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The Emergence of Organizational Intelligence

by Richard Veryard

Organizational intelligence is a new way of looking at business improvement and survival, combining the latest management thinking with advanced software technologies to produce highly effective organizations. People and technology have complementary forms of intelligence, and in an intelligent organization these abilities are coordinated and mobilized to the best advantage. This *Executive Report* surveys the six key capabilities of organizational intelligence and shows how a range of organizational and technological innovations each contributes toward the whole framework.

Executive Report

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Cutter Business Technology Council

The Emergence of Organizational Intelligence

THIS MONTH'S AUTHOR

Richard Veryard

IN THIS ISSUE

This *Executive Report* begins by taking a detailed look at organizational intelligence, including the nature of intelligence in organizations, benefits, and more. The report then examines the six key capabilities of organizational intelligence: information gathering, sense making, decision and policy, knowledge and memory, learning and development, and communication and collaboration. Next, the report traces some selected loops through these six capabilities and discusses how to put them into a coherent and complete framework. A case study is presented that shows one example of how organizational intelligence has been implemented in a global insurance company. Finally, the report concludes with some general requirements and practical steps (see the Appendix for a glossary of terms used in the report).

WHAT IS ORGANIZATIONAL INTELLIGENCE?

Organizational intelligence is a framework for integrating a broad range of business improvement and survival initiatives, combining the latest management thinking with advanced software technologies to produce highly effective organizations. People and technology have complementary forms of intelligence, and in an intelligent organization these abilities are coordinated and mobilized to the best advantage.

Organizational intelligence includes the following abilities:

- Making sense of complex situations and acting effectively
- Interpreting and acting upon relevant events and signals in the environment
- Developing, sharing, and using knowledge relevant to its business purpose
- Reflecting and learning from experience

These characteristics of organizational intelligence are much the same as the traits we recognize in intelligent individuals — not the narrow form of intelligence as measured by IQ tests but the broad practical intelligence

that all people possess to some extent and that some people possess more greatly than others. There is, however, no automatic correlation between the intelligence of an organization and the intelligence of the people in the organization; a stupid organization can be full of brainy people who don't talk to each other, while an intelligent organization can be made up of average people who collaborate effectively.

Nature of Intelligence in Organizations

Even the most unintelligent person has some amazing cognitive abilities, such as pattern matching, that generations of computer scientists have been unable to code into even the most sophisticated of computers. And at the other extreme, even the most frighteningly intelligent people (however that may be measured) have an upper limit to the amount of complexity they can handle; moreover, some limit must always remain, even if it is possible for an individual to expand this limit by appropriate mental exercises and disciplines, consumption of super foods, or attachment of quasi-robotic prosthetic devices.

Similarly, organizational intelligence isn't all or nothing; we can't simply divide the organizations of the world into two categories: intelligent and unintelligent. Instead, we can observe instances and patterns of both intelligent and unintelligent behavior in nearly all organizations and can use the organizational intelligence framework as a lens through which we can identify certain strengths and weaknesses (opportunities for improvement) of selected organizations.

In one of his "images of organization," Gareth Morgan shows how organizations can be understood as institutionalized brains.[1] According to this view, the articulation of an organization creates a structure of attention, interpretation, and decision making that fragments, routinizes, and bounds the decision-making process to make it manageable, and thereby simplifies the task facing each manager.

When considering intelligence in organizations, we might imagine that an obvious place to look would be in those organizations with the word "intelligence" in their name — although clearly this refers to a particular kind of intelligence rather than intelligence in general. We may observe two important things about such organizations: First, organizations supposedly dedicated to intelligence don't always achieve it. Second, these organizations often receive strong public and political criticism whenever they are perceived to fail.

Although there are several interesting examples available in the public domain that help to illustrate and explain some key aspects of organizational intelligence, including some high-profile failures that have been subject to detailed postmortem investigation and analysis (up to and including government commissions), it is important to remember that the published accounts of such failures often have some political agenda and necessarily leave out far more than they include. Nonetheless, we can generally learn something useful from such stories even if we don't take them entirely at face value.

And of course the same principle applies to commercial organizations. What we now know (or think we know) about Enron is very different from the prevailing view of Enron at that company's peak. And suppose we take a well-known episode from the history of Microsoft and the Internet: the Bill Gates "tidal wave" memo from May 1995.[2] There are alternative accounts of this episode, and the memo clearly doesn't tell the whole story, but it still gives us some fascinating clues about the presence or absence of intelligence loops within Microsoft and elsewhere in the industry at the time.

