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A question of interpretation: the Viable System Model (VSM)

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- **HIGHLIGHTS**

- **The Viable System Model is open to interpretation.**
- **The interpretation argued here is that it is a problem structuring method.**
- **It is a model, not representing reality, but facilitating the handling of reality.**
- **This model can be used with the VIPLAN Method, within the VIPLAN Methodology.**
- **It aims to involve multiple views about how to handle organisational complexity.**
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ACCEPTED MANUSCRIPT

Title page

Title: A question of interpretation: the Viable System Model (VSM).

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ABSTRACT

Smith and Shaw (Smith, C. M., & Shaw, D. (2018) The characteristics of problem structuring methods: A literature review. *European Journal of Operational Research*. <https://doi.org/10.1016/j.ejor.2018.05.003>) offer an interesting insight into the characteristics of problem structuring methods (PSMs) grounding this upon a literature review. However, their evaluation of Stafford Beer's Viable System Model (VSM) is open to a different interpretation to the one they offer, drawing upon significant literatures seemingly not considered. Whilst Smith and Shaw argue that the VSM is not a PSM, the characterisation of the VSM presented in this short communication suggests that in terms of the thirteen questions posed by these authors, that indeed, the VSM can be viewed as PSM.

KEYWORDS: problem structuring methods, viable system model, models, cybernetics, soft OR.

Short Communication: A question of interpretation: the Viable System Model (VSM)**INTRODUCTION**

Smith and Shaw (2018) offer an interesting insight into the characteristics of problem structuring methods (PSMs) grounding this upon a literature review. They state that “PSMs make some unique assumptions about the nature of problems and how to solve them” (ibid, 2). Thus, the paper

develops and tests a framework of inter-related questions that can be used to assess the veracity of the PSM claims that such methods make (ibid, 1).

In other words, these characteristics, revealed by thirteen appropriate questions that constitute four pillars, provide a framework to assess PSMs and their claims to be PSMs. These four pillars relate to the ontological (reality), epistemological (knowledge), axiological (values) and methodological (approach) aspects of a PSM. These translate into systems characteristics (Q1-3), knowledge and involvement of stakeholders (Q4-7), the values of model building (Q8-11) and structured analysis (Q12-13). This is the proffered benchmark by which to evaluate claims about being a PSM. This is an admirable project.

Indeed, when a range of approaches are assessed by Smith and Shaw in terms of the thirteen questions, only the SSM, SODA and the strategic choice approach (SCA) were assessed as answering yes to all thirteen questions. However, it is to be noted that these questions were derived from a literature review drawing particularly upon these three approaches. It was concluded that only these three approaches are deemed classifiable as PSMs.

However, there is one concern with Smith and Shaw’s assessment, which relates to the evaluation of the Viable System Model (VSM). This, along with the evaluation of the other approaches, is stated to be based upon a ‘comprehensive literature review’ (ibid, 3). This invites the question as to what literatures have been reviewed. There appears to be a conspicuous absence of many of the, especially more recent, influential works that have informed the use of the VSM. Whilst there is reference to Stafford Beer’s “Brain of the Firm” (2nd ed., 1981), there is no reference to the equally influential ‘The Heart of Enterprise’ (1979) or ‘Diagnosing the System for Organisations’ (1985) or the epistemological insight about the role of the VSM (Beer, 1983). Each offers deeper insights. Likewise, there is no reference to the significant contributions of Raul Espejo (e.g. 1990, 1992, 1999, 2015a, 2015b; Bowling & Espejo, 1992; Espejo & Harnden, 1989; Espejo, Bowling & Hoverstadt, 1999; Espejo & Reyes, 2011) and Angela Espinosa (e.g. Espinosa, Harnden, & Walker, 2008; Espinosa & Walker, 2011, 2013; Espinosa, & Duque, 2018). An understanding of this work is likely to provide a deeper and different evaluation, with each of the questions being answered in the affirmative, leading to the view that the VSM is indeed a PSM.

AN ALTERNATIVE INTERPRETATION

The VSM is a model of a viable system constituted by five systemic functions (one to five) and two regulatory mechanisms (cohesion and adaptation) (Espejo, Bowling & Hoverstadt, 1999). 'System one' is constituted by the primary activities, invoking a recursive view of how the complexity of an organisation is unfolded (Espejo, 1989).

