Demystifying Beer – do you want fries with that?

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Abstract

This paper concerns the strongly theory based organisational intervention - Stafford Beers' Viable Systems Diagnosis (VSD). The assumption that organisations have difficulty in transforming good theories into effective workplace practices is examined using VSD. We propose levels of knowledge or recursions of the Beer system that are appropriate and effective in terms of organisational interventions. We contend that the lexis emanating from Brain of the Firm, *and* The Heart of the Enterprise *exacerbates the complexity of VSD causing readers to focus on* Diagnosing the System. *We suggest this outcome contributes to the non-popularity of VSD, but that Beer himself cannot be exonerated. The lack of fundamental VSD principles, identified as a deficiency in* Diagnosing the System *is expanded from the antecedents,* Brain *and* Heart. *The paper concludes by considering a systematic categorisation of Beer's work that will guide organizational change agents wishing to use this intellectually complex and powerful system.*

Keywords

Stafford Beer, Viable Systems Diagnosis (VSD), Recursion, Requisite Variety, Residual Variety

Introduction

In this paper, we consider the strongly theory based organizational intervention - Stafford Beers' Viable Systems Diagnosis (VSD) as part of an Action Research (AR) work in progress. In the specific context of this organizational intervention, the application of VSD particularly in relation to organizational information flows, proved difficult and the methodology was recast into an elementary yet functional approach termed PICCO where PICCO stands for Policy, Intelligence, Control, Coordination and Operations. The success of this contextual intervention led to development of the PICCO approach in the organization to cater for differing organizational understanding and application requirements. We examine a short history of the theory of information flows during the 20th century and investigate the evolution of VSD from Beer's major works. We consider the popularity, understanding and application of VSD and propose that there are levels of knowledge or recursions of the Beer system that are appropriate and effective in terms of organizational interventions. This is based on an assumption that organizations have difficulty in transforming good theories into effective workplace practices if the theories are couched in a form or language that is neither common nor easily accessible. The challenge is to avoid the pitfalls of the 'quick-fix' while being able to apply good theoretical concepts to organizational operations. This is particularly true of Beer's work, which can be difficult to understand and is not widely popular in management circles. Reflections on the practicality of the PICCO approach led to a systematic categorization of Beer's work that will serve as a guiding tool for organizational change agents wishing to use VSD as an intellectually complex and powerful system.

Organizational information flow

As a simple means for working and thinking about control and communication in an organization, five basic information flow variables were proposed. PICCO is based on VSD but in particular, this translation is couched in a language that was found to be more accessible in this organizational context. This mnemonic involves five elements, as does the VSD model, Policy, Intelligence, Control, Coordination and Operations. In the PICCO approach, Policy is the organizational brain, or decision-making process. Internal and external environments must inform Policy and this information flow is called Intelligence. Organizations balance environmental issues using various Control mechanisms, which require uniformity and consistency, this is termed Coordination, although coordination does not necessarily imply uniformity across all dimensions of organizational activity. Organizations are purposeful because they involve Operations. As in Stafford Beer's VSD, PICCO (Figure One) is concerned with information flows between these elements in the organizational system.

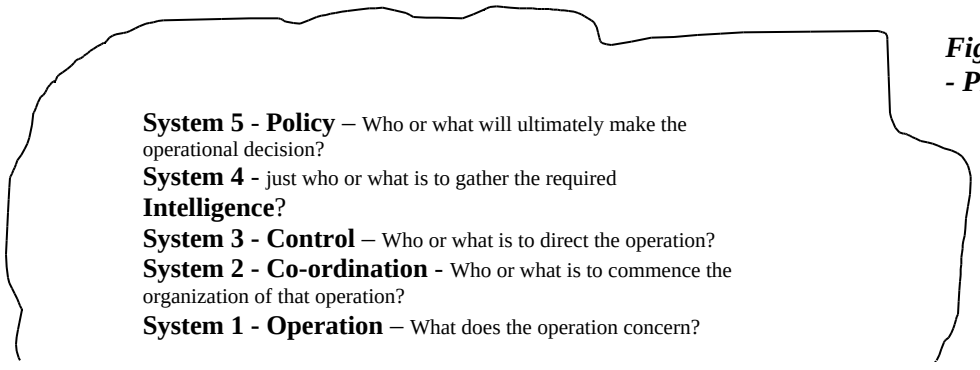

Figure One - PICCO

The five elements are considered in no rigid order, sequence or hierarchy and in their practical applications, individuals and/or groups choose whatever time and recurrence is needed in each phase. Generally, the Policy (S5 in Beer's terminology) and Operation (S1) bookends will be givens and the other elements of the system will be applied or developed as necessary on a regular basis and in levels of recursion appropriate to particular activities.

Individuals control and coordinate operations according to intelligence they receive. They may formulate Policy at their recursive level and send it to a senior level of the organization (Figure 2). In a hierarchical sense, policy from a lower individual subgroup will form part of the higher groups' intelligence system (S4). This is the connecting nature of the recursive systems postulated by Beer. But it is not a direct mapping across; policy at one level of recursion will become intelligence, not policy at a higher level. The whole organization operates according to the five interconnecting elements, which recur in the subgroups as they go about their work and, it is suggested; also recur again in individuals as they work alone.

It is not suggested that PICCO approach presents any ultimate control template but that it is a useful approach to assist in the understanding of the application of Beer's methodology in an organization. PICCO is at the primary level of recursion in the systematic and progressive understanding of Beer's work.

