A Case Study Evaluation of the Use of the Viable System Model in Information Systems Development

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This paper considers the usefulness of the Viable System Model (VSM) in information systems (IS) projects. The VSM is a rigorous organizational model which was developed from the study of cybernetics and has been given considerable attention by management science research. The paper presents a case study that focuses upon the sales team of a manufacturing company. This sales team were seeking to develop database support for group working. The VSM was useful in highlighting the organizational limitations upon the IS project and challenged some assumptions about the nature of work in the company. It is proposed that the VSM provides a valuable diagnostic capability that shall assist the company in future IS developments.

Concepts and models of systemic behaviour are now much in evidence as many different scientific disciplines grapple with their own issues of organization and adaptation (see Capra 1996 for a useful synthesis). Information systems (IS) research has been particularly receptive to such “systems thinking” (e.g. Checkland 1981; Checkland and Holwell 1997), possibly as a result of its need to address people and technologies as an organized complexity. It has been widely appreciated that many different kinds of sophisticated model are useful in IS projects. Organizational and enterprise models have been promoted as a response to the observation that many IS projects fail, not because of technical difficulties, but because of a misconception of the potential contribution of the IS to the greater organization.

The focus of this paper is upon a particular branch of systems thinking, namely cybernetics. Cybernetics has been highly influential in the development of systems concepts across many different disciplines (Checkland 1981) and continues to attract attention today (see again Capra, 1996). Its focus is upon patterns of control and communication in systems of all kinds and is thus described as the science of organization (Beer 1979, 1985). We are motivated by a general interest in developing cybernetic approaches to IS projects. We propose that cybernetic models and theory may assist the study of patterns of communication in organization and make it possible to appraise the linkage between these communication patterns and the structure of the organization itself. Our particular focus in this paper is to consider the value of the Viable System Model (VSM). The VSM has been developed from cybernetic theory by Beer (1972, 1979, 1985) for application to human organizations. It has been given considerable attention by management scientists (e.g. Espejo and Harnden 1989).

This paper is organized into five further sections. The next section (‘The Viable System Model’) gives an outline description of the VSM. Following this, the case study of the development of a database system for a sales team is introduced (‘The Case of Heather Manufacturing Systems’). The VSM created for the case study follows in ‘The Viable System Model of HMS’. This leads to the Discussion which considers the usefulness of the VSM in the case study and a projection of its utility in other IS projects. Finally, some short conclusions are presented.
The Viable System Model

The VSM is an organizational model. This paper can give only a very brief introduction to its features, the basis and features of which are set out at length by Beer in a trilogy of books (see Beer 1972, 1979, 1985). The reader may also pursue a fuller understanding of VSM and cybernetics by reference to related academic studies (e.g. Espejo and Harnden, 1989; Kawalek and Wastell, 1996).

By **viable system**, Beer refers to a system (an organization of some kind) which is capable of maintaining a separate existence, of surviving on its own (1979, p.113). This is the central idea in Beer’s philosophy. Organizations (at whatever level) are to be seen as systems (i.e. goal directed entities made up of interacting parts, operating in an environment of some kind). The issue is: what form of internal “architecture” is required if these systems are to be viable?

Beer’s answer to this question is built upon a fundamental concept in cybernetic thinking, namely the Law of Requisite Variety (Ashby, 1965). This law stipulates that the “variety” of the regulator must equal or exceed the variety of that which is being regulated (variety is defined as the number of possible states of whatever it is whose complexity we want to measure). It follows from this that organizations can be understood to be structures for handling variety. Therefore the structure of an organization seeking to survive in a particular environment must be attuned to the variety of the environment. For example, as an environment becomes more complex so the organization will require to adapt itself in order to manage this variety and to preserve its viability. This simple idea is depicted at Figure 1.

