Using the Viable System Model to Make Organisational Action Research More Sustainable

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Abstract

Organisational action research frequently struggles to achieve sustainability beyond specific projects, individuals, or institutional conditions. Such failures are commonly attributed to contextual factors including organisational politics, leadership change, or lack of management commitment. This paper argues that these explanations are incomplete, as recurring breakdowns also reflect limitations in how action research methodologies themselves conceptualise organisational viability. Focusing on the Networks of Action (NOA) approach and its foundation in the bootstrap algorithm (BA), the paper examines why NOA-based initiatives have achieved long-term sustainability within the Health Information Systems Programme (HISP) while similar attempts elsewhere have repeatedly failed. Drawing on Stafford Beer's Viable System Model (VSM), the paper re-articulates NOA as a viable organisational system in its own right, making explicit the functions of coordination, control, development, and identity that remain implicit in the original bootstrap formulation. Through a retrospective re-analysis of a failed action research initiative in public administration, the study demonstrates how sustainability problems can be understood as deficiencies in systemic design rather than contextual misfortune. The contribution is a VSM-based BA for NOA development: the paper reframes action research sustainability as a problem of organisational viability and shows how organisational cybernetics can complement existing socio-technical approaches by providing design principles for more sustainable Networks of Action.

Keywords: Action research; Networks of Action; Viable System Model; Bootstrap Algorithm; Sustainability; Organisational Cybernetics

1 Introduction

Organisational action research promises to combine practical problem solving with the generation of theoretical insight (Reason & Bradbury, 2008). Despite its long history and extensive methodological development, action research initiatives frequently struggle to achieve long-term sustainability due to shifts in political priorities, the departure of key individuals, cultural challenges, or technical problems (Avison et al., 2001; Meister & Gronski, 2007; Simonsen, 2009).

The Networks of Action (NOA) approach (Braa et al., 2004) provides a potential response to this challenge. Making research initiatives into nodes of a network provides security for the network even though individual efforts may fail, as illustrated by the global Health Information Systems Programme (HISP) (Braa & Sahay, 2012). As HISP has been grown by following the Bootstrap Algorithm (BA)

(Hanseth & Aanestad, 2001), one might expect similar success elsewhere, but several attempts to do so have resulted in failure (e.g. Øgland, 2013; 2016; 2020; 2025).

From the perspective of organisational cybernetics, this contrast is noteworthy. The NOA associated with HISP would be expected to comply with the Viable System Model (VSM) (Beer, 1981), whereas attempts to construct NOAs elsewhere through application of the BA alone would not necessarily do so. The outcome may result from the way components of the VSM — including identity, development, control, coordination, production, and the relationships among them — are not explicitly addressed by the BA. Consequently, the BA may present substantial challenges for actors who are not culturally embedded within HISP or similarly long-term successful NOAs.

The paper addresses two related research questions:

- RQ1: How can the Viable System Model make the organisational viability requirements of Networks of Action explicit?
- RQ2: How can a VSM-based reformulation of the bootstrap algorithm improve the sustainability of organisational action research initiatives?

The paper is structured as follows. Section 2 presents the original articulation of NOA as an action research methodology grounded in the bootstrap algorithm (BA). Section 3 introduces a VSM-based reformulation of the BA, making explicit the viability conditions required for sustainable action research. Section 4 revisits an empirical case, first recounting earlier NOA-based work that failed and then re-analysing this case to identify warnings and action signals that might have emerged had the VSM-based re-articulation been applied. Section 5 discusses implications for action research methodology and sustainability. Section 6 concludes.

Because several specialised concepts are used throughout the paper, the following abbreviations are employed consistently: Networks of Action (NOA), Bootstrap Algorithm (BA), Viable System Model (VSM), Actor-Network Theory (ANT), Health Information Systems Programme (HISP), Internal Control System (ICS), and Total Quality Management (TQM).