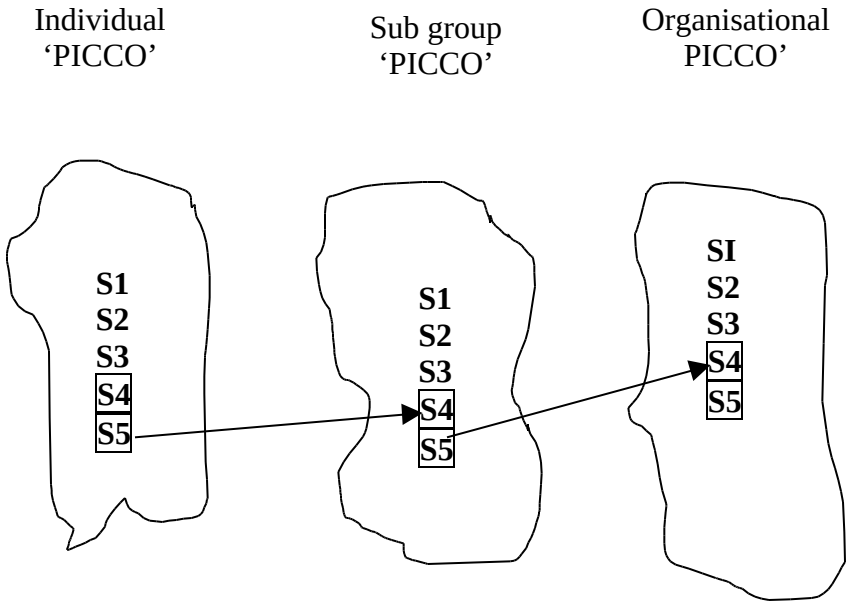

Figure Two – PICCO Recursion

We argue that PICCO is nothing more than a contextual approach for everyday organizational issues. As such it is a good, workable and operationally effective method for addressing information flows in this organization.

A short history of information flows in the 20th-century

At the turn-of-the-century, the thinking of Taylor (1911) characterized information flows as primarily task related with organizations existing in a tightly bound and controlled environment, all that was necessary was the internal consistency and control of the task and its environment. In relation to the tasks of organizations, it can be argued that organizations worked, and still work, along the bureaucratic lines defined by Weber (1958) where, it was argued, tasks could be matched, with near mathematical precision, against competencies. This can be characterized as a 'closed system' approach, where it was possible to close off the task environment to all external influence. Throughout the 20th century, the coordination and control of people and organizations, however has been strongly influenced by changing technologies and the application of social science disciplines including ideas of democratic workplaces. Computer technology has meant that information flows and their organizational effectiveness have become significant issues for all organizations and have had profound influences on the nature and structure of work. This has meant that while the match between competency and task is still a central focus for organizations, the concept of these tasks existing in an environmentally immune microcosm, as implicit in both Weber and Taylor, sits both historically and conveniently in the last millennium.

Organizational viability is now closely linked with the organizations ability to cope with, and create, dynamic information flows. The PICCO approach materialized from such a concern and has emerged from VSD as a practical application of Beer's work to specific settings (Stephens and Haslett 2001, 2002[a], 2002[b]). As such PICCO, in this context, provides a basic feedback approach supporting and promoting an elementary decision-making process for both individuals and organizational groupings. To develop an understanding of information flow in organizations to the next level, it is necessary to take a more detailed look at the work and background of Stafford Beer.

Beer's work

The flow of information, organizational viability and the emergence of Viable Systems Diagnosis (VSD) consumed Stafford Beer for half a century until his passing in 2002. Beer was an Englishman who began early studies in philosophy and psychology. With the outbreak of World War II, a stint in the Army saw him unconventionally merge the interdisciplinary elements of logic and philosophy with models of military logistics seeking insight and understanding. So began a devotion to what we now call an open systems theory approach (von Bertalanfy, 1968, Emery, 1981, Stacey, 1993) 'set against the reductive processes that have dominated our culture' (Kybernetes, 2000 p559). This continuous search for sequential configuration and linkage of information flows, often from ostensibly unrelated events, became known as Operational Research (OR) and later more generally cybernetics. Cybernetics, originally attributed to the mathematician

Norbert Weiner in 1948 involves control and communication (of information flows) in the animal and the machine. Beer considers organizations to comprise people (animal) within a contained system (machine) inseparably connected to an 'external' environment. It is important to emphasize the mutuality of people, workplace and environment even at this early stage in relation to dynamic information flows and organizational viability. This theme is crucial to a true understanding of Beer's work and is central to rebutting the often-cited critique relating to a so-called mechanistic, inanimate approach to 'people' management (Flood and Jackson, 1995, Jackson, 1985).

This paper addresses the common view of VSD's undeniable complexity and also examines some of the reasons for this view. Amid today's rapid-fire bustle where organizations seek quick fix action methodologies, it is typical for management to hurriedly dispatch VSD into 'the too hard basket'. This reaction is understandable from a reading of the Beer trilogy *Brain of the Firm (1972), The Heart of the Enterprise (1979)* and *Diagnosing the System for Organizations (1985)*. This is not easy work and it is reasonable to assume that many managers concerned with the real day-to-day problems of organizations are unlikely to spend the time required to complete this task. Designating the PICCO approach as having a low degree of VSD complexity does however commence a recursive conceptualization into an understanding of Beer's work. Figure 3 shows PICCO in the context of VSD complexity.

