, power, market share, shareholders value, profit). Multinational corporations will never accept that the values of business cannot be derived from the business practice but precede this practice. Multinational corporations will never accept that the rules of the business practice cannot be decided by its managers but are a response to the law of God. Noreena Hertz shows that we need a strong state in order to set boundaries for modern organisations. We need a strong state to exact justice on state level and strong

international organisations to create conditions for justice on world level. However, she also shows that most states are too weak and that international organisations often deteriorate to pressure groups of political-economical strong states.

Disclosive systems thinking requires a context in which values can flourish. When this context is absent, the only thing that remains is prophecy: prophecy about biblical justice and biblical peace, prophecy until justice and peace embrace! (Wolterstorff, 1983).

I have two reasons to emphasise the developments at the highest levels of the CPTS model. The first reason is a pastoral one. Development of information systems always takes place in the 'lower' levels of the organisations. These development are guided by the 'directional perspectives' set at the top of the corporation. That means, often Christian or humanistic engineers find themselves split between the values of the corporations and their own values. Often, they have the opportunity to follow their own values because their activities are not described in detail. However, the more 'ethics' is embedded in systems and procedures and the more hierarchical organisations are led, the less freedom will remain for individuals to take their own responsibility. In other words, the freedom of the individual engineer to work in a responsible way is strongly determined by rules and principles of an organisation. It is merciless to emphasise the responsibility of the individual engineer without recognising that individuals only can bear such a responsibility in a responsible context. Maybe, we have not only to develop an ethics of disclosure but also an ethics of resistance and protest.

The second reason to emphasise the developments at the highest level, is the fact that 'directional perspectives' have to be leading in the development of practices, systems, artefacts, and technologies. The book works up from the basic level (basic technologies, technological artefacts), via the medium level (socio-technical systems), to the highest level (human practices, directional perspectives). Carl Mitcham suggests that this set-up reflects 'our cultural assumptions about the central and driving character of science and technology' (p. 275). I do not believe that this criticism does justice to the idea of an ethics of response and disclosure. However, taking into account the idea that we live in a world of collective technical systems and that individuals are superseded by complex organisational systems, the lower level of the hierarchy (basic technologies, technological artefacts) has to be understood from the higher level (human practices, directional perspectives), and not the other way around. I have the feeling that when the book would be written once more — but then in the top-down direction of the hierarchy — the idea of disclosure would be elaborated even more fruitfully.

6. *Conclusion*

In Search of an Integrative Vison for Technology gives a travel report of an explorative expedition in the field of information systems. The main tools in the backpack were derived from the philosophy of Herman Dooyeweerd. Every

page expresses the joy the travellers had during their trip and the beautiful views they have seen. I wish that the travellers continue their expeditions. Some old places can be visited once more to investigate the full richness of that scene. Some new places have to be explored next time.

References

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