Thus far, the organization has been depicted as being responsive to a changing environment. In fact the interaction between organization and environment is much more complex than this. Beer’s concepts of ‘variety attenuation’ and ‘variety amplification’ describe the patterns of adaptation whereby organizations seek to pro-actively manage their variety and that of their environment. Variety attenuation describes the process of reducing the number of states between an entity and a receiver (e.g. a hospital markets a new diabetic clinic thereby amplifying its variety from the perspective of the local population). Therefore, fundamentally, the management of any organization is concerned with equating varieties through attenuation and amplification.

The concepts of operational system and meta-system are fundamental to the architecture of the VSM. All viable systems comprise these two elements: an operational system which performs productive work, and a meta-system which is the means of regulating the operational system. These concepts are recursive in that the combined structure of operational system/meta-system at one organizational level together constitute the operational system at another ‘higher’ level in the hierarchy (e.g. project teams organized in departments, departments nested in enterprises). At each level, though, the relationship of operational system and meta-system is invariant. Note that the use of the terms ‘lower’ and ‘higher’ does not infer a conventional, hierarchical structure of command and control. VSM proposes a distinctive view of control in organizations which emphasises the need for self-organization and localised management, whilst maintaining the integrity of the whole. Therefore hierarchy simply denotes the referential context of a particular level of “organizational recursion”, not some other notion of authority.

The VSM is made up of five component sub-systems. System One constitutes the operational system. Systems Three, Four and Five make up the meta-system. System Two is something of a hybrid. It is a sub-system of the meta-system but its sole purpose is to serve the needs of System One. The functionality possessed by each of these sub-systems is briefly described below.

- System One is concerned with operations. It comprises a collection of operational systems, each comprising an area of operational activity (operational unit) and the local management structure responsible for directly managing the operational unit (operational management). System One constitutes the set of these systems visible at the current level of analysis.

- System Two is concerned with coordination. It provides a coordination service to System One without which System One would be potentially unstable. System Two is the element which ‘dampens’ the instability caused by conflict between parts of System One and its sole function is anti-oscillatory. For example, a process model might constitute a System Two where it provides a framework for cooperation between production teams.

- System Three is concerned with management. Its role is to steer the organization towards its current objectives. It interprets the policy decisions of higher management and maintains the operations of System One. To System Three, the internal operations of System One are opaque; perform, it carries out its management on a resources-results basis. This is facilitated by information loops which form the “resource bargain”. This bargain represents a continuous

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**Figure 1. An Organization and its Environment.**

![Diagram of Organization and Environment](image-url)
process of negotiation between central and operational management about the balance of central and local control: it embodies an agreement stipulating that, in return for certain resources, System One will achieve certain goals. Although System Three is restricted to managing on a resource-results basis, it can gain additional information about the operations of System One through the sporadic use of an audit.

• System Four is concerned with intelligence. It enables the organization to learn and adapt. It is an intelligence gathering and reporting function that seeks useful information about the environment of the current system-in-focus. It searches the environment for opportunities and threats. It provides a model of the organization and the environment which serves as a basis upon which hypotheses are explored and changes proposed to the organization as a whole (e.g. “move into new markets”).

• System Five sets policy. The values and beliefs espoused through System Five should be shared with all other elements of the organization. An important part of this role is thus to arbitrate between System Three and System Four. Conflict can arise because of the different functional emphases on the status quo (System Three) and change (System Four). Similarly, System Five should be open to the other elements of the viable system. It should be able to respond to all significant signals that pass through the filters of Systems One, Two, Three and Four. A special kind of signal is the algedonic signal which by-passes all the normal communication channels and reaches directly from System One to System Five. In a well-functioning organization the signal will simply say that all is well, but it can also quickly alert System Five to a sudden crisis (e.g. “new product specification cannot be met.”)

It should be noted that carrying out a VSM study of an existing organization involves the development of a mapping between these components of the model and the individuals, teams and departments that the modeller identifies in the organization. This mapping allows the modeller to identify omissions (i.e. threats to viability) in the organization and to critique its capability to carry out the different functions effectively. In this way the use of the VSM can understood to constitute a diagnostic of organizational viability.

The five sub-systems of the VSM are displayed in Figure 2. This uses the diagrammatic conventions established by Beer.

