
FRAMEWORK · COMPANION · V1.0

A VSM account of management-system integration

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Reading PDCA+ through Stafford Beer's Viable System Model — what becomes visible when management-system disciplines are recognised as System 1 units of an organisation that needs to be viable as a whole.

AUTHOR

Joacim Brandell

Written for GRC practitioners · no prior cybernetics background assumed

Why this piece exists

The PDCA+ cybernetics companion identified three pieces of further work the cybernetic reading opens up. This is the first of them — the most substantive — taking up the suggestion that PDCA+ could be positioned in the cybernetics conversation as a first attempt at a Viable System Model for management-system integration.

This piece is written for GRC practitioners who do not know the Viable System Model. It teaches enough of the model to be useful, applies it to management-system integration concretely, and is honest about where PDCA+ is and is not a VSM. A reader who finishes it should be able to diagnose an integration problem in VSM terms, explain the diagnosis to a colleague, and recognise when the framework is and is not the right tool for what they're facing.

The Viable System Model is Stafford Beer's account, developed across three books between 1972 and 1985, of what any organisation that persists through change must structurally contain. The model is more useful than it is famous, partly because Beer wrote it in prose that assumes a familiarity with mid-twentieth-century operations research that most contemporary readers do not have. What follows is the part of the model GRC practitioners need, with the operations-research vocabulary set aside.

VSM in fifteen minutes

Beer's claim is structural: any organisation that survives in a changing environment must contain five identifiable systems performing five distinct functions, in specifiable relationships. He numbered them 1 through 5, in approximately the order in which they appear when an organisation grows from a single operator to something larger. The numbering is not a hierarchy. Each system needs the others to do its work; none is more important than another.

The five systems

System 1 is operations. It is whatever the organisation actually does to act on the world it operates in. A factory's System 1 is its production lines. A hospital's System 1 is its wards and operating theatres. An organisation's System 1 is plural — it contains as many System 1 units as the organisation has operationally distinct ways of acting. Each System 1 unit is responsible for managing its own subject matter, within its own scope, against its own criteria. Operations is the substantive work.

System 2 is coordination. When an organisation has more than one System 1 unit, those units interact: they share resources, they make claims on the same parts of the environment, they produce outputs other units consume. Without something to coordinate the interactions, the units oscillate against each other — production schedules conflict, two units commit the same budget, one unit's output arrives before another unit is ready to receive it. System 2 is what prevents the oscillation. It is not a manager and not an authority; it is a coordination protocol

that the System 1 units run on. The classic example is a railway timetable: nobody decides what each train should do; the timetable is the protocol, and the trains run on it.

System 3 is operational control. It is the part of the organisation that bargains with System 1 units about resources, that arbitrates when two units want the same thing, and that holds System 1 accountable for performance against agreed expectations. System 3 is where the question "is each operational unit performing adequately?" gets answered, and where the answer leads to action — adjusted budgets, reassigned scope, removed obstacles. System 3 also has an irregular cousin, System 3*, which is sporadic audit-style observation that bypasses the normal control channel when the normal channel may itself be misreporting. System 3* is what catches Goodhart's Law in action: when System 1 starts hitting its metrics by doing things that no longer match what the metrics were supposed to measure, System 3* is what notices.

System 4 is intelligence about the environment and the future. It is the part of the organisation that looks outward and forward — that pays attention to what the world is doing, what competitors are doing, what is changing in the operating environment, and what the organisation might need to be different in order to remain viable. System 4 produces options; it does not choose between them. Its work is informational and developmental: scenarios, forecasts, environmental scans, what-if analyses, prototypes.

System 5 is identity, policy, and closure. It is what decides what the organisation is — its purpose, its values, its non-negotiables, its boundaries. System 5 mediates between System 3 (which has the inward-and-present view) and System 4 (which has the outward-and-future view) when they disagree about priorities, which they regularly will. System 5's authority is not operational; it is constitutional. It says what the organisation is for, and that constraint determines which of System 4's options the organisation will actually pursue.

THE FIVE SYSTEMS, IN ONE SENTENCE

Operations (1) does the work; coordination (2) keeps the operations from grinding against each other; operational control (3) holds operations accountable for performing; intelligence (4) looks outward and forward; identity (5) decides what kind of organisation this is.