However, as a model, it requires methods for how it can be used, and, as such, methods are features of the model which cannot be ignored. One method to use the VSM is the VIPLAN Method (Bowling & Espejo, 2000; Espejo, 1989, 1999, 2008; Espejo, Bowling & Hoverstadt, 1999; Espejo & Reyes, 2011). This provides a framework to make sense of the organisation of interest, but as a system viewed recursively within the context of its metasystem and accounting for its sub-systems. Further, it is important to appreciate the context in which the model is being used and for what reasons, as this introduces another set of issues such as, what is the problem, who are the stakeholders and what is the nature of their engagement? This is likely to be in social situations that are viewed as problematic, because it is unclear what the problem is. These situations are characterised by complexity, uncertainty and turbulence (CUT), in other words, they are messy (Ackoff, 1974).

This calls for a methodology that can be used to make sense of such situations and in doing so invokes a PSM such as Peter Checkland's (1981) Soft Systems Methodology (SSM). Indeed, Munro & Mingers (2002) identified ten respondents in a study of multimethodological practices, who have combined SSM and VSM. One relatively recent application is that of Liboni, Cezarino, Caldana & Donaires (2015). Another approach for the application of the VSM has been developed by Espinosa & Walker (2011, 2013) with demonstration of use in Espinosa, Reficco, Martinez & Guzman (2015). A more generic approach for handling complex problem situations is the VIPLAN Methodology (Bowling & Espejo, 1992, 2000; Espejo 1992; Espejo, Schuhmann, Schwaninger & Bilello, 1996; Espejo & Reyes, 2011).

The significance of the VIPLAN Methodology is its conceptual grounding in Second Order Cybernetics (von Foerster, 1979). This draws attention to the stakeholders relevant to the situation as perceived and how this is assessed. It also has implications for how these stakeholders are organised (using the VSM) in order to create conditions (i.e. the context or Operational domain) that are more conducive for improving the likelihood that these stakeholders engage in appropriate discourse (i.e. Informational domain) and establish effective solutions that can be implemented (Espejo, 1992). It invokes the desire for trust (Espejo, 1999). In other words, the aim is both to create a situational context conducive for learning as well as to facilitate the learning process with view to taking effective action. The Second Order Cybernetic (constructivist) stance of the VIPLAN Methodology is more fully developed in Espejo & Reyes (2011).

The VSM may be used in Smith and Shaw's mode 1, in terms of the 'expert' analyst making sense of the perceptions of others, or it may be in terms of facilitating participant engagement (mode 2). Whatever, the VSM is implicitly participative, requiring input from those knowledgeable about and/or with an interest in the situation of interest (cf. Espejo, 1990, 1996). Thus, the VSM is not an objective model of reality, but a model that reflects peoples' participation and perceptions of how the relevant organisational system of interest functions. Indeed, Beer (1985: 2) states "you are not determining absolute facts: you are establishing conventions... a model is neither true nor false: it is more or less useful". The VSM can be viewed as a 'generative mechanism' (Harnden, 1989), an epistemological device (Espejo, 1996), a meta-language (Espinosa, Harnden, & Walker, 2008; Espinosa, 2015) and a boundary object (Harwood, 2009) to elicit, organise and communicate knowledge about the complexity of social organisation.

Implicit in such situations is the acknowledgement and the handling of cultural and political issues, otherwise intended change will not happen due to opposition and undermining by dissenters. Cultural issues relate to the historically embedded ways things are done (e.g. within different communities). Political issues include how power is exercised, how the voice of different factions is handled and the impetus for change. Rather than messy situations being open to harmonious engagement, they can be fraught with, perhaps irreconcilable, tensions between different groupings. This is problematic, as is evident with the experience of Stafford Beer in Chile (Beer, 1981; Espejo, 1990, 2009; Medina, 2011).