2 The Existing NOA Development Method

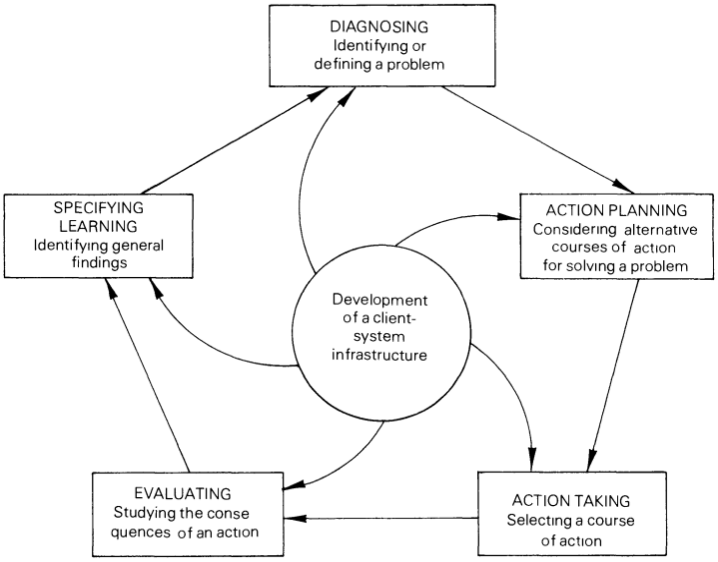
The concept of Networks of Action (NOA) emerged within research on the development of large-scale information infrastructures, where technological change was understood as inseparable from organisational and political processes. A key starting point is the work of Hanseth & Monteiro (1997), who draw on actor-network theory (ANT) to analyse the dynamics of infrastructure development. Within this perspective, technological systems are conceived as socio-technical networks constituted through processes of negotiation, translation, and alignment among heterogeneous actors. Development outcomes are therefore shaped not primarily by technical design decisions but by the ability to enrol actors, stabilise interests, and gradually build alliances around shared practices.

Later, when viewing the development of the HISP network of action research through this perspective of information infrastructure development, Canonical Action Research (CAR) was about to become the leading role model for action research within the information systems research domain (Davison et al, 2004), building on the five-step cyclic structure recommended by Susman and Evered (1978), but NOA did not want to commit to any action research model in particular (Braa et al. 2004). Indeed, one of the strategies for making NOA sustainable was to make sure that the research carried out at any node could be strategically chosen as “action and research” rather than CAR. On the other hand, the development of the NOA in itself, when viewed as an information infrastructure, can be looked at through CAR and its cyclic model in Figure 1.

Using this model, a NOA can be developed by diagnosing the current situation of how the network is performing, making action plans for improving and expanding, implementing action, evaluating action

and specifying learning. The NOA article by Braa et al. (2004) could be seen as "specified learning" from a cycle that was initiated by diagnoses in the late 1980s and early 1990s, when it was realised that action research projects not sufficiently connected within strong networks of influence had a high risk of ultimate failure (Bjerknes et al, 1987; Engelstad & Gustavsen, 1993).

Figure 1. Action research cycle (Susman & Evered, 1978, p. 588)



ANT provides a powerful descriptive vocabulary for analysing the politics of development. It highlights how infrastructures emerge through contingent processes rather than through top-down planning and emphasises the importance of installed bases, local adaptations, and ongoing negotiations. However, precisely because ANT is primarily analytical, it offers limited prescriptive guidance for practitioners seeking to initiate or steer network formation. While ANT explains why infrastructures evolve incrementally and why large-scale design efforts frequently fail, it does not specify how actors should proceed when attempting to bootstrap a new socio-technical network.

This limitation is addressed in the work of Hanseth and Aanestad (2001), who describe how to succeed with information infrastructure development by use of the bootstrap algorithm in Figure 2. The bootstrap perspective recognises that information infrastructures cannot be successfully deployed through comprehensive upfront design. Instead, they must grow from small, manageable beginnings that deliver immediate value to a limited group of users while simultaneously creating conditions for further expansion. The bootstrap algorithm therefore provides a set of prescriptive principles: start small, build upon the existing installed base, ensure early usefulness, and enable self-reinforcing adoption dynamics. Development becomes a process of cultivating positive feedback loops rather than implementing predefined architectures.

As the BA was developed outside the context of NOA, it is worth clarifying what concepts like "solution", "users", "communication" and "use" in Figure 2 mean for developing NOA infrastructure. Firstly, the solution in this context is the socio-technical nature of the R&D network. When using HISP as an illustration, the information infrastructure contains not only the network of health information systems but also the scholarly network that includes methods, conferences and journals for publishing research (Øgland, 2018). This means that the users in Figure 2 are a combination of researchers, developers and others, and when it comes to communication and use of the infrastructure, the idea is to serve all these communities of practice.

Taken together, NOA is positioned at the intersection of descriptive and prescriptive traditions. ANT provides an understanding of the political and relational nature of infrastructure development (Braa

et al., 2004), while the BA introduces a practical logic for initiating and sustaining growth (Braa et al., 2004, p. 339; Manda & Sanner, 2012). The NOA approach integrates these perspectives by framing development as the deliberate cultivation of expanding socio-technical networks capable of generating both local usefulness and broader systemic transformation.