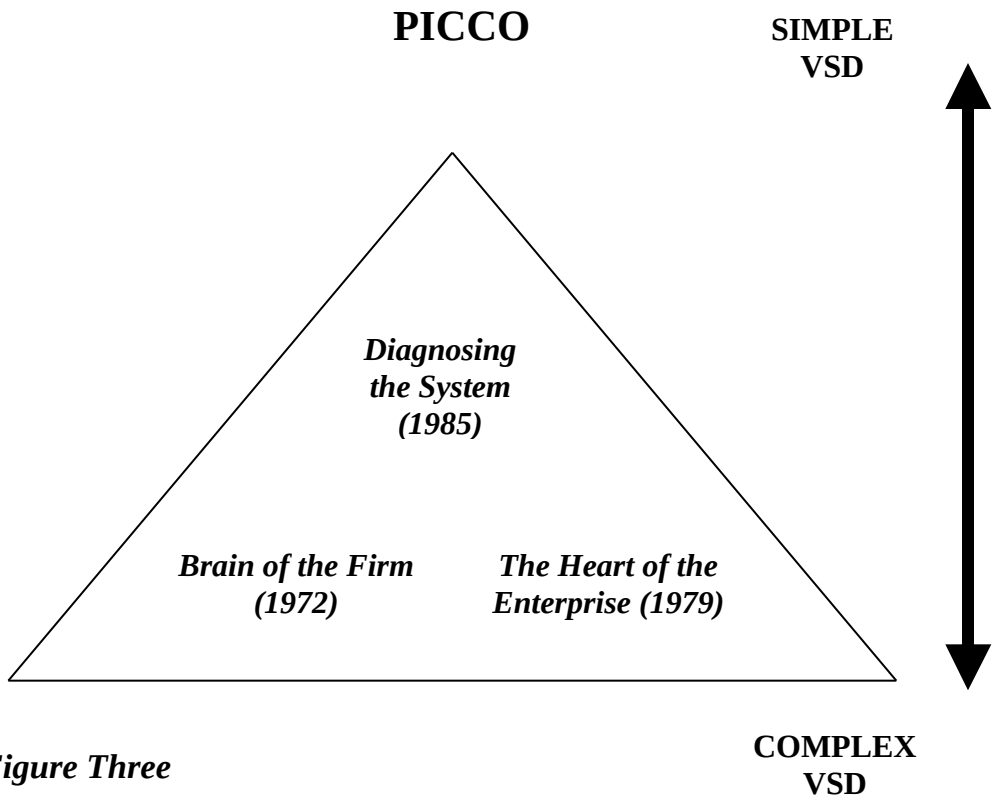

Figure Three

Brain and *Heart* provide the cornerstone for VSD. Through the biological metaphor, VSD links the functionality of the human body to the organization as the ultimate viable system via five cooperative yet recursive sub-systems. Recursion is stressed again; using the PICCO approach to address the understanding of information flows in our Action Research intervention - we asked basic questions, and sought sensible policies from a methodology that uses the biological metaphor to better visualize information flows in organizations according to a systemic whole.

To summarize VSD: System one is modeled on the muscles and organs of the body; the bits that essentially do things. System two, the human sympathetic nervous system keeps an eye on the muscles and organs and stabilizes their interaction. System three involves the brain, as it controls the complexity of muscles and organs. System four assimilates the gathering of intelligence through the five senses. System five equates to decision-making. The parallels to organizational functions are obvious - System one activities will align with organizational purpose and the other Systems (the Beer meta-system) will provide support and resources in no order of importance to best cope within a dynamic environment, promoting overall viability.

However when faced with an option of digesting two significant volumes loosely awash with neurocybernetic and physiological vocabulary, there is an inclination for management not versed in Beer and VSD to launch straight into *Diagnosing the System* without visiting *Brain* and/or *Heart* (Figure Four).

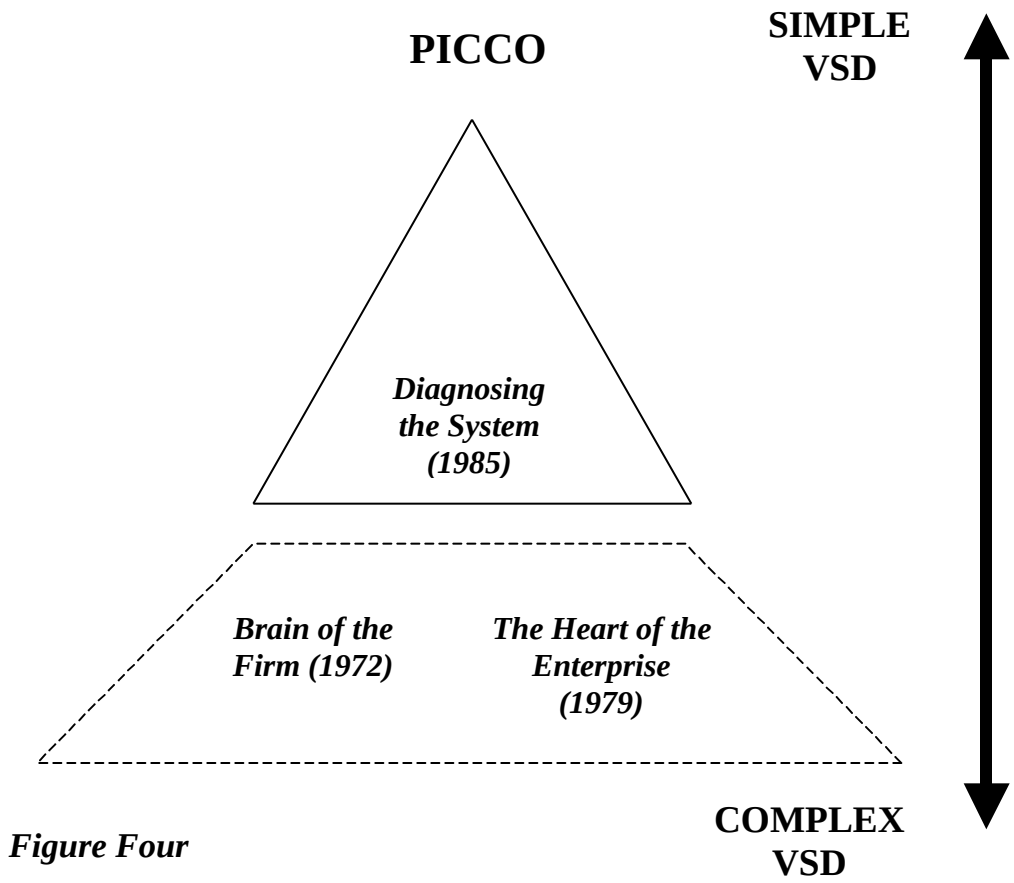

Figure Four

So if individuals or organizations see value behind the PICCO approach, but they want to gain an understanding of Beer at the next level of complexity, then all they need do is read *Diagnosing the System*, but with a realisation that this degree of understanding involves the need to be aware of some important issues.