This view of the VSM is consistent with second order cybernetics: "Anything said is said by an observer" (Maturana, 1970: 8) and its corollary "anything said is said to an observer" (von Foerster, 1979: 5). This draws attention to our role as observers and that which we, as observers, engage with. As observers, we perceive, make sense and adjust or position in our everyday engagements with whoever and whatever is part of our world. Implicit is the distinction between the structural couplings between the observed entity and its environment and the cognitive domain of the observer and how the entity's observed structural couplings (i.e. interactions) are conceptualised (Maturana, 1970; Harnden, 1989). In this sense, the VSM is not viewed as a model representing the internal dynamics of the entity and its structural couplings with its environmental niche. Instead, the VSM, as a 'generative mechanism', epistemological device, a meta-language or a boundary object within the observing system facilitates exchanges between observers and, orientated through language, the development of a consensual domain and, thus, the co-ordination of interactions (Maturana, 1970). Espinosa, Harnden & Walker (2008) develop this argument. It facilitates the emergence of views. This establishes the VSM within an interpretivist ontology (Espejo & Harnden, 1989; Espejo, 1996).

This now raises a fundamental question about Smith and Shaw's (2018) proffered framework to establish the characteristics of PSMs and how it might be used. Significant within this framework is the role of the model, where a model is defined as:

an integrated representation of a situation that supports negotiation or develops new understanding (Smith and Shaw, 2018: 3)

As a representation of reality, this can be interpreted as implying that there can be only one model of a situation, despite multiple and potentially conflicting viewpoints about the situation. This might explain why the VSM, as a model, appears to have been interpreted in the way presented by Smith and Shaw. However, the view of the VSM presented here considers a model, not a representation, but as

... a *convention* – a way of talking about something in a manner that is understandable and useful in a community of observers. It is not a description of reality, but a tool in terms of which a group of observers in a society handle the reality they find themselves interacting with

(Espejo & Harnden, 1989: 445)

Thus, this enables all thirteen of Smith and Shaw's questions to be answered in the affirmative regarding the VSM, rather than just four. To illustrate why this is the case, two questions are re-evaluated drawing upon the preceding discussion.

Question two is the first question to be answered as 'NO': Does the approach model participants' subjective interpretations of the world? The Smith and Shaw (2018: 9) response is that the:

VSM takes a system-in-the-world position in which the laws underpinning the model, such as requisite variety, exist... and objectively model an external reality.

An alternative response is YES, since the second order cybernetics lens recognises that the VSM is not an objective model of reality, but a model that facilitates the articulation of peoples' perceptions of how the organisation being evaluated functions. Indeed, Beer (1985: 2) states "you are not determining absolute facts: you are establishing conventions... a model is neither true nor false: it is more or less useful".

The next question to be answered in the negative is question five: Does the model building involve the facilitation of participants? The Smith and Shaw (2018: 9) response is "Likewise, VSM and... models can be built in Modes 1 or 2". This is explained in a previous section:

For example, the majority of the VSM literature does not use the model as a method of facilitation, so the answer would be 'no' to question 5, Does the model building involve the facilitation of participants? There is one paper that uses VSM as a facilitation tool (Tavella & Papadopoulos, 2015), but this does not represent the dominant use of VSM in the literature.

(Smith and Shaw (2018: 8)

There is ambiguity here. There is not denial of participant facilitation, merely that the majority of papers reviewed failed to use the VSM in a facilitation mode. Indeed, that the VSM can be used in a facilitation mode allows the alternative response of YES. The VSM, as a facilitative device, focuses attention in those who have a relevant voice about what is happening (e.g. participants). It may be mode 1 in terms of the 'expert' analyst making sense of espoused views or it may be in terms of facilitating engagement among those whose voice should be heard (mode 2).

The other questions can be answered in a similar manner as illustrated with the following short responses.

Question six: 6. Does the model building enhance participants' learning about the situation? YES, the VSM can be used as a boundary object (Star & Griesemer, 1989; Harwood, 2009) allowing views to be shared about what is happening and the issues, though this need not be the case when the analyst make sense of observations.

Question seven: Does the approach aim to develop buy-in to politically feasible outcomes? YES, otherwise intended change will not happen due to opposition and undermining by dissenters.

Question eight: Is credibility established in models by preserving multiple participant contributions? YES, but this depends on how the VSM is used. Is this in a diagnostic or design mode? Core is the verification of what is happening by participants, which should lead to convergence. In contrast, possibilities of what might desirably happen can reveal divergence. The VSM is not a stone, but an epistemological device to make sense of social organisation. Whilst there is the social construction of the reality that we are part of, there are observable invariances (mechanisms) in everyday behaviour. This gives the illusion of being objective. Variances are an issue for debate and clarification.