The Case of Heather Manufacturing Systems

The rest of the paper seeks to illustrate and evaluate the VSM through a case study of a database project in a manufacturing company. The subject of the study is Heather Manufacturing Systems (HMS) (pseudonym), a manufacturer of industrial equipment based in the north of England. It has a number of subsidiary sales and technical offices throughout Europe and is itself part of a larger industrial conglomerate. After some years of stability and growth, in the late 1980’s HMS were confronted with a major business challenge. Up to this point in time almost 80% of their output had been sold to a single UK organization. When it became clear that this organization was planning to radically reduce the scale of its operations, HMS were faced with a crisis. They had to find new markets and customers for their products or be faced with correspondingly radical reductions in their activity. HMS responded by finding new buyers for their products throughout the EC and latterly in Eastern Europe as well. In order to achieve this, fundamental changes were required of the Sales team. They were required to change from primarily operating in the UK and being reactive, to operating throughout Europe and being proactive. Driven by the urgency of their quest, the Sales team have been able to innovate, extemporise and navigate through difficulties to the extent where
today 75% of sales come from European markets and they have a growing order book.

Given the nature of the new customer profile of HMS, it is considered that they are unlikely to ever experience the levels of stability that characterised the years preceding the late 1980’s. Indeed in order to consolidate their position in the market place, ambitious targets remain. The Sales team are required to generate a further substantial increase in sales over the next five years without incurring more than a restricted growth in revenue costs. In order to achieve these targets the Sales team advocated that they develop and implement their own IS strategy. In this they would break with the established practice of centralised IS development. As well as making it easier to develop tailored systems for Sales, it was argued that this localised IS strategy would assist them in the concomitant development of new innovative models of operation. Underpinning this argument was a critical assumption; that the Sales team have a high degree of autonomy.

The proposed IS strategy was given the go-ahead in early 1996 although it was not until early 1997 that the main design and development activities started. The project was given the name ‘Whole Europe Information System for Sales’ (WEISS) (pseudonym). Its focus is a groupware project using Lotus Notes to facilitate information sharing amongst the peripatetic sales engineers and the head office in England. The broad aim of WEISS is to improve the efficiency of processes operated by the Sales team. The scope of the project is as follows:
- Sales Order Processing;
- Sales Force Management;
- Management Information.

**Issues Arising**

To date most attention has been given to the development of functionality connected with sales order processing. Much success has been reported with increasing levels of support for WEISS being voiced by members of the Sales team and with several important areas of functionality already launched. However, concerns remain over the ability of the WEISS project to address important issues in the organization and the more general direction of IS strategy being followed by the Sales team. Two issues in particular have been raised.
- Delivery-time problems are causing frustration amongst customers.

Members of the Sales team find it difficult to obtain realistic estimates of delivery times from the Production team. The Production team are working at above full capacity and complain that Sales staff have unrealistic expectations of how quickly units can be built and despatched. The result of this is an increasing frustration amongst customers of HMS who now routinely find that the delivery dates for their orders are not kept. Faced with this difficult situation, there is a growing belief that new database support may be needed and that this issue should be addressed from an IS perspective.
- Teams other than Sales are now requesting functionality from WEISS.

As knowledge of WEISS grows throughout HMS, teams other than Sales have requested that parts of the implementation be adapted to suit their purposes. For example, the Accounting team have requested that one field be added to an existing database in order that it might be useful to them also by allowing access information from a ‘Point of Invoice’ field. The Engineering team have requested an additional facility (order tracking) arguing that it will be useful to them, to the Sales team and to the Accounting team in helping to keep track of the manufacture of products.

This interest in WEISS by other teams can be interpreted as evidence of the success of the project to date. Clearly the project is perceived in a positive light and other teams are keen to ‘buy in’ to it, albeit in a limited way. However, this raises issues about the scope of WEISS, who controls it and how, in the face of any conflict between different teams, issues can be resolved. For example, if in the future the Engineering team became dependent upon some aspect of WEISS’s operation which the Sales team wanted to change, how would any conflict be resolved?