Recursion

Beer's most consequential claim about the five systems is that the model recurses. Any System 1 unit — any operational unit of the organisation — is itself an organisation in his sense, and must therefore contain its own System 1 through System 5 to be viable on its own scope. A factory's production line is a System 1 unit of the factory, but it is also a viable system in itself, containing its own operations (the individual workstations), its own coordination (the line balancing), its own operational control (the line supervisor), its own intelligence (the maintenance and engineering function), and its own identity (its scope and purpose within the factory). The recursion continues downward as far as the operational decomposition continues.

And upward, the same way. The factory is a System 1 unit of the company that owns it, and the company is a System 1 unit of the holding group, and the holding group is a System 1 unit of the market it operates in. At each level, the question "what are the five systems?" has an answer, and the answer differs depending on which level you're standing at.

Recursion matters because it is what makes the model composable. An organisation does not need to be designed all at once. New operational units can be added, existing ones can be removed, scope can be redrawn — all without the model breaking, because each unit is itself a viable system that handles its own internal viability and only needs to expose a well-formed interface to the level above it. This is the property that lets large organisations stay coherent across reorganisations, and it is the property that makes Beer's account useful for thinking about management-system integration, where disciplines come and go, regimes overlap, and the substrate has to accommodate them all.

Variety channels

Each of the five systems communicates with the others through channels, and Beer was precise about what those channels carry. The channels carry variety — Ashby's term for the number of distinguishable states the system can be in. A System 3 channel that lets System 1 report its performance must have enough variety to carry every meaningful state of System 1; if the channel is too narrow, important signals get attenuated and System 3 makes decisions on incomplete information. A System 2 protocol that coordinates between System 1 units must have enough variety to handle every meaningful interaction between them; if it is too narrow, units start coordinating outside the protocol, and the protocol stops being authoritative.

Variety channels are usually where VSM diagnosis finds the problem in real organisations. The five systems are usually present in some form. What is usually undersized are the channels between them — the reporting line from operations to control that's too narrow to carry the real situation, the coordination protocol that doesn't accommodate a new kind of interaction, the intelligence channel from System 4 to System 5 that has too much delay to be useful when policy decisions need to be made.

The algedonic channel

Beer also identified one specialised channel worth naming separately: the algedonic channel. Algedonic, from the Greek for pain and pleasure, is the channel that carries urgent signals from anywhere in the organisation directly to System 5, bypassing the ordinary channels through Systems 3 and 4. The algedonic channel is what gets used when something is wrong enough that the normal reporting and control machinery is too slow to handle it. A factory floor worker pulling the andon cord on a Toyota line is using the algedonic channel: the signal reaches the level it needs to reach without going through the supervisors, managers, and dashboards that would normally mediate.

The algedonic channel is not for normal traffic. If it carries normal traffic it stops being algedonic and becomes another regular channel. Its purpose is to ensure that the organisation's identity-and-policy level — System 5 — can be reached when the channels designed to reach it are themselves the problem. Most organisations have algedonic channels

in practice but do not name them as such; in VSM diagnosis, asking "what is your algedonic channel?" often reveals that the organisation has no reliable way for urgent signals to reach the top without traversing layers that may filter them out.

Mapping management-system practices to the five systems

With the model in hand, the mapping question can be asked precisely. Where in any management-system standard does each of the five systems appear?

The answer is that each standard, on its own scope, articulates a complete VSM. This is not a coincidence. The standards were written to describe how a particular kind of management work should be done in a way that survives change, and what survives change is a viable system. The standards do not use VSM vocabulary, but the structural moves are recognisable once you know what to look for.

Within a single discipline

Take ISO 31000 — the risk management standard. Its System 1 is the operational risk-management work: identifying risks, analysing them, treating them, accepting residuals. Its System 2 is the protocols by which risk-management activities coordinate with each other across the organisation — how the risk register is maintained, how risk owners hand off to each other, how scope boundaries are managed. Its System 3 is the part of the standard concerned with monitoring and review — checking whether risk-management activities are performing adequately and intervening when they aren't. Its System 3* is what the standard calls "continual improvement" plus internal audit — the irregular, audit-style observation that catches what regular monitoring misses. Its System 4 is the environmental scanning component — watching for emerging risks, regulatory changes, what other organisations are learning. Its System 5 is the risk-management policy, the risk appetite statement, and the leadership commitments — the constitutional level that says what kind of risk-management programme this is.