Figure 2. The Bootstrap Algorithm (BA) (Hanseth & Aanestad, 2001, p. 14)

1. Start with
   - simple, cheap, flexible solution
   - small network of users that may benefit significantly from improved communication with each other only
   - simple practices
   - non-critical practices
   - motivated users
   - knowledgeable users
2. Repeat as long as possible: Enrol more users
3. Find and implement more innovative use; go to 2
4. Use solution in more critical cases; go to 2
5. Use solution in more complex cases; go to 2
6. Improve the solution so new tasks can be supported; go to 2

While the bootstrap algorithm provides a pragmatic and prescriptive approach to developing Networks of Action, many of the political, social, and cultural dynamics highlighted by actor-network theory remain implicit within its operational logic. Issues such as shared purpose, developmental vision, control, coordination, and sustained productivity continue to shape network development, yet they are largely treated as emergent outcomes of growth rather than as explicit objects of design or reflection. Consequently, important organisational and governance dimensions of network formation are often understood only between the lines, which may help explain why attempts to apply the NOA approach outside the original HISP context have often proven difficult to sustain (e.g. Øgland, 2013; 2016; 2020; 2025).

3 A VSM-Based Reformulation of the NOA Development Method

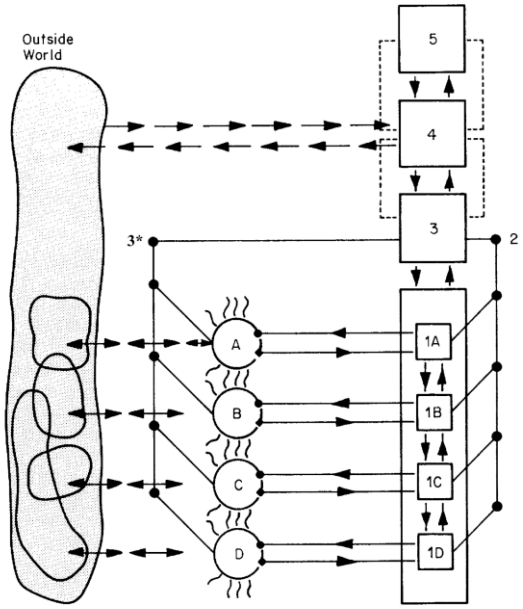
The Viable System Model provides a cybernetic framework for understanding how systems maintain viability in complex environments (Beer, 1981). According to the VSM, illustrated in Figure 3, any viable system must perform a set of necessary functions related to operations (System 1), coordination (System 2), control (System 3), development (System 4), and identity or policy (System 5). These functions are recursively present at all levels of organisation.

Applying the VSM to action research approaches means that both practical and theoretical outcomes are associated with production process. In Figure 3, the components A, B, C and D represent action research (or "action and research") at different locations, where the interaction with the environment on the left represents both interaction with client institutions and academic environments. System 1 represents the production of theoretical knowledge and practical results, while systems 2-5 represent the necessary coordination, control, development and purpose.

When using the BA to implement NOA, coordination, control, development and purpose were part of the ANT description and only indirectly addressed through the algorithmic statements in Figure 2, but Figure 4 shows a VSM-based reformulation of the BA.

As with the comments about the original BA, terms like "solution", "users", "meaningful work" and "tangible outputs" in Figure 4 are meant to represent the total R&D infrastructure of universities, practitioners, technologies, and organisational initiatives.

Figure 3. The Viable System Model (VSM) (Beer, 1981, p. 130)



Although the algorithm in Figure 4 looks different from the version in Figure 2, the logic is the same, including the bottom-up focus. The first five steps deal sequentially with the five systems, starting with production and ending with purpose. Both algorithms are iterative or recursive, making sure that all key interests are repeatedly addressed.

Figure 4. A VSM-scaffolded BA for infrastructure development (Øgland, 2025, p. 98)

1. **Activate productive operations (VSM System 1)**
   Start with a simple, low-cost and flexible solution that enables a small group of motivated and knowledgeable users to perform non-critical but meaningful work and to produce tangible outputs.
2. **Stabilise interaction (VSM System 2)**
   As use spreads, introduce lightweight coordination mechanisms that reduce friction between users and prevent interference, while preserving local autonomy and momentum.
3. **Legitimise and resource success (VSM System 3)**
   When operational practices demonstrate value, extend their use to more critical and complex contexts by aligning them with existing management controls, resource allocation, and accountability structures.
4. **Learn and adapt (VSM System 4)**
   Reflect on emerging practices to identify new uses, anticipate future needs, and improve the solution so that it can support additional tasks and contexts.
5. **Reaffirm purpose and identity (VSM System 5)**
   Anchor the expanding system in a stable sense of purpose and policy, ensuring that growth remains aligned with external requirements and organisational identity rather than transient managerial fashions.
6. **Repeat recursively**
   Treat each expansion as a new System 1 unit within a larger viable system, and repeat the cycle at increasing levels of scale and criticality.