The position taken was that these issues can at some level be understood to be a consequence of the organizational design of HMS. Thus, whilst the designers of the WEISS system are notionally free to develop whatever systems the Sales team want, in practice they must consider the organizational constraints upon the Sales team itself.

It follows that in order to understand the contribution of WEISS to the Sales team, its designers have to consider the contribution of the Sales team to the broader organization. An organizational model was needed in order to address this organizational view and to complement the data and process views already catered for in the development process. It was therefore decided to develop an organizational model using the VSM and to use it to inform the WEISS project.

**The Viable System Model Of HMS**

**Research Method**

The VSM was constructed by a project team made up of university researchers and database developers. One researcher took responsibility for developing the model whilst the other team members sought out the information needed for it and provided an ongoing critique. It was necessary to supplement the team’s own knowledge of the organization of HMS by a series of interviews with stakeholders in the WEISS project. These interviews were undertaken on an ad-hoc, ‘need to know’ basis, whenever a shortcoming in the VSM model was identified. The interviews were of variable length (from 10 minutes to one hour). They focused upon a subset of the questions set out by Flood and Jackson (1991) for a “viable systems diagnostic.” The modelling exercise was likened to a detective process. The VSM modellers (the detectives) sought to build up a complete picture of the organization (using the VSM). Whenever a shortcoming in their knowledge was...
identified (by scrutiny of the model), they would engage with stakeholders to enhance their understanding. The stakeholders selected as the subject of user interviews were as follows:

- Project manager (holding both a sales team and a WEISS role);
- Production staff;
- Two system developers;
- Head of Sales Team;
- Four sales staff.

A Presentation of the VSM

Our presentation of the VSM created for HMS starts at Level 1 ("the system in focus"). The operational system is defined as being made up of the two principal transformations (these were identified in a SSM exercise which preceded the creation of the VSM; see Checkland 1981 for details of SSM). These are the twin strands of 'finished products business' and 'spares business' and are shown as operational elements.

The organizational units that make up HMS are arranged against the functions (i.e. Systems One to Five) that they contribute to. The net effect is to see the organizational units as collaborating over different functions of the organization and at different levels of concern. Hence, although it was assumed that the different management units of HMS have clear autonomy and responsibility, the model suggests that in practice management is much more dependent upon interaction and collective decision making. For example System 3 functionality at this level (i.e. guiding the organization towards its existing objectives) requires that agreements be reached between the Engineering, Production, Sales, Accounting, HR and Commercial teams.

Level 2 begins the process of questioning how the System One components shown at Level 1 are actually realised in the organization (see Figure 4). Thus, the creation of the model gives opportunity for identifying and assembling those units which contribute to ‘Finished Products Business’ and ‘Spares Business.’

For purposes of brevity, only ‘Finished Products Business’ is set out in this paper.

The formal procedures of the company require the production cells to report only to the Production Manager. However, the modelling revealed that much of the meta-system functionality is actually shared in a delicate and contentious power balance between Production and Engineering. The contribution of the Sales team to meta-system management at this level is also significant; a fact considered in the Discussion.

Discussion

The VSM exercise facilitated a new level of understanding of the HMS organization and put the WEISS project in a new light. It undermined the assumption that the Sales team have a high degree of autonomy and provided important insights into how IS strategy might be re-aligned. The following presentation of the findings of the VSM exercise takes

![Figure 3. Heather Manufacturing Systems; Level 1.](image-url)
place in three parts. First, the contribution of the Sales team to HMS is reviewed in the terminology of the VSM. Secondly, the implications for IS strategy in HMS are drawn out. Finally, an assessment is made of the value of the VSM in IS projects.

The Contribution of the Sales Team to HMS

Despite the many successes enjoyed by the WEISS project to date, the VSM exercise has helped to expose the naivete of some of the assumptions underpinning it. At the outset it was generally accepted that the Sales team was largely autonomous and able to design their own operations. After all, the team had so successfully contributed to HMS’s remarkable response to new market conditions.