Read this way, ISO 31000 is a complete account of how to run a viable risk-management discipline. The same exercise produces the same result for ISO/IEC 27001 (information security), NIST 800-128 (configuration management), ISO/IEC 27035 (incident management), and so on. Each standard tries, within its own scope, to articulate a complete viable system on its subject matter. The five systems are all there. The standards work, in their own scope, because they get the structural shape right.

System	What it does	In a bound discipline
System 1	Operations	The substantive work — identifying, treating, responding
System 2	Coordination	Handover rules, scope boundaries, intake protocols
System 3	Operational control	Monitoring, review, performance against expectations
System 3*	Audit channel	Internal audit, sporadic deep-dive, exception review
System 4	Environment & future	Environmental scanning, emerging-issue tracking
System 5	Identity & policy	Policy, appetite, leadership commitments, scope

What goes wrong when multiple disciplines coexist

The trouble starts when an organisation runs several of these complete-in-themselves viable systems alongside each other. Each discipline has its own System 5 — its own policy, its own scope statement, its own leadership commitments. Each has its own System 4 — its own environmental scanning, often producing overlapping and sometimes contradictory readings of the same external world. Each has its own System 2 — its own coordination protocols, none of which coordinate across discipline boundaries.

The result is an organisation that has, by simple count, six System 5s and no organisational System 5, six System 4s and no organisational System 4, six System 2s and no organisational System 2. Each discipline is locally viable; the organisation is not coherent. This is the structural diagnosis behind the practical observation that started PDCA+ — that GRC teams hold organisational coherence in their heads because there is no structural place for it to live.

THE STRUCTURAL DIAGNOSIS

An organisation running several management-system disciplines has multiple Systems 5, 4, and 2 at the discipline level and none at the organisational level. The disciplines are viable; the organisation is not coherent. Coherence has to be reconstructed by hand because it has no structural home.

Where the conjunction sits

PDCA+'s conjunction is the framework's answer to this diagnosis, but it is not — and this is important — the organisation's missing System 5 or System 4. It is the missing System 2, and a specific form of System 3*.

System 2 is what the conjunction's work most clearly is. The schemas, taxonomies, and translation rules are coordination protocols — they let bound disciplines interact without grinding against each other, without one discipline's output being illegible to another, without resources (most prominently the control inventory) diverging across disciplines. A bound

discipline operates on its own subject matter; the conjunction's protocols are what let its operations interact coherently with the operations of other bound disciplines. This is System 2 work, exactly.

System 3* is the conjunction's second function. Its continuous observation of what passes through the substrate, and its surfacing of inadequacies in its own protocols, is audit-style work — irregular, looking at things the regular channels don't see, catching the cases where the protocols themselves have started to fail. When the taxonomy starts misclassifying change-authorisation failures as configuration deviations, the conjunction is doing System 3* work: noticing that the normal channel is no longer telling the truth about what flows through it, and surfacing the noticing to whoever can act.

The conjunction is not doing System 3 work — it is not bargaining with bound disciplines about resources, not holding them accountable for performance, not directing their substantive work. The whitepaper is explicit that it has no authority over substance. In VSM terms, this is the right answer: System 2 and System 3* do not need substantive authority to do their work, and giving them that authority would compromise their function. System 2 needs the protocols to be authoritative; System 3* needs the audit observations to be uncoloured by the responsibility for fixing what they observe. The conjunction's "no authority over substance" posture is structurally precise for the role it plays.

What about Systems 1, 4, and 5? These remain with the bound disciplines and the organisation's leadership. Each bound discipline does its own System 1 work (its operational subject matter), its own System 4 work (environmental scanning for its domain), and its own System 5 work (policy and identity for the discipline). The organisation's overall System 5 lives where it always has — with the executive function, the board, the constitutional documents. PDCA+ does not provide an organisational System 5; it provides the System 2 and System 3* that let the disciplines participate coherently in whatever organisational System 5 already exists.