Question nine: Is the model building process suitably generic so it can be transferred to multiple problem contexts? YES, the VSM is about how to regulate the organisation of people so that their ventures survive – this implies different contexts.

Question ten: Does the model building process aim to create confidence in the outcome through procedural rationality? YES, there is a logical process such as in the form of the VIPLAN method and the VIPLAN Methodology. Both draw upon participants for their knowledge of the situation of interest.

Question eleven: Does the model act as an audit trail of the decision making process validated through collaborative enquiry? YES, the VSM needs to be grounded in source data if it is to be meaningful.

Question twelve: Does the approach structure knowledge through different stages of analyses? YES, the VSM is a model, but to construct the model there is a logical (structured) process as revealed in the response to question ten.

Question thirteen: Does the approach have distinct phases for divergent and convergent thinking?

YES, the VSM, as a model, supports discussion about both what is happening and possibilities for change. This will reveal both shared views and differences.

This re-evaluation of the VSM draws attention to how an approach is interpreted. The SSM can be viewed as an approach for handling situational complexity and has been established by Smith and Shaw (2018) as a PSM. However, taking other approaches, for example, systems dynamics and the VSM, both give rise to models of the complexity of the changing relations among entities in a situation. However, these models do not exist in isolation, but as part of activity that assumingly is likewise attempting to handle situational complexity. Models invoke methods for model building and use, which, in turn, draw attention to the process within which models are used, for example, solving complex problems. Assumptions about use may be explicit, as in the case of the SSM. However, they may be unclear, as is in the case of Stafford Beer's account of the VSM, which others (e.g. Espejo and Espinosa) have developed.

CONCLUSION

In conclusion, the manner in which Smith and Shaw (2018) have interpreted the VSM has drawn attention to a fundamental issue in their framework, that of how a model is defined. The VSM, as a model, can be viewed, not as a representation of reality, but as a device to support the handling of reality. As such the VSM can be argued to be a PSM.

REFERENCES

- Ackoff, R.L. (1974) *Redesigning the Future*. New York: John Wiley & Sons.
- Beer, S (1985) *Diagnosing the System for Organisations*. Chichester: John Wiley & Sons.
- Beer, S. (1979) *The Heart of Enterprise*. Chichester: John Wiley & Sons.
- Beer, S. (1981) *Brain of the Firm*. [2nd edition], Chichester: John Wiley & Sons.
- Beer, S. (1983) A Reply to Ulrich's 'Critique of Pure Cybernetic Reason: the Chilean Experience with Cybernetics'. *Journal of Applied Systems Analysis*, 10, 115-119.
- Bowling, D., & Espejo, R. (1992). An intervention with the cybernetic methodology in regent engineering. *Transactions of the Institute of Measurement and Control*, 14(1), 17-28.
- Bowling, D., & Espejo, R. (2000) Exploring computer supported cooperative work in a retail bank. In: J Allen and J Wilby (eds.) ISSS 2000 International Society for the Systems Sciences: accession number 20151. CD-ROM, Toronto.
- Checkland, P. (1981) *Systems Thinking, Systems Practice*. Chichester: John Wiley & Sons.
- Espejo, R. (1989) A cybernetic method to study organisations. In: Espejo & Harnden (eds) *The Viable System Model: interpretations and applications of Stafford Beer's VSM*. Chichester: John Wiley & Sons.
- Espejo, R. (1990) Complexity and change: Reflections upon the cybernetic intervention in Chile, 1970–1973. *Systems Practice*, 3(3), 303-313.
- Espejo, R. (1992) Management of Complexity in Problem Solving. *Transactions of the Institute of Measurement and Control*, 14(1), 8–16.
- Espejo, R. (1994) What is Systemic Thinking? *System Dynamics Review*, 10(2-3), 199-212.
- Espejo, R. (1996) Requirements for effective participation in self-constructed organizations. *European Management Journal*, 14(4), 414-422.
- Espejo, R. (1999) Aspects of Identity, Cohesion, Citizenship and Performance in Recursive Organisation. *Kybernetes*, 28(6/7), 640-658.
- Espejo, R. (2008) Observing organisations: the use of identity and structural archetypes. *International Journal of Applied Systemic Studies*, 2(1/2), 6–24.
- Espejo, R. (2009) Performance management, the nature of regulation and the CyberSyn project. *Kybernetes*, 38(1/2), 65-82.
- Espejo, R. (2015a) An Enterprise Complexity Model: Variety Engineering and Dynamic Capabilities. *International Journal of Systems and Society*, 2(1), 1-22.
- Espejo, R. (2015b) Performance for Viability: complexity and variety management. *Kybernetes*, 44(6/7), 1020-1029.
- Espejo, R. & Harnden, R.J. (1989) *The Viable System Model: interpretations and applications of Stafford Beer's VSM*. Chichester: John Wiley & Sons.