The creation of the Viable System Model shows the operation of the Sales team in a different light. It suggests that the team contributes to a variety of different functions in HMS and operates through a series of explicit and tacit partnerships with other teams. In other words, they are less characterised by autonomy than they are by diversity of functionality and bargaining. The following illustrate the work of the Sales team in VSM terms (the reader may find it useful to refer back to the VSM diagrams):

- Contributing to the Level 1 coordination (System 2) function of HMS. The Sales team have a role in the coordination of production of finished products vis-a-vis spare parts. In the normal course of events the Production Manager will seek to manage the resources of his team so as to achieve the best balance between satisfying orders for finished products and orders for spare parts. However, the resources available to the Production Manager are finite. Production are faced with ambitious financial targets and an expanding orderbook. It is therefore increasingly important that there be some sort of arbitration over questions of competing resource. A vital contribution to the arbitration mechanism is made through informal and formal contact with the Sales team. This can work in several ways. For example, individual sales engineers will advocate that their order (e.g. a complete product for Company X, a spare part for Company Y) be given priority. Alternatively, the sales staff might strike an agreement between themselves and so inform Production which order is their highest priority. Throughout, in playing this role, the sales staff must maintain the support of the Production Manager who has the ultimate formal authority to govern the production schedules and may, if he sees fit, choose to over-ride his colleagues in Sales.

- Contributing to the Level 1 management (System 3) function of HMS as a whole. The Sales team contribute to the management function which governs the progress of new product and spare parts production. They are able to influence decisions over the corporate requirements of production operations (e.g. quality standards), the resources given to Production (e.g. finance) and the degree of accountability they have (e.g. access to production schedules). Other teams in HMS are also able to influence these decisions (i.e. Engineering, Accounting, HR, Commercial and Production themselves).

Figure 4. Finished Products Business; Level 2.
Contributing to the Level 2 coordination (System 2) function of Finished Products Business. At this level of recursion (i.e. Level 2), the issue is the relative urgency of different orders. It is common for a number of different orders (e.g. for Company X, Company Y and Company Z) to be classified as equally urgent. The arbitration between the competing claims for resource can be influenced by the Sales team. They work in a similar way to when influencing decisions at Level 1. They may individually make a case for their order to be given highest priority or may come to some arrangement amongst themselves and inform Production. However they operate, they must work with the Production Manager who has ultimate responsibility for scheduling decisions.

Contributing to the Level 2 management (System 3) function of the Finished Products Business. At the lower level of recursion, within Finished Products operations, the Sales team contribute to the balance of management control and autonomy maintained between production management and the different production teams. The role of the Sales team is not officially recognised in the company and indeed, the VSM would suggest, is a symptom of some deficiency in the organisational design. It arises because the Sales team will sometimes try to anticipate the actions of the production teams and to alter them so as to best suit the interests of a particular client. In the terminology of the VSM, the nature of the resource bargain is being altered and the production teams are being burdened with providing a higher level of accountability than is optimal.

A typical scenario will help to illustrate this point. A sales engineer may be pressured into promising an unfeasible delivery date for a client in order to win a contract. Anticipating that the Production team will not be able to deliver on time he will instead make a special petition to them. In other words, he will extend his System 2 (Levels 1 & 2) role of arbitration to one of anticipation; he will intervene in the day-to-day management of production (i.e. System 3 at Level 2). This intervention may be executed by the sales engineering arriving on the factory floor and speaking to the production workers themselves. The problem is that the sales engineer has only a partial view of the operation of the Production team, and cannot fully appreciate the context within which they operate. As a result his intervention may do more harm than good. It may actually make it harder for the production workers to achieve their goals, it may compromise the best management of resources and have a negative impact upon the system dynamics of production. This is an example of what Beer calls a “cancerous activity” (1979, p.209), where the action of the meta-system contaminates operational freedom at a lower level of recursion.