THE CONJUNCTION'S ROLE, PRECISELY

The conjunction is the organisational System 2 plus a structural System 3 — the coordination protocols that prevent disciplines from oscillating against each other, plus the audit channel that observes when the protocols themselves are becoming inadequate. It is not System 5 and not System 4.*

Where the recursion levels actually sit

Recursion is where the model gets harder to apply, because real organisations do not come with their recursion levels labelled. The question "what is the System 1 unit at this level?" can have different answers depending on what you're trying to understand, and the framework needs to be applied at the right level to be useful.

For management-system integration, three recursion levels usually matter.

Level 1: the discipline itself

The first recursion level is inside a single management-system discipline. At this level, the System 1 units are the operational activities the discipline performs — for risk management, this is the work of identifying, analysing, treating, and accepting risks across whatever organisational scope the discipline covers. System 2 is the coordination protocols within the discipline. System 3 and 3* are the discipline's monitoring and audit functions. System 4 is the discipline's environmental scanning. System 5 is the discipline's policy and identity, which is to say its scope statement and the standards it operates under.

At this level, the standards do their work well. ISO 31000 articulates the discipline well; ISO/IEC 27001 articulates it well; NIST 800-128 articulates it well. The reason GRC integration is hard is not that any individual standard is structurally inadequate. The standards are fine. The trouble is at the next level up.

Level 2: the organisation's management-system landscape

The second recursion level is the organisation seen as something that runs management-system disciplines. At this level, the System 1 units are the disciplines themselves — risk management is one System 1 unit, configuration management is another, incident management is another, and so on. What looks like a complete viable system from inside the discipline looks like a System 1 unit from this level up. Beer's recursion principle says this is exactly what should happen: a viable system on its own scope is a System 1 unit on the next-larger scope.

At this level, the question is what the System 2, System 3, System 4, and System 5 are. System 5 is the organisation's leadership and governance — the executive function that sets enterprise-wide policy and decides what kind of organisation this is. System 3 is the management-and-reporting structure that holds the disciplines accountable — usually the chief risk officer, chief information security officer, and similar roles, plus the committees they report to. System 4 is the function that watches the regulatory and technological environment for changes that will affect the disciplines — sometimes a dedicated function, sometimes distributed across the disciplines themselves.

System 2 is the level where PDCA+'s conjunction lives. It is the coordination layer that lets the disciplines interact without oscillating against each other. In organisations without PDCA+, this layer is reconstructed by the GRC function holding the coordination protocols in its head. In organisations with PDCA+, the substrate holds the protocols structurally.

System 3* is also where the conjunction operates — the audit-style observation that catches when the coordination protocols themselves are becoming inadequate. The conjunction's surfacing of taxonomy misclassifications, schema gaps, and translation-rule inadequacies is System 3* work at this recursion level.

THE LEVEL PDCA+ OPERATES ON

PDCA+ operates at recursion Level 2 — the organisation seen as something that runs management-system disciplines. The conjunction is the System 2 and System 3 of that level.*

Standards continue to do their Level 1 work; PDCA+ does the Level 2 coordination the standards cannot do.

Level 3: the regulatory ecosystem

There is also a recursion level above the organisation — the regulatory and standards ecosystem in which the organisation operates. At this level, organisations are the System 1 units, and the standards bodies, regulators, certification authorities, and industry consortia are the rest of the viable system. ISO and NIST themselves do System 4 work at this level: scanning the environment, anticipating future needs, developing new standards versions to address what they see emerging. ISO Annex SL is a System 2 protocol at this level — a coordination protocol across the standards themselves, so that ISO 27001, ISO 9001, and ISO 14001 can interoperate in organisations that adopt all three.

This level matters for PDCA+ for one reason: it is where standards revisions come from, and the relationship between standards revisions and the framework's System 4 function is worth understanding directly.

System 4 and the puzzle of standards revisions

System 4 is the function that watches the environment and the future. In a typical management-system discipline, System 4 work is partially internal — the discipline's own environmental scanning, its own intelligence about emerging risks or new attack patterns or changing technology — and partially external, in the form of standards revisions and authoritative guidance that arrives from the standards body.