In the case of HISP, control through participative bottom-up development (System 3), development strategies for "conquering the world" (System 4), and values founded in equality and power to the powerless (System 5) are presented at conferences (e.g. DHIS2, 2024), but it is not explicitly part of the BA. While this makes sense for the purpose of avoiding ideological commitments, the VSM-based BA compensates by making it necessary to specify foundational issues that otherwise have to be read between the lines of the original BA.

4 Illustration of How a VSM-Based BA Might Improve NOA Sustainability

4.1 An NOA-Inspired Action Research Attempt That Failed

This section recounts a 6-year action research effort aimed at developing an internal control system (ICS) in a large public-sector organisation (Øgland, 2018; 2025).

Diagnosis: The starting point was an attempt to continue action research on ICS by means of TQM implementation after a reorganisation, where the new head of quality management was poorly educated, had poor understanding of TQM, and was critical of everything having to do with science and theoretical knowledge. The organisation itself had been working with TQM initiatives for about 30 years, through the likes of Lean Management and ISO 9001, but only in a superficial manner. As most of the middle-managers were scared of acknowledging errors and problems, usual practice consisted of hiding things under the carpet, blaming others, or designing procedures and systems not intended for implementation.

Planning: The NOA planning followed step 1 of the BA, getting involved in TQM work and then identifying at least one other person whose work could be greatly improved by communication and collaboration in developing TQM infrastructure, and which would also benefit the academic action research network. After being assigned to work on Lean Management issues, along with people who were totally demotivated and saw their contribution as "bullshit work" (Graeber, 2013), it was noted how the archive manager was going against the grain in trying to follow international standards such as ISO 30301 and wanting to make sure that his part of the total management system would benefit from Lean Management and other potentially useful TQM frameworks associated with the quality department.

Action: Initial action consisted of doing ISO audits on behalf of the archive manager by focusing on Lean Management, thus doing work as required by the head of quality management while also engaging with Lean Auditing theory (e.g. Paterson, 2014), and trying to cultivate the academic network by engaging with conferences, journals, and trying to connect with HISP. Most of the academic work had to be done outside of office hours, due to the anti-scientific climate, but various methods were used to make the research comply with ethical standards, and among the non-managerial practitioners within Lean community, a series of presentations on how to succeed with Lean Management got popular.

The reason for the popularity was that the lectures illustrated how to get out of the "bullshit work" situation by actually measuring cycle times for processes, counting errors and problems, using this for taking action that produced measurable improvements and so on, but this way of sharing knowledge, building competence and empowerment was exactly the opposite of what those in charge wanted. Apparently, the quality manager felt that too much knowledge and skills within the group would undermine the command-and-control leadership, and thus decided to terminate the action research.

Evaluation: Although the BA was able to cycle through steps 2 to 6 for several years, it ended in collapse as the single-node NOA had been unable to connect with a larger NOA or grow into an inter-organisational network. Although the BA had been followed, both as means of building ICS infrastructure within the client organisation and as means for developing a NOA to make action research sustainable, there was failure on both accounts.

Learning: Contributions to theory were first described in a book on how to survive as a management consultant (Øgland, 2023), where the main ingredients were the so-called SWEAT principles and LEAK values, which were designed for supporting meaningful action in hostile environments, and then a book on how to implement internal control in publication administration (Øgland, 2025), suggesting the VSM-based revision of the BA that we saw in Figure 4. Neither of the books were critical of the BA

in itself, but in both cases, it was emphasised how the original BA formulation had to be supported by normative theory that dealt with issues that had previously been articulated through ANT.

4.2 Re-Analysing the Same Case Through the Viable System Model

This section revisits the same case, trying to rethink how it might have worked if the alternative VSM-based BA formulation had been used.

Diagnosis (VSM perspective): Using the VSM as a diagnostic tool would have produced the same outcome as in the previous account, but the results would have been presented in a more structural manner, showing how the purpose of the client organisation (system 5) did not fit with production (system 1), how there was no developmental vision (system 4), how control (system 3) focused on making sure that quality management personnel were developing tools unintended for use, and how coordination (system 2) was largely absent to avoid questions about leadership competence. Similarly, weaknesses in the academic aspect of the NOA would have been identified more clearly.