Here I offer commentary on some of the arguments Gates makes in the memo:

- **Gates:** "Exponential improvements in computer capabilities ... would make great software quite valuable."

  Commentary: Account of Microsoft's previous strategy. Appeals to a shared memory of past events to explain Microsoft's success to date.

- **Gates:** "Exponential improvements in communications networks ... the Internet is at the forefront of this."

  Commentary: Prediction of future trend; creating a plausible narrative based on observation and analysis. Weak signals gradually getting stronger.

- **Gates:** "Perhaps you have already seen memos from me or others here about the importance of the Internet. I have gone through several stages of increasing my view of its importance."

  Commentary: Emphasizing a gradual shift of opinion. There is no criticism of Microsoft implied if we ask why several stages were necessary and what these stages were. With hindsight, it may always seem that radical conclusions might have been reached more quickly, but we should also recognize that many organizations take a lot longer to reach such critical shifts in opinion.

- **Gates:** "Now I assign the Internet the highest level of importance."

  Commentary: This is a key decision, from which a large number of other decisions and policies will

follow. Note how a series of observations and speculations slowly built up toward this decision.

- **Gates:** "Memos from me or others here"; "In highlighting the importance of the Internet to our future I don't want to suggest that I am alone in seeing this. There is excellent work going on in many of the product groups."

  Commentary: Emphasizing the collective nature of the process. It is always tempting to see all decisions as made personally by the CEO, especially in the case of a high-profile company founder like Bill Gates. Although much of the memo is in the first person singular ("I have, I assign"), Gates also wishes to share the credit and responsibility to some extent.

- **Gates:** "There will be a lot of uncertainty as we first embrace the Internet and then extend it. Since the Internet is changing so rapidly we will have to revise our strategies from time to time and have better inter-group coordination than ever before."

  Commentary: Emphasizing the need for Microsoft strategies to rapidly evolve, presumably based on emerging trends and feedback.

- **Gates:** "I am looking forward to your input on how we can improve our strategy."

  Commentary: Emphasizing the need for collective strategy making.

There may be things that Microsoft itself can learn (or has already learned) by looking back on this episode. Could the importance of the Internet have been recognized sooner? How quickly did Microsoft align itself to this new agenda? How effectively did Microsoft monitor the evolution of the Internet and adjust its strategies? How did Microsoft use the tools and platforms that were available at the time (such as e-mail), and how might today's technologies (such as blogging and social networking) have affected the process?

More generally, there are things that any organization can learn by looking through similar episodes in its own history. How quickly were important signals picked up? How effectively were strategies and policies formulated and decided, and how effectively were followup actions communicated and coordinated?

As with any other firm, the survival and success of Microsoft depends on how it deals with a small number of major episodes and turning points like this, as well as with countless minor episodes. No amount of intelligence can guarantee that every episode will be handled correctly, but we should expect an intelligent organization to get more of these episodes right, to take appropriate action promptly when things start going wrong, and perhaps even to get better at handling these episodes over time.

Was Enron intelligent? Enron certainly did some clever and innovative things and employed a lot of talented people, but the spectacular failure of Enron suggests that there were some serious flaws in its thinking. Here are two suggestions. First, there appears to have been a collective failure within Enron to appreciate the scale of its exposure to risk, which indicates a weakness in sense making — an insufficiently robust way of seeing beyond the complexity of the accounts and understanding the true financial state of the company. And, second, there appears to have been a collective refusal to learn from the voices of doubt coming from external critics. When a company is convinced by its own cleverness, this conviction can become a barrier to learning and therefore a limitation of true intelligence.

Business Background

It is a commonplace that the business environment is getting ever more complex and dynamic, affecting public and voluntary sector organizations as much as commercial enterprises. Each organization will have a slightly different experience of this phenomenon, but some of the common features include:

- Valuable ideas that may be rapidly copied or bypassed
- Constant pressure to squeeze more from less; demand for greater productivity, marginal returns on assets, working harder, working smarter
- Shorter lifecycle of products and technologies; reduced loyalty of customers and service providers
- Apparent explosion of choice for businesses and consumers; almost countless ways of satisfying any given need
- Massive information overload

Each organization will find different ways of coping with these pressures, but common themes include:

- Greater situational awareness of "what is going on"
- Greater emphasis on knowledge generation and flows rather than merely hoarding past stores of knowledge; corporate memory as legacy
- Higher expectations of innovation and change and a constant need to develop new and enhanced capabilities

- Willingness to engage with complexity rather than attempting to retreat into false simplification and one-size-fits-all mentality
- A culture of collaboration and empowerment, as senior management increasingly appreciates the brainpower, creativity, and enthusiasm of a properly motivated and mobilized workforce ("Theory Y"[3])

Many organizations recruit highly intelligent individuals into key positions and give them exceptional rewards for their energy and talent. Many organizations spout the Stalinist doctrine, "Our people are our greatest asset," but the demands of the modern organization require more than individual brainpower; they require collective brainpower — the full brainpower of the organization, supported by appropriate tools, platforms, and technologies — to maintain the fitness of the organization to its environment.