This is a peculiar structural arrangement, and worth looking at directly. The discipline's System 4 is, in significant part, outsourced to the standards body. When ISO publishes a new version of 27001, the discipline does not have to do its own work to figure out what changed about the information-security landscape — it can adopt the standard's revisions and update accordingly. When NIST publishes a revision to 800-128, configuration management practices update. This works tolerably well when the environment changes at the rate the standards bodies revise their standards, which has historically been every few years.

When the environment changes faster than that, the arrangement breaks down. The discipline's internal System 4 has to do work the external System 4 (the standards body) is not yet doing, and the question of how the discipline's own intelligence relates to the standards' intelligence becomes operational rather than theoretical. This is one of the situations where PDCA+'s conjunction starts doing more than System 2 and System 3* work, and where the boundaries of what the framework is for need to be drawn carefully.

What the conjunction can and cannot do here

The conjunction's continuous observation of its own substrate is, structurally, a form of System 4 work — looking at what is happening and identifying where current arrangements

are becoming inadequate. But it is System 4 work on the conjunction's own substrate, not on the disciplines' subject matter. When the taxonomy starts misclassifying findings, the conjunction sees this. When the regulatory environment changes in a way that means the substrate needs new categories the conjunction has no view of, it does not see this — because the substrate itself does not yet have the language to see it.

This is a structural limit of the framework worth being honest about. PDCA+ does System 2 and System 3* work well. It does a narrow form of System 4 work — internal to the substrate — well. It does not do organisational System 4 work, and it cannot replace the function that watches the regulatory and technological environment. That work still has to live somewhere, and one of the open questions for any organisation adopting PDCA+ is where that somewhere is.

The standards-revision dependency

There is a related puzzle worth naming. PDCA+'s substrate — its schemas, taxonomies, translation rules — is built in part from the standards that articulate the bound disciplines. When ISO 27001 revises, the conjunction's substrate has to revise in response. When NIST RMF updates, the conjunction's substrate has to update in response. The substrate is, in this sense, downstream of the standards bodies' System 4 work.

This is fine as long as the standards bodies' System 4 is doing its work adequately. When it is not — when the environment changes faster than standards revisions, when standards bodies prioritise other things, when the gap between revisions stretches beyond what the environment can tolerate — the substrate inherits the inadequacy. PDCA+ does not solve this; it makes it more visible. When the conjunction starts surfacing inadequacies that turn out to be inadequacies in the underlying standards rather than in how the substrate is implementing them, the organisation is seeing a System 4 failure two recursion levels up. The framework does not fix this, but it makes it diagnosable, which is itself useful.

A STRUCTURAL LIMIT, NAMED

PDCA+ does System 2 and System 3 well, and a narrow form of System 4 internal to its substrate. It does not do organisational System 4 — environmental scanning, future-oriented intelligence — and cannot replace whatever function does. Adopting PDCA+ requires being clear about where organisational System 4 lives, and PDCA+ does not specify this.*

Where PDCA+ departs from VSM, and why

The point of this piece is the VSM reading of PDCA+, but it is important to be honest about where the reading stops being clean. PDCA+ is not a VSM, and treating it as one would distort both.

PDCA+ is not a complete viable system

The framework provides System 2 and System 3* at the organisational-management-system level. It does not provide System 1 (the disciplines do that), System 3 (line management does that), System 4 (the disciplines and external standards bodies do that), or System 5 (executive leadership does that). PDCA+ is one component of a viable organisation, not the whole. An organisation that adopted PDCA+ without ensuring its other Systems are adequate would have well-coordinated disciplines and an incoherent enterprise.

PDCA+ is descriptive of a particular structural problem

VSM is normative — it claims a viable system must have these five systems in these relationships. PDCA+ is descriptive of a particular structural problem (how management-system disciplines align) and prescriptive only about the solution to that problem. The framework would still be useful in organisations that depart from VSM-shaped structure in significant ways, because the variety engineering and second-order observation arguments hold independently. Reading PDCA+ as if it required a VSM-shaped organisation to work would limit its applicability without good reason.