The Implications for IS Strategy in HMS

The light extended by the VSM exercise suggests how IS strategy might be reformulated in HMS. The starting point is to consider the different functions expressed in the model (i.e. Systems 1 to 5 over the different levels of recursion) and to analyse the information required to fulfil each of them in HMS. In effect, this means that the VSM should be understood as a generic template of an information system which can be specialised to different organizational settings. An important implication for HMS will be to place greater emphasis upon supporting the collaboration of teams, for example recognising that no fewer than six teams are stake-holders in the System 3 activities of HMS (Figure 3). The problems raised earlier (“Issues Arising”) can be used to illustrate how IS strategy might develop from this new standpoint.

First, there is now genuine concern that increasing frustration amongst customers over delayed delivery dates will have a detrimental effect on the long-term business prospects of HMS. The problem is generally perceived to be in the province of the Production team who have formal responsibility for scheduling decisions and who maintain the computer system through which these decisions are facilitated. The contribution of the Sales team to these scheduling decisions, though tacitly acknowledged, is in some circumstances dismissed as “interference.” The inference is that scheduling decisions could best be made upon technical issues alone, that the inclusion of the Sales team in decision making confuses the picture. The VSM exercise suggests otherwise. It emphasises that the Sales team play a vital role in production scheduling through their contribution to the System 2 (coordination) functions of HMS. In particular they provide an essential arbitration service when different orders compete for resource in the production plant. The implication is that a successful information strategy will have to recognise this. The need to share information about scheduling between the Sales, Production and Engineering teams should be a prime concern of IS development. Concomitant with this will be a need to recognise the political responsibility that the Sales team must take for their contribution to scheduling decisions; i.e. to recognise formally that production scheduling cannot be wholly entrusted to any one team alone. The net effect of this might then be that the Sales team seek to define a consistent policy for scheduling decisions and that they discourage actions which are detrimental in the long term. The reader will recall that at one level the involvement of the Sales team in scheduling decisions can be inimical; i.e. where a sales engineer goes beyond his arbitration role and seeks to intervene directly in the production decisions being taken on the factory floor. Giving the Sales team due weight of responsibility for scheduling decisions might thus make it easier for the Production Manager to define the limits to their power to intervene in production decisions.

The second issue highlighted earlier in the paper concerns the interest in WEISS that is being shown by teams other than Sales. This is evidence that the project is in good repute. However, it is problematic in that the WEISS designers are forced to consider whom they should develop functionality
for, how WEISS should interface with the work of other teams, and how competing demands might be reconciled. The given examples of the Accounting and Engineering teams (‘Issues Arising’) reveal, anecdotally, that these different teams have some overlapping management information requirements to Sales (e.g. an order tracking system, invoice information). The VSM exercise predicted this for it exposes the unsafe assumption that the Sales team have a high degree of autonomy. Informed by this, the IS strategy could be expected to pay much greater heed to the requirements of meta-systemic collaboration between different teams. Thus a prime concern should be to facilitate information sharing; to support the levels of co-operation that are cardinal to the well-being of the organization as a whole. For example, in carrying out their System 3 managing role, the Sales team will be seeking to collaborate with five other teams in the resources/results management of the Level 1 one sub-systems of finished products and spares.

The two issues discussed above suggest that both production scheduling and management information are major concerns for IS strategy in HMS. The WEISS project is unable to have a substantial impact on either. Issues of production scheduling have been ruled outside of its scope (despite some debate earlier in the project) because they fall under the remit of the Production team. Whilst management information issues are to be considered by WEISS, it will be unable to properly address requirements for co-operation between teams because of its ownership by the Sales team alone. The reader may note the irony in this, given that the project uses Lotus Notes, a product well-suited to the support of inter-group work. The problem stems from a failure to rigorously analyse the group dynamics of the organization prior to setting out to support them. In this regard, the VSM has provided the missing piece of the jigsaw.