Diagnosing the System for Organizations (1985)

Beer wrote *Diagnosing the System* acutely aware his previous work had generated considerable criticism on three fronts:

- The use of complex vocabulary
- The required knowledge of cybernetics
- The perception that VSD used as a conceptual framework or model created segregation of people from their (working) environment.

These criticisms continue to be valid. Beer composed *Diagnosing the System* as an efficient coursework book to address these issues. He required not much more than common sense to methodically construct specific 'viability templates' using basic VSD principles. That was his objective, a radical, no fuss look at specific organizational configurations to promote contextual improvement. Beer emphasized that cybernetic competency was not a pre requisite in diagnosing any organizational system and presented *Diagnosing the System* in simplified language.

> The point about this book is that it should guide any manager through the questions that affect his own organizational structure, in the light of cybernetic science, without requiring him or her any prior knowledge at all of this interdisciplinary subject.
>
> (Beer 1985 p i)

An unintended consequence is that the simplified logical sequences expounded in *Diagnosing the System* appeal to people looking for organizational quick fixes. This leads to the perception that the text is a definitive workable précis of the principles underpinning *Brain* and *Heart*, minus the intricate language. In addressing VSD complexity in isolation from the *Brain* and/or *Heart* vernacular, *Diagnosing the System* can distance readers from the concepts of learning, adaptation, and evolution that is central to the VSD model.

Diagnosing the System produced a model-based framework that did not require readers to understand the principles underlying its construction, namely the fundamental recursive principles required in true VSD. The consequence of this is the possibility of severe limitation of organizational impact of the use of VSD and a disappointment with the methodology itself. In organizational life, it is essential not to underestimate the importance of 'quick wins'. Where the need for results is tantamount, time cannot be spent on esoteric experimentation and it is into this trap that actions based on an underdeveloped understanding of Beer can lead. Herein lies the problem: How does a manager use a truly VSD-based intervention in an organization unprepared for VSD and still gain a quick win while maintaining the necessary complexity and integrity of Beer's framework. PICCO is designed to solve this problem. It is the "Beginners Guide to VSD".

This is not to suggest *Diagnosing the System* is of little value to organizations and individuals but to suggest that an appropriate grasp of recursion is necessary in the unraveling of VSD complexity. The PICCO approach can be successful where a limited intervention is sought but as the intervention becomes more complex, a deeper knowledge of the fundamental principles is necessary. We cite the following interpretations from *Diagnosing the System* as important contributors to the better understanding of information flows in our organizations.

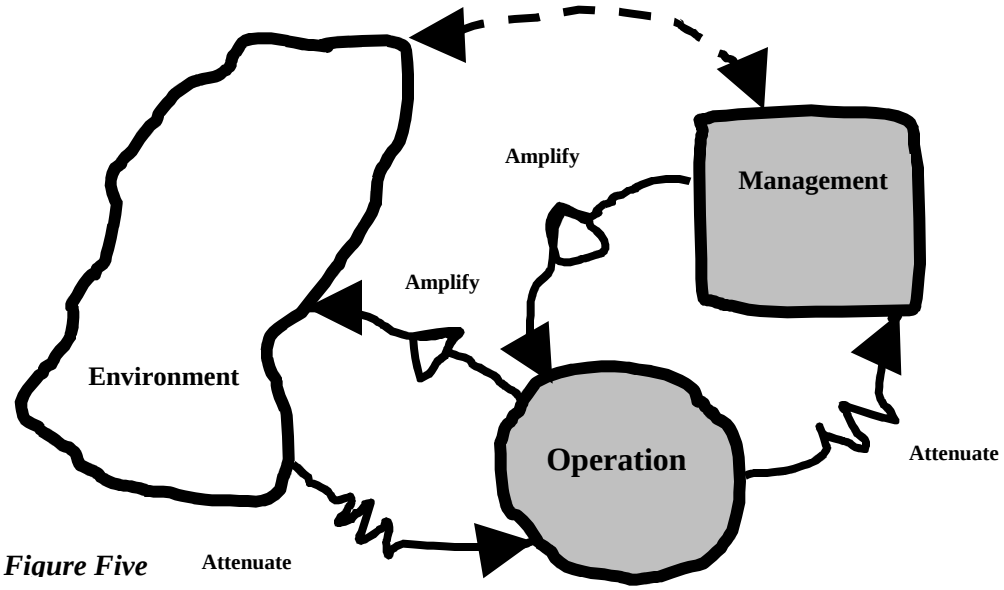

Figure Five

Figure Five shows the interconnectivity between the environment, operations and management.

The PICCO approach seeks to attenuate the information flows between the environment and operations on one hand and operations and management on the other. It also seeks to amplify those between management and operations on one hand and operations and the environment on the other.

These three components of environment, operation and management expand into expressions common to Beer that are important to our organizations.

- Organizational viability, defined by Beer as the ability to maintain a separate existence (of operation and management), is understood to function within a greater environment *System one - the operational component of the PICCO approach.*
- Variety, the measure of complexity or the number of possible states of a system when amplification or attenuation is considered.

  Feedback, the ability of a system to revisit its output consequences so as to revise and monitor how its input causes information flow oscillations.

  We suggest the concept of a variety dial to turn up or turn down ‘noise’ as existing information flows oscillate

  Systems two and three - coordination and control in PICCO.

- Dealing with these oscillations means the variety dial seeks organizational homeostasis or stability of a system's internal environment (operation and management) despite the whole system's having to cope with a volatile 'external' environment

  System four - intelligence in PICCO.

- Finally Ashby's Law of Requisite Variety (only variety can absorb variety) suggests appropriate policy can only be made when the organization is smarter than the situation it is attempting to manage Dealing with variety is discussed in terms of recursion - a next level that contains all the levels below it.

  System five – policy in PICCO

This summary indicates the expressions that we have found to be important in our organizational context. We positioned *Diagnosing the System* also at the lower end of the VSD complexity scale indicating these expressions added a greater degree of VSD complication to the PICCO approach.