Recursion is treated lightly

VSM is built around recursion: every System 1 unit is a complete viable system, recursively, all the way down. PDCA+ treats recursion lightly — it acknowledges that bound disciplines are viable systems on their own subject matter, but it does not develop the implications. A fuller VSM treatment would specify the recursion levels precisely, articulate the variety channels between levels, identify the algedonic paths, and diagnose specific channel inadequacies. PDCA+ does the structural minimum — enough to be coherent — and leaves the rest. This is appropriate for what PDCA+ is trying to do; it would not be appropriate if PDCA+ were claiming to be a complete VSM treatment.

The model was not derived from VSM

PDCA+ was built from the lived problem of management-system integration, not from the cybernetics literature. The fact that it reads cleanly in VSM terms is, in this author's view, evidence that the framework has caught something structurally real — but the convergence is post hoc. A proper VSM-derived framework would do the derivation work forward, starting from Beer's account and constructing the integration framework from variety engineering, recursion, and the channel structure as first principles. This piece is the reading, not the derivation. The derivation remains future work.

What VSM diagnosis offers a GRC practitioner

Even without the full derivation, the VSM reading gives GRC practitioners three diagnostic moves that the standards' own vocabulary does not.

Diagnose the level

When an integration problem appears, ask which recursion level the problem actually lives at. A configuration drift discovered by event management that risk management never hears

about is a Level 2 problem — a System 2 failure at the organisational-management-system level. A configuration drift that configuration management discovers but cannot resolve because its own monitoring is too narrow is a Level 1 problem — a variety channel inadequacy inside the discipline. The two require different interventions. Standards vocabulary tends to treat both as "a configuration management issue"; VSM vocabulary distinguishes them clearly.

Diagnose the channel

When something is going wrong between disciplines, ask which channel is inadequate. Is it a System 2 protocol that doesn't accommodate a new kind of interaction? A System 3 reporting line that's too narrow to carry the real situation? A System 4 intelligence channel that has too much delay? An algedonic path that doesn't exist when it needs to? "The disciplines aren't talking to each other" is a complaint; "the variety on the System 2 channel between event management and risk management is being attenuated below the level needed for routing decisions" is a diagnosis.

Diagnose the missing system

When integration breaks at the organisational level, ask which of the five systems is undersized or absent. Most often, it is System 2 — the coordination layer that PDCA+ is built to provide. Sometimes it is organisational System 4 — there is no function watching the environment for cross-discipline implications. Occasionally it is System 5 — the organisation has no clear identity-level position on what kind of GRC programme it is, and the disciplines are each operating against implicit and incompatible assumptions about this. PDCA+ addresses the first; it surfaces but does not fix the second and third.

VSM AS DIAGNOSTIC TOOL

VSM gives the GRC practitioner three diagnostic moves the standards do not: identify the recursion level the problem lives at, identify which channel is inadequate, and identify which of the five systems is undersized or absent. Each move sharpens the intervention.

What this opens up

This piece is the VSM reading. Three further pieces of work follow from it.

- **A full VSM diagnostic for management-system integration.** A structured method that a GRC practitioner could apply to an organisation: identify recursion levels, map the five systems at each level, diagnose channel variety, locate the algedonic paths, and produce a diagnosis that points to specific structural changes. The method exists in fragments in the VSM literature; it has not been developed for the management-system integration domain.
- **A forward derivation of PDCA+ from VSM first principles.** The post-hoc reading in this piece converges, but it does not derive. A proper derivation would start from Beer's account and construct the framework's structural moves from variety engineering,

recursion, and channel structure as first principles. This would position PDCA+ in the cybernetics conversation as a developed extension of VSM rather than a convergent independent invention.

- **Channel-level instrumentation of the conjunction.** If the conjunction is the organisational System 2 and System 3*, its variety channels can be measured. Channel adequacy is a property that can be observed and reported on. A framework that knew the variety of its own channels — and could surface when channels were becoming inadequate — would be doing System 3* work on itself, recursively. This is a tractable engineering problem; what it needs is the vocabulary to specify what to measure, which the VSM reading provides.

Each of these is a separate piece of work. This piece is the VSM reading, completed and made teachable for a GRC audience. What it offers is a way to talk about why management-system integration is structurally hard, using a vocabulary that has been refining its account of these questions since the 1960s — and a recognition that PDCA+ has independently re-derived a piece of that account, in the right place, for the right reasons.

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