Organizational Background

A "traditional" organization is divided into specialist functions: sales and marketing, manufacturing, distribution, R&D, or whatever. This kind of structure is based on the assumption that a significant proportion of business problems can be solved within a single function. For those problems that don't fit into a single function, there are three possibilities:

1. Escalate the problem to the board level, where each function is represented by a senior manager.
2. Assign the problem to a dedicated cross-functional project or task force or delegate it to a general-purpose consultancy firm.
3. Ignore the problem and hope it goes away.

All organizations do these things some of the time, and sometimes they get away with it. But over time there will be a gradual buildup of unsolved problems, unsatisfactory solutions, unaddressed issues, overstretched individuals, and complicated cross-functional relationships; this accumulation of "stuff" increasingly impedes the ability of the organization to respond in an agile and appropriate way to strategic challenges.

The point about organizational intelligence is that if your organization can identify and solve more problems in a more efficient and effective manner, and increase its capacity to solve more complex problems in a more intelligent manner, the accumulation of "stuff" may be slowed or even reversed.

Many organizations have moved away from the traditional hierarchical structure, toward flatter matrix or network structures. This kind of structural change may contribute something to improving organizational intelligence. However, formal organizational structure does not fully determine the actual behavior of the organization; in most organizations, the presence or absence of knowledge flows and de facto collaboration have as much to do with culture as with formal structure.

IT Background

Although IT pays lip service to the profound pressures and transformations in the business world, the typical IT portfolio largely fails to support the business as an agile knowledge-based learning organization, concentrating instead on increasingly complex and sophisticated automation of routine operations and transactions.

However, a wide variety of software products and platforms are being promoted for their contribution to various aspects of what we are calling organizational intelligence, including:

- Agile enterprise
- Collaboration networks
- Complex event processing
- Enterprise 2.0
- Real-time business intelligence
- Smart work

Benefits

Intelligence is important for organizations, especially in a complex and dynamic world, because it encapsulates a number of critical and widely acknowledged strategic capabilities, including those relating to knowledge and learning.

This leads to the following two hypotheses: that general improvements in organizational intelligence are desirable and that such improvements are widely possible.

There are three ways in which an organization and its stakeholders can benefit from organizational intelligence:

1. The organization is likely to become more successful in the short term and have greater prospects for survival and growth in the longer term.
2. Staff morale is likely to improve, and the individual employees will themselves have greater opportunities for personal growth and fulfillment.
3. In the broader socioeconomic system, intelligent organizations will create more wealth, not merely economic wealth but in human potential.

Are these benefits available to all organizations or only to those organizations that already possess above-average collective intelligence? It may well be true to some extent that intelligence breeds intelligence; in other words, "to those that have, more shall be given." But our working hypothesis is that practically any organization, however dysfunctionally stupid on the surface, contains the seeds of intelligence that can be nurtured with sufficient insight and patience.

Organizational intelligence provides a key focus for certain individuals within a large organization. For example:

- The CIO needs to take a strategic view on the use of information within and beyond the boundaries of the organization. Use of simple information within routine business operations is largely taken care of within established application package suites such as SAP and Oracle or homegrown legacy systems. If the CIO is not to be merely a glorified purchasing clerk, acquiring standard commodity software and services from the cloud, he or she needs to rethink and reframe the role of management information within the organization. Organizational intelligence offers a framework for providing a joined-up set of systems, services, and platforms to support intelligent and collaborative business processes across the enterprise and its ecosystem.
- The HR director needs to take a strategic view on the development of creative collaborations and intelligent communities across the workforce and beyond. The deployment of new social tools within the enterprise (such as Enterprise 2.0) represents an opportunity for radical cultural transformation, which calls for sensitive leadership.
- Other key roles may include sales and marketing, product/service, and R&D.
- Meanwhile, the more enlightened software vendors will advise their customers how to align their systems and services with business objectives and organizational culture.