It is our contention that *Diagnosing the System* contributes to the original criticism of Beer and VSD in three ways. First, it camouflages, if not distorts the fundamental understanding of VSD principles. Second, it exacerbates rather than satisfies the *Brain* and *Heart* criticism noted earlier and third, it is dismissive of the interdisciplinary context that is cybernetics. The unraveling of this inadvertent consequence may be considered according to Beer/VSD fundamentals.

Beer states that in order to control any viable system, information flow must be ameliorated or attenuated according to the variety it exposes. The viability of the VSD methodology (able to maintain a separate existence - not only in terms of operation and management, but from an overall cybernetic sense) was exposed via the *Brain* and *Heart* critique, and Beer did not like this criticism. He responded by removing (attenuating) vernacular and the perceived reliance on cybernetic principles to produce *Diagnosing the System*. What is suggested here is that this attenuation did not answer the criticism, but inadvertently disguised, if not erased, some elucidation of some fundamental issues emanating from the heart of the Beer philosophy.

These fundamentals, found in the two monumental precursors, really need to be grasped well before tackling *Diagnosing the System* if there be any expectation of improving the more complex information flows in an organization. Our contention is that, in the long run, these fundamentals must be understood and included in organizational interventions if *Diagnosing the System* is to achieve its prime objective (Figure Six).

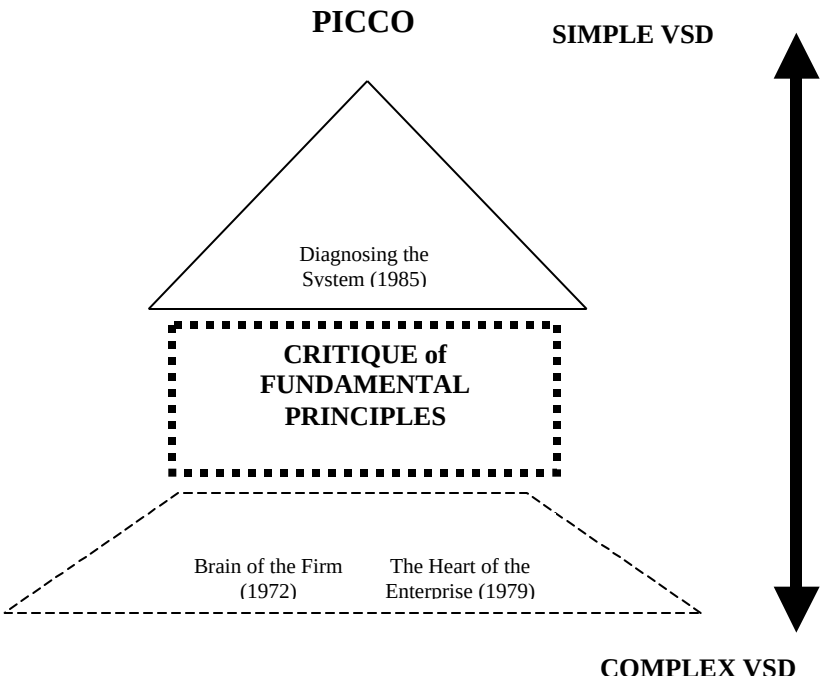

Figure Six

In order to move to a next degree of the understanding of VSD complexity, the fundamental principles encapsulated in *Brain* and *Heart* need to be teased out.

Brain of the Firm (1972)

In *Brain*, Beer intended to present a text comprehensible to managers seeking information flow improvement. However, it is important to realise that while the neurophysiologic lexis of *Brain* is not easy going for managers, ultimately its mind dance between vocabulary confrontation and comprehension provides precise definitions. An example involves the Beer interpretation of the complexity of activity going on inside (the company) as - 'a capability inherent in natural systems to self organize the anastomotic reticulum in ways that we do not properly understand' (Beer, 1972 p52).

The initial confusion at being confronted with the term anastomotic reticulum is ameliorated when reticulum, (a tangled network of connection) and anastomotic (there is no way of tracing) is translated in poetic Beer simplicity. The précis is "as branches that intertwine, like streams form a river, veins from arteries, they part, they wander, they interact, they rejoin, there is no way of tracing the route by which a particular pailful of water taken from the sea arrived there" (Beer, 1972 p30). This is to show that, at this level of reading of Beer, it is necessary to penetrate the dense foliage of vocabulary. In *Brain*, Beer presented the biological glossary for a precise definition of neurocybernetics and physiology. By merging these 'sciences' with management information flows, *Brain* plays its role in contributing to the interdisciplinary foundations of cybernetics – and that is a precise, if oft misunderstood, tenet of Beer's work. The cybernetic junction of the

pure sciences with the biological sciences enables ‘the flow and behavior of information in the animal body as the basis of physiological control’ (Beer, 1959 p1). Reading *Diagnosing the System* without knowledge of *Brain* denies an understanding of this prime interdisciplinary tenet and a resultant VSD template will suffer accordingly.

A similar confusion arising from *Brain* concerns Beer’s theory of models. ‘The value of the model is to make clear how an organization actually works, as distinct from the way that it allegedly works so that it may be streamlined and made more effective’, Beer (1972 p155). Expounded from *Cybernetics and Management (1959), Decision and Control (1966)* and later elucidated in *Designing Freedom (1974),* the actual VSD modelling process often seemed to confuse managers more than any intricate vocabulary. It is said that Beer incorrectly assumed that people’s knowledge of the workings of their own bodies and correlated medical terminology to be profound. For this reason, he believed that they should be able to visualize underlying cybernetic principles through an alignment with the biological metaphor underpinning VSD. –Beer assumed (incorrectly) that his readers would understand how the metaphor of the brain and its interconnectivity with the central nervous system through regulation and homeostasis provided the simplest logical parallel to the communication and control of the animal and the machine. In fact, Beer endeavours to explain only confused further. The reader is left wishing, Byron's phrase, that he would "explain his explanations."