Planning (VSM perspective): Planning would have benefitted from a structural diagnosis. Even though the planning itself would have been done in the same way, i.e. addressing the first step of either version of the BA, a full VSM diagnosis would be useful for making sure that initial collaboration with the archive manager would fit all five systems, where an explicit implementation of system 4 would be useful for planning expansion into the Lean Management forum and beyond.

Action (VSM perspective): Although the spiralling out from the initial NOA would have followed a similar trajectory as with the original BA, the dysfunctional nature of system 2-5 within the client organisation should have been addressed step-wise and systematically, as explained by the alternative VSM-based BA, with a stronger focus on the academic side of the NOA.

Evaluation (VSM perspective): Given the focus on systems 2-5 for making the NOA sustainable, one might have hoped that the ICS infrastructure continued to grow not only within the given client organisation but also as part of a larger network of ICS practice, connecting client organisations and research institutions in a manner where collapse at one client organisation would make it possible for the action researchers associated with the given NOA node to move onto another one.

Learning (VSM perspective): While the BA-driven action research concluded that the VSM might be useful (Øgland, 2025), embedding the VSM in the NOA design from the outset would likely have shifted attention toward maintaining the long-term viability of all five systems, their interdependencies, and the recursive integrity of the overall design. In theory, the VSM should prevent organisational breakdown (Beer, 1981). Yet, if failure had nevertheless occurred, as documented elsewhere (ibid., Part IV), the resulting learning could have extended the literature on preventing such failures (e.g. Espejo & Reyes, 2011), thereby further strengthening VSM theory.

5 Discussion

The illustrative case does not merely document a failed action research initiative; it demonstrates how sustainability problems become interpretable as *design deficiencies* when viewed through the Viable System Model. While the bootstrap algorithm explains how Networks of Action can emerge and expand, the retrospective analysis shows that it provides limited guidance regarding coordination, governance, and collective identity. The failure analysed in Section 4 was therefore not primarily the result of adverse context or insufficient commitment, but of missing organisational functions required for maintaining coherence across distributed activities. The VSM-based reformulation makes these functions analytically visible and therefore actionable.

This reinterpretation clarifies the methodological contribution of the paper. Rather than rejecting the bootstrap algorithm, the VSM reframes it as a mechanism operating within a broader viable system.

The original BA relies on growth dynamics and local usefulness to stabilise networks, implicitly assuming that coordination, control, and strategic direction will emerge through practice. The VSM-based BA differs by treating these elements as explicit design concerns. Action research sustainability thus shifts from being an outcome of successful projects to a property of organisational architecture. In this sense, the contribution lies not in explaining success retrospectively, but in specifying conditions under which similar initiatives may become reproducible beyond culturally embedded contexts such as HISP.

Several counterarguments may be considered. One might argue that contextual and political factors remain decisive regardless of methodological design. The analysis does not deny this; rather, it suggests that viable organisational structures increase the capacity of action research networks to absorb such disturbances. Another concern is that the VSM introduces analytical complexity that may constrain the flexibility valued in action research. However, the model functions here as a diagnostic scaffold rather than a prescriptive blueprint, supporting reflection without determining specific organisational forms. The VSM-based reformulation therefore complements socio-technical and actor-network perspectives by making explicit the viability conditions that earlier approaches largely treated as emergent.

6 Conclusion

This paper has argued that challenges of sustainability in organisational action research can be understood as problems of organisational viability rather than solely as contextual or cultural limitations. By reinterpreting the bootstrap algorithm through the Viable System Model, the study has shown how mechanisms that successfully support local network formation may nevertheless lack the coordination, control, development, and identity functions required for long-term continuity. The analysis in Section 3 answers RQ1 by demonstrating how the Viable System Model makes these organisational viability requirements of Networks of Action explicit and thereby complements existing NOA theory.

The illustrative case further suggests that failures of action research initiatives may arise not only from adverse circumstances or insufficient participation, but also from missing systemic conditions for maintaining coherence across distributed actors. The retrospective analysis in Section 4 provides a tentative answer to RQ2 by suggesting that a VSM-based reformulation of the bootstrap algorithm may improve the sustainability of organisational action research by treating viability as an explicit design concern rather than an emergent property of successful practice.

The proposed VSM-based reformulation does not replace existing action research principles but complements them by extending the methodological focus from facilitating emergence alone toward consciously shaping organisational structures capable of sustaining collaborative learning over time. Future work should explore how such viability-oriented designs can be operationalised and evaluated across different organisational and cultural contexts.

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