DETAILED CAPABILITY MODEL

Organizational intelligence calls for six connected capabilities as listed below. An informal schematic diagram is shown in Figure 1. The six capabilities are:

1. **Information gathering** — How well does the organization collect and process information about itself and its environment?
2. **Sense making** — How well does the organization interpret and understand itself and its environment?
3. **Decision and policy** — How effective are the (collective) processes of thinking, decisions, policy, and action?
4. **Knowledge and memory** — How does the organization retain experience in a useful and accessible form?
5. **Learning and development** — How does the organization develop and improve its knowledge, capabilities, and processes?
6. **Communication and collaboration** — How do people and groups work together? How do they exchange information and knowledge? How do they share ideas and meanings?

When an organization lacks intelligence, this may be because one of these six capabilities is weak or marginalized within the organization or because the loops connecting these capabilities aren't working. But when these capabilities are connected and in balance, the organization will make better decisions, respond more promptly and appropriately to key events and trends, and learn efficiently from experience.

In the following sections, I provide an outline of the six capabilities, with examples of good and poor practice, as well as the dependencies between them.

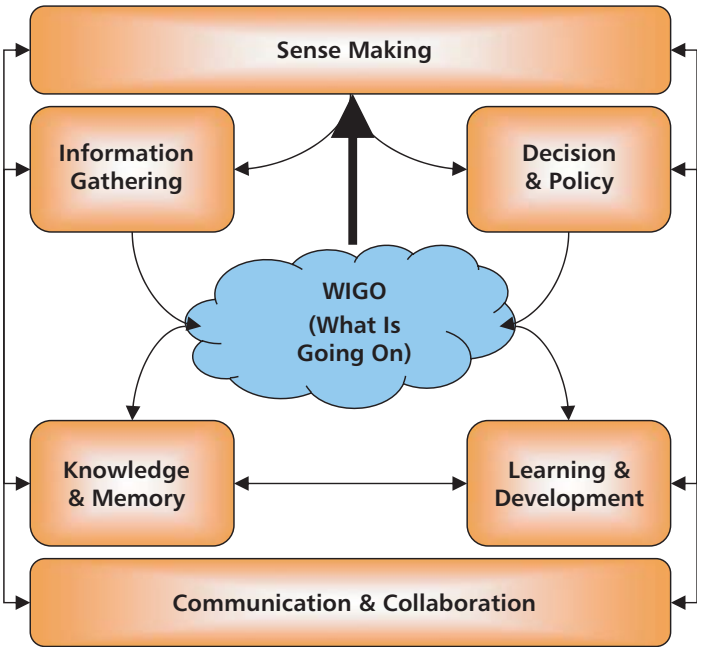

Figure 1 — Key capabilities of organizational intelligence.

INFORMATION GATHERING

This capability refers to how well the organization collects and processes information about itself and its environment.

Definition

Information gathering refers to a broad range of activities for collecting data about what is going on, both inside and outside the organization. It includes routine information flows as well as detection of expected or unexpected events. Some data may be received from outside sources (such as customers, business partners, or agents); some may be collected using technical devices (such as cameras or RFID sensors); and some may be picked up by members of the organization in the course of their work, either as a side effect of some other activity or as the result of a determined effort to find something out.

For the purposes of this report, information gathering also includes the automatic inference of complex events, trends, and patterns; for example, using complex event processing or data mining software.

Motivation

The intelligent organization needs to pay attention to relevant events and trends inside and outside the organization and respond appropriately. Such an organization may be called event-driven, responsive, or agile.

A useful way of thinking about strategic business improvement is to view a business organization as a network of events and to think about organizational strategy in terms of the relationship between an external set of possible events and an internal set of possible events. An organization is capable of responding in certain ways to certain classes of event. Making an organization more responsive means enabling the enterprise to mobilize more appropriate responses to a greater range of events and trends without proliferation of unnecessary complexity. In systems thinking, this is called requisite variety.[4]

Characteristics

Let's start with a model of heterogeneous raw material, like a rich and tasty "event soup." From this soup, we may extract some events or signals for special attention. We can classify these events or signals in various ways, as shown in Table 1.

The three distinctions seen in Table 1 are independent; we may find any combination of routine/exception, familiar/rare, and strong/weak. An organization needs to respond to both routine events (business as usual) and nonroutine events; an intelligent organization will be better able to respond to the rare as well as the familiar and should be more able to discriminate those weak signals that may be relevant.

Organizations are (or should be) interested in weak signals because some weak signals provide an early warning of opportunities or threats.[5] The sooner an opportunity is correctly recognized, the more time the organization has to take advantage of it. And the sooner a threat is correctly recognized, the more time the organization has to take preventative or corrective action.