The important point to emphasize here is that Beer never assumed any profound knowledge on the part of the reader any more than he suggested the VSD model must be an equivalent, absolutely congruous template for the firm or organization. An ‘exact’ replication of enterprises mapped according only to neurocybernetics was not the line of reasoning. Beer’s intention was to highlight one comprehensible example, based on one (neurocybernetic) discipline, one possible organizational model. In this way, he hoped individual firms could conceptualize the use of any interdisciplinary framework to create their own organic template.

> Once we have understood how the brain obtains reliable decisions from its network of unreliable components, for example, we have grasped principles of redundancy that can be expressed mathematically, and which hold for all informational networks.
>
> (Beer, 1979 p xi)

As mentioned earlier, Beer wrote *Diagnosing the System* very much aware of the criticism that *Brain* had generated a perception that VSD modeling had created segregation of people from their (working) environment. It must be remembered that the prevailing paradigm in the *Brain* era involved the machine metaphor. ‘Soft’ behavioral sciences involving psychology and socio – technology were in their infancy and systems thinking embryonic. Beer visualized his thinking by engaging models quite unconventionally through a combination of the newer soft disciplines. He was not

proposing his combination, as ‘the only’ combination, but rather as an indication of how cybernetic insights could germinate from any amalgamation of disciplines, provided those chosen abided by scientific first principles. His objective was use of scientifically based disciplines to assist in the improvement of the nature of information flows in any viable system. This was perceived as suggesting a separation of people from their organizational context. His promotion of this ‘new’ cybernetic discipline was not dissimilar to that of the emerging disciplines of psychology or the social sciences. However, it was not well received by the ‘hard’ scientists who perceived it as weakening the people/workplace connectivity. This point is important to emphasize because the Beer modeling philosophy never intended any people/workplace segregation. In fact, Beer’s objective was the exact opposite. The basis of VSD, can be traced to the earliest Beer works, and involves both the cybernetic *animal and machine* and the Beer *people/workplace/environment* in mutuality, not segregation.

This mutuality, which is established in *Brain,* involved the role of the manager as an inseparable part of the organizational system. This coupling is not necessarily evident without the reading of *Brain.* By suggesting in *Diagnosing the System* that the role was to ‘guide any manager through the questions that affect his organizational structure’, Beer meant energetic involvement, probing how and why variables might impact in specific organizational structures, according to the cybernetic principles espoused in *Brain.* As such, *Diagnosing the System* is very much about an inseparable coupling and the dynamic interaction between people within organizations, of man with (organizational) machine. *Diagnosing the System* is not about the application of an inert prescriptional quick fix requiring simple application.

The axiom ‘the first principle of control is that the controller is part of the system under control’ (Beer, 1972 p25) was explicit and initially seems readily embraced by readers at any level including those versed only in *Diagnosing the System*. But is this really so?

In a world still rife with ‘reductive processes that have dominated our culture’ (Kybernetes, 2000 p559). where scientific methodologies clearly alienate the scientist from the experiment, how do we truly consider and cope with organizational information flows. If there is no clear understanding that the controller is (a) an inseparable part of the system under control and (b) must interfere with, influence and change that control system? The controller/control statement is central, but if interpreted in the light of pure science leads to a misinterpretation of the intended people/workplace/environment inseparability.

To emphasize this point we cite a prophetic Beer truism:

> we incline to live our lives via heuristics and struggle to control them by somewhat lifeless algorithms
>
> (Beer, 1972 pp51-57)

This profound statement epitomizes both individual and organizational reality some forty years after it was written. It positions VSD and cybernetics as an effective conduit for controllers manifestly identified as inseparable from, and influential in, organizational information flows. The point we emphasize is that *Diagnosing the System* cannot truly highlight the recursive nature of VSD without there being an understanding of first principles espoused in *Brain*. As a stand-alone text, it suffers accordingly.

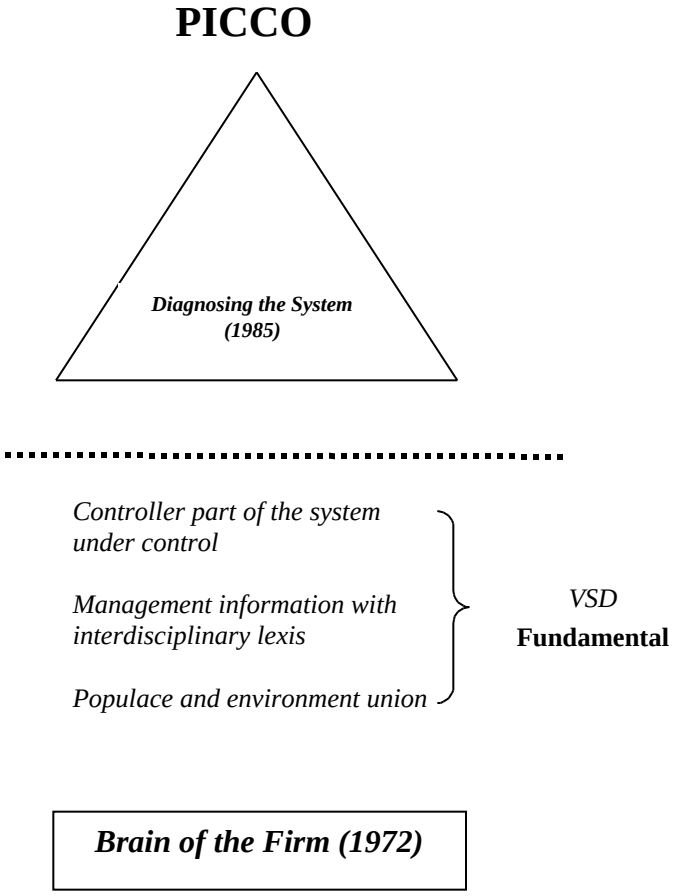

Figure Seven demonstrates three of a number of fundamental VSD principles that emerge from *Brain* and to emphasize the lack of foundation to those readers versed only in *Diagnosing the System*. Our summary of the VSD principles emerging from *Brain* that

make it easier to understand the impact of information flows in our organizations and to progress the VSD recursive content are as follows:

	PICCO	**Diagnosing the System**	**Brain of the Firm**
S5	Policy	Law of Requisite Variety – being smart, Recursion	Controller part of the system. Algorithms/Heuristics Algedonic signal, Meta-system
S4	Intelligence	Homeostasis – stability of internal and external environment	People/workplace/environment Organizations working toward states of comfortable management, Entropy
S3	Control	Variety – Amplification, Attenuation, Feedback, Oscillations	Positive (reinforcing) and Negative (balancing) Feedback. Variety 'dial', Transducer
S2	Coordination		
S1	Operation	Viability – Operation and Management	Model what best works for your organization. Interdisciplinary approach

The biological metaphor introduced in *Brain* pragmatically produced a brilliant expose of the cybernetic principles by which the real world of man is inextricably linked with the machine. VSD is not about people reluctantly linking real life information flows situation with some obtuse creation. VSD is about co-creation and understanding information flows based on sound principles. Sensibly and ideally, these principles stack up using the neurocybernetic discipline but alike interdisciplinary mixtures can also work in VSD as is evident in its companion volume *The Heart of the Enterprise*.

The Heart of the Enterprise (1979)

The Heart of the Enterprise is also about information flow in organizations but it does not talk about neurophysiology. There is at best a minor intersection with the *Brain* lexis; However, *Heart* reaches the same concluding model where information flows in viable systems with neurocybernetic pointers are neatly replaced by a whole new set of managerial principles. This outcome verified a most important but perhaps implicit (to some) intention of *Brain* cited previously, namely that neurocybernetic replication was not a necessary or sufficient target of any VSD. The contribution of neurocybernetic

understanding and reasoning is to exhibit and enhance reliable decision-making via one interdisciplinary subset, holding for all informational networks within VSD.

In *Heart*, Beer also attacks the mechanistic interpretation of VSD and any indication of separation of people and workplace, arising out of possible misinterpretation from *Brain*. He strongly endorsed the original Weiner cybernetic coupling of animal and machine and elucidated this unbreakable union into the people/workplace/environment mutuality.

> The choice of the word heart is deliberately ambiguous. The heart of enterprise is its effective organization as a viable system. But management that is based on however profoundly scientific principles, and lacks 'heart', in the sense of human concern, will not succeed.
>
> (Beer 1979 p xii)

Beer emphasized the point time and again that the heart of any viable enterprise (machine) was the human being (man), and that the two was inseparable. Although not clearly designated in *Heart*, Beer referred to what we now know to be an open systems philosophy (von Bertalanfy, 1968, Emery, 1981, Stacey, 1993). He argued that the concept of a separate existence was relative - 'any viable system (able to maintain a separate existence) exists in an environment' (Beer, 1979 p119). In fact, the very basis of VSD involved a dichotomy: any particular system was capable of maintaining its information flow as internally discrete and coherent while still maintaining it as an open system. This is possible through the use of intelligence (S4) on one hand and operation and coordination (S1 + S2) on the other (refer Figure Five). Beer maintained the three spheres of influence in VSD are environmental, operational and managerial. This elementary series of viable systems coexist and are embedded within a synergistic meta-system. Suffice to say in *Heart*, Beer strongly refuted this pointed critique emanating from *Brain*.

Beer also designed the positioning of heart in the title to deal with a related criticism. Cybernetics while based on scientific rigor was positivistic in nature and neglected human factors. Again Beer's terminologies needed close assessment:

> if you will adopt the cybernetic conventions offered here, you will be able to translate from one language to another, whereupon the particular institution will indeed 'look like' the model [my emphasis]
>
> (Beer, 1979 p 225)

Our interpretation, that this statement signified a union of people and positivism seems far from abandoning human factors. Although *Heart* addresses the positivistic critique aimed at cybernetics, the fundamentals behind this argument have their roots in *Decision and Control* and are better placed at a later time. Nonetheless the elements we have taken from *Heart* further expand the understanding of VSD and the following table presents our summary. The table should be considered, not as a whole, but as our development of individual systems and levels of understanding of VSD principles that we find useful. They provide for a better understanding of information flows in our organizations.

	PICCO	**Diagnosing the System**	**Brain of the Firm**	**The Heart of the Enterprise**
S5	Policy	Law of requisite Variety – being smart, Recursion	Controller part of the system. Algorithms/Heuristics Algedonic signal, Meta-system	Ashby' Law – to be smarter than the situation you are trying to manage: Continuous learning Embrace error as learning - Action is learning Action is management Algedonic signal –minute information factors with the capacity to flip an organization pleasure/pain switch Conant Ashby Theorum – residual variety. Competency gaps require hard work – from you
S4	Intelligence	Homeostasis – stability of internal and external environment	People/workplace and environment, Organizations working toward states of comfortable management, Entropy	Black Box – there is a level of understanding between input and output that is beyond the human mind. We cannot hope to understand everything. We learn to manage within the unmanageable Open systems
S3	Control	VARIETY – Amplification, Attenuation, Feedback, Oscillations	Positive (reinforcing) and Negative (balancing) Feedback. Variety 'dial', Transducer	Dealing with Variety – is a part of management. Skills and competencies allow you to control the variety dial.
S2	Coordination			
S1	Operation	VIABILITY – Operation and Management	Model what best works for your organization. Interdisciplinary approach	Viable Systems – are able to maintain separate existence. Existence does not mean good or successful or socially acceptable. [Crime is a viable system]

It has been our contention that the lack of recognition and adoption of Beer's work maybe due to misinterpretation we have outlined in this critique and response. The new interdisciplinary methodology created in the initial volume *Brain* provoked criticism that resulted in the response that is *Heart*. But in linking the trilogy, any explanation or feeling of resolution will, at best, be partial. It is our desire to further investigate VSD through the study of the initial works of Beer including *Cybernetics and Management (1959, Decision and Control (1966)* and *Management Science (1968)* at a later date.

Concluding remarks

Delving into Beer and VSD by commencing with *Diagnosing the System* may seriously impair the understanding of the principles behind Beer's work and be a primary reason for VSD not enjoying appeal within modern management folklore. The purpose of this work has been to consider why this unpopularity exists and to suggest Beer is, (unintentionally) at least partly to blame for this tendency. It is recognized that Beer's work and VSD does not conclude with *Diagnosing the System*. *Beyond Dispute (1994)* in addressing political and hierarchical influences in organizations adds to VSD but it has not been the subject of this paper.

Beer, deeply conscious that *Brain* then *Heart* had generated not trivial VSD critique, wrote *Diagnosing the System* in answer to criticism. On the whole this essentially tri-directional response intended to address vocabulary complexity, required depth of cybernetic understanding and the perception that the VSD model created (unintended) segregation of people from their (working) environment. Beer understood that while coping with dynamic information flows in organizations was an important viability concern, a combination of people and workplace and (accelerating) environmental dynamics as principle ingredients, could provide no straightforward solution. His aim was to produce a simple VSD summary, albeit founded on first principles, that could best cope with this problem (Figure Three). Following *Brain* and *Heart*, Beer virtually eliminated complex vocabulary, stressed that knowledge of cybernetics was unnecessary and implied model/organizational specificity by virtue of required interaction. *Diagnosing the System* emerged as an efficient coursework book seeking a simple common sense approach to enable the creation of specific 'viability templates' using fundamental VSD principles. This simplification came at a severe price, namely the distancing of some fundamental VSD principles from the reader it was intended to help.

In order to understand the profound impact of *Diagnosing the System*, we considered the Beer trilogy both individually and as a holistic evolving manuscript. We have been able to construct a table showing a scale of VSD complexity from the most difficult principles emerging from *Brain* and *Heart* to the simplest – our PICCO approach. We commenced this paper with a description of the PICCO approach to demonstrate how the authors have attempted to introduce VSD into organizations and to suggest the degrees of complexity understandable to various people in our organizations. The PICCO approach has proven to be effective in contextual settings but implementation of pure VSD is seen as a momentous task in everyday organizations. The paradox that *Diagnosing the System* presents is its unfortunate acceptance as a somewhat 'easy way' to understand the workings of the complexities of VSD. We have shown it to be far from that. We contend

that to be a significant and enduring contributor to management folklore *Diagnosing the System* must be read after *Brain* and *Heart*.

This contention is nothing revolutionary given the realisation that the Beer trilogy is paramount to unraveling the complexity of VSD. The exercise is simply to point out that while employment of only *Diagnosing the System* will allow readers to construct specific viability templates, those templates must be deficient in VSD fundamental principles found in *The Heart of the Enterprise* and *Brain of the Firm*. In conclusion, we also state that very few of the suggested Beer readings involve attention to his original works. Beer's work began with *Cybernetics and Management (1959), Decision and Control (1966)* and *Management Science (1968).* These volumes trace an embryonic VSD establishing some vital precursors that are easily missed by devotees to the chosen trilogy.

Bibliography

Beer, S. (1959). Cybernetics and Management. Great Britain: John Wiley & Sons.

Beer, S. (1966). Decision and Control. Great Britain: John Wiley & Sons.

Beer, S. (1968). Management Science. Great Britain: John Wiley & Sons.

Beer, S. (1974). Designing Freedom. Great Britain: John Wiley & Sons.

Beer, S. (1981). Brain of the Firm. Great Britain: John Wiley & Sons.

Beer, S. (1985). Diagnosing the System for Organizations. Great Britain: John Wiley & Sons.

Beer, S. (1979). The Heart of the Enterprise. Great Britain: John Wiley and Sons. Reprinted with corrections 1988, 1994, 2000.

Beer, S. (1994). Beyond Dispute: The Intervention of Team Syntegrity. Great Britain: John Wiley & Sons.

Emery, F.E. (1981). Systems Thinking. 2. London UK. Penguin

Flood, R.L. and Jackson, M. (1995). *Creative Problem Solving.* Total Systems Intervention. Chichester UK: Wiley.

Jackson, M.C. (1989). Evaluating the managerial significance of the VSM, in The Viable System Model: Interpretations and Applications of Beer's VSM (Eds). Espejo, R., and Harnden, R.J.), pp407-39. Chichester UK: Wiley.

Kybernetes (2000). The International Journal of Systems and Cybernetics. Ten pints of Beer. The rationale of Stafford Beer's cybernetic books (1959-94). A discussion with Stafford Beer. Vol.29 No.5/6, 99 558-572 MCB University Press. Emerald

Stacey, R.D. (1993). Strategic Management and Organisational Dynamics. London UK. Pitman.

Stephens, J. and Haslett, T. (2001). Viable Systems Diagnosis and Organizational Learning. Published in proceedings: Systems in Management 7th Annual conference of the Australia and New Zealand Systems Society (ANZSYS). W.Hutchinson and M. Warren eds. Edith Cowan University, Perth, WA.

Stephens, J. and Haslett, T. (2002a) Viable Systems Diagnosis: an Adaptive Agent? Published in proceedings: Sixth International Research Conference on Quality, Innovation and Knowledge Management. Kuala Lumpur February 2002

Stephens, J. and Haslett, T. (2002b). Action Learning as a Mindset – The Evolution of PICCO. Systems Practice and Action Research (SPAR) 15 (6), 485-507 December 2002

Taylor, F.W. (1911). The Principles of Scientific Management. New York. Harper and Row.

Von Bertalanfy, L. (1968). General Systems Theory, Foundations, Developments and Application. New York. George Braziller

Weber, M. (1958) The protestant Work Ethic and the Spirit of Capitalism. New York. Schribner's.