Thus, given the existing organizational structure, the VSM was used to help to set out a way ahead for WEISS. The priority was to broaden its scope through ‘buy in’ from other teams. That other teams are interested in WEISS suggested that the time was ripe for just this sort of departure. The WEISS project, or components of it, could come under the ownership of more teams than just Sales and hence address IS issues more effectively from a broader standpoint. This has now been largely accomplished in HMS, and the authors are now developing the model to inform the debate over the requirements of each team. For example, we are able to question what support services are needed by each of the teams operating at System 3, Level 1. This is essentially a process of specialising the generic IS template given by the VSM.

The Value of the VSM in IS Projects

It was noted earlier how the VSM has been used in the HMS project in addition to more conventional data modelling and process modelling. It can be likened to enterprise modelling approaches where the aim is to inform the system development process through an understanding of the context and structures of the organization. As an enterprise modelling approach the VSM is distinguished by its underlying cybernetic theory. We have seen how cybernetics is concerned with the identification and description of patterns of organization in complex entities. It has influenced the development of many different areas of research (e.g. the science of cognition, artificial intelligence, the study of ecosystems) and through ideas of self-organization continues to inform many debates today (Capra, 1996: pp. 51-71).

The cybernetic basis of the VSM encourages the modeller to focus upon the interaction of the environment and the organization. The modeller is forced to consider how organizational structure is shaped by environmental circumstances. Hence, the IS project itself is contingent upon broader business and environmental issues. This is consistent with a long tradition of thinking in organizational theory. The widely-cited work of Lawrence and Lorsch (1967) has been instrumental in establishing the critical linkage between environmental turbulence and organizational structure. Their work has highlighted the need to strike the right mix of internal differentiation and integration in relation to the stability/flux of the external environment. They contend that a more turbulent business environment requires greater organizational differentiation (i.e. the division of tasks amongst a greater number and/or variety or organizational units). In cybernetic terms this correlates to Ashby’s basic thesis that the variety of the regulator must equal or exceed the variety of the regulated.

Conclusion

IS development projects require the reification of a sophisticated technical artifact in a dynamic, uncertain and complex organizational environment. The developers of the database system at HMS faced exactly this problem: they were required to bring their technical expertise to bear in a business environment that was very rapidly changing and very difficult to understand. Organizational modelling is often proposed as a solution to this kind of problem. By adopting the VSM, the project was able to exploit the coherent and rigorous theoretical basis of the model.

In the context of HMS and the WEISS project, the use of the VSM has been highly valuable in helping to explore the organizational context of the WEISS project and to inform its future direction. It became a useful accessory to many discussions about the project, enabling the database developers to more accurately understand their potential contribution to the organization. It also helped to ruthlessly expose some important misconceptions and false assumptions. In so doing, the VSM exercise has proved to be complementary to the other design approaches adopted in the project (i.e. process and data modelling). We anticipate that using the VSM shall continue to be highly beneficial to the company as it considers the further development of WEISS.

In summary, the VSM offers a coherent exposition of
cybernetic theory which allows the modeller to investigate the intricate relations of communication, control and organizational structure. The ability to comprehend and manage these relations can have a substantial bearing upon the success of an IS project. It follows that the VSM is worthy of further application in other IS case studies. Our work shall seek to carry out further applications and to develop a method for IS development using the VSM.

References
Beer, S., (1979), Heart of Enterprise, John Wiley & Sons, Chichester.

Dr. Peter Kawalek has experience of a large number of modelling and process improvement projects for industry (e.g. software development, sales team support, telecommunications, insurance). His experience has contributed to the formulation of the process approach to IS development that is described in the recent McGraw-Hill book, “Business Information Systems: A Process Approach” (Warboys, B.C., Kawalek, P., Robertson, I., Greenwood, R.M.). With David Wastell and Richard Vidgen (University of Bath), Peter co-founded the “Viable Systems Group,” a group of international membership which is dedicated to the investigation of the use of the Viable System Model in information systems research. Peter is also co-editor of the forthcoming Artech House book ‘Systems Modelling for Business Process Improvement’ (with David Bustard and Mark Norris).

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[www.irma-international.org/article/privacy-preserving-outsourced-similarity-search/118088/](www.irma-international.org/article/privacy-preserving-outsourced-similarity-search/118088/)