There are several dimensions of information gathering and signal processing as shown in the list below:

- **Range/scope** — the types of information and event that the organization is routinely or exceptionally capable of capturing
- **Strength/accuracy** — the accuracy with which the information and events can be captured (may be measured in terms of false positives and false negatives)
- **Granularity/precision** — the degree of differentiation of which the organization is capable
- **Aggregation/filtering** — reducing the quantity of information, allowing decision makers to focus on the most critical items
- **Relevance** — the extent to which information can be linked to organizational goals and intentions
- **Speed** — the speed with which relevant events can be detected and responded to

Technologists often focus on speed as the key dimension, but for improving organizational intelligence, the key dimension is often granularity — enabling the organization to identify more precisely and respond more flexibly and appropriately to a finer level of detail and differentiation.

The filters that the organization applies are one of the most important characteristics of an organization's information gathering capability. The purpose of a filter is to separate "relevant" from "irrelevant" information, but of course in a complex and dynamic world the question of relevance is always problematic, and a stupid organization often filters out some important signals (in other words, signals that will prove important in hindsight) and attempts to marginalize those individuals who seek to draw attention to these signals.

Table 1 — Types of Events

Distinction	Description	Example
Routine vs. exception	Some events are within the normal operating bounds of some system.	An electricity supply network may detect a signal that a popular TV transmission has reached a commercial break. This leads to a predicted spike in demand for electricity, as millions of consumers switch on kettles and other devices. This is a routine signal.
	Other events may be regarded as exceptional. Systems generally have ways of handling a range of common exception conditions.	The network controller receives automatic notification of a fault at a substation. This is a common exception, which triggers some fault correction and network repair activity.
Familiar vs. rare/ unprecedented	Some exception conditions are relatively common, and we expect trained operators and/or automated systems to be able to handle these conditions correctly and effectively.	Bad weather grounds some flights in some countries.
	Other conditions are extremely rare or even unprecedented.	Volcanic ash grounds all flights across Northern Europe for several days (as occurred in early 2010).
Strong vs. weak	Some signals are clear and unambiguous.	Examples include major disasters such as Three Mile Island, the 9/11 attacks, or the volcanic eruptions in Iceland. These are unquestionably strong signals (once they have occurred). Examples also include the emergence of major sociotechnical changes such as the Internet.
	Early warning signals are often weak and ambiguous.	With hindsight it is often possible to find weak signals of these disasters that were overlooked until it was too late.

Dependencies

Information gathering is dependent on some notion of relevance, which comes from sense making. Furthermore, the identification of meaningful trends and patterns is dependent on prior knowledge and learning, as well as evolving sense making.

Information gathering is also dependent on learning for continuous improvement:

- How does an information gathering system learn new patterns?
- How does an information gathering system get recalibrated as the environment evolves?
- How do we control (and reduce) the level of false positives and false negatives?

Above all, an organization's understanding of the required granularity and quality of information may be refined though experience; in other words, a learning loop that assesses the sensitivity of outcomes to the characteristics of the input. Is the cost and complexity of this information justified by results, or is it just an unnecessary distraction and expense?

Patterns and Examples

Situational Awareness

Failures in high-risk, high-reliability organizations can often be attributed to poor situational awareness — a failure to monitor what is going on. For example, in the 2003 electricity blackout on the US East Coast, major electric utilities lost track of what was going on. They also failed to appreciate how vulnerable the system had become because they did not really understand voltage stability conditions and needs.[6]

Doctrine of Secrecy

There is often a false assumption that secret information is superior to publicly available information. Harold Wilensky makes this point in his 1967 book *Organizational Intelligence*, where he asserts that a sophisticated reporter working with open sources is better than an agent working with top-secret information.[7] Wilensky highlights the distorting effects a doctrine of secrecy can have on intelligence; an example from Wilensky's book concerns the possible consequences of an American invasion of Cuba in the early 1960s, where reporters read the situation more accurately than the CIA experts. In another example, in his analysis of Enron, Malcolm Gladwell notes that the journalists who finally exposed Enron were able to download all the information they needed from Enron's own Web site.[8]

Triangulation

One of the important principles of information gathering is trying to achieve corroboration of important facts from independent sources. However, sometimes what appear to be independent sources turn out to be traced back to a single original source. For example, two newspapers may report the same story using slightly different words; it turns out they are both relying on the same publicity material or press release. Sometimes this can be engineered by publicists wishing to present their clients in a positive light, some of whom have become extremely adept in "Google spinning" — making sure that the