- Espejo, R. & Harnden, R.J. (1989) The VSM: an ongoing conversation... In: Espejo & Harnden (eds) *The Viable System Model: interpretations and applications of Stafford Beer's VSM*. Chichester: John Wiley & Sons.
- Espejo, R. & Reyes, A. (2011) *Organizational systems: Managing complexity with the viable system model*. Springer Science & Business Media.
- Espejo, R., Bowling, D. & Hoverstadt, P. (1999) The Viable System Model and the Viplan Software. *Kybernetes*, 28(6/7) p661-678.
- Espejo, R., Schuhmann, W., Schwaninger, M. & Bilello, U. (1996) *Organizational Transformation and Learning: A Cybernetic Approach to Management*. Chichester: John Wiley & Sons.
- Espinosa, A. (2015) Governance for sustainability: learning from VSM practice. *Kybernetes*, 44(6/7), 955-969.
- Espinosa, A., & Duque, C. (2018). Complexity management and multi-scale governance: A case study in an Amazonian indigenous association. *European Journal of Operational Research*, 268(3), 1006-1020.
- Espinosa, A., & Walker, J. (2011) *A complexity approach to sustainability: theory and application*. London: Imperial College Press (World Scientific Press)
- Espinosa, A., & Walker, J. (2013) Complexity management in practice: A Viable System Model intervention in an Irish eco-community. *European Journal of Operational Research*, 225(1), 118-129.
- Espinosa, A., Harnden, R., & Walker, J. (2008) A complexity approach to sustainability—Stafford Beer revisited. *European Journal of Operational Research*, 187(2), 636-651.
- Espinosa, A., Reficco, E., Martinez, A., & Guzman, D. (2015) A methodology for supporting strategy implementation based on the VSM: A case study in a LA multi-national. *European Journal of Operational Research*, 240(1), 202–212.
- Harnden, R. (1989) Outside and then: an interpretative approach to the VSM. In: Espejo & Harnden (eds) *The Viable System Model: interpretations and applications of Stafford Beer's VSM*. Chichester: John Wiley & Sons.
- Harwood, S.A. (2009) The changing structural dynamics of the Scottish tourism industry examined using Stafford Beer's VSM. *Systemic Practice and Action Research*, 22(4) p313-343.
- Liboni, L.B., Cezarino, L., Caldana, A.C.F., & Donaires, O.S. (2015). Diagnosing failure in an organizational strategic alliance for new product development. *Systems Research and Behavioral Science*, 32(6), 721-734.
- Maturana, H. (1970) *Biology of Cognition*. Biological Computer Laboratory Research Report BCL 9.0. Urbana IL: University of Illinois. Reprinted in: *Autopoiesis and Cognition: The Realization of the Living*. (1980) Dordrecht: D. Reidel Publishing Company.
- Medina, E. (2011) *Cybernetic revolutionaries: technology and politics in Allende's Chile*. Cambridge: Mass.: The MIT Press.

- Munro, I., & Mingers, J. (2002). The use of multimethodology in practice—results of a survey of practitioners. *Journal of the Operational Research Society*, 53(4), 369-378.
- Smith, C. M., & Shaw, D. (2018) The characteristics of problem structuring methods: A literature review. *European Journal of Operational Research*. <https://doi.org/10.1016/j.ejor.2018.05.003>
- Star, S.L., & Griesemer, J.R. (1989) Institutional ecology, translations' and boundary objects: Amateurs and professionals in Berkeley's Museum of Vertebrate Zoology, 1907-39. *Social Studies of Science*, 19(3), 387-420.
- Von Foester H (1979) Cybernetics of Cybernetics. In: Krippendorff K (ed.) *Communications and Control in Society*. Gordon & Breach: New York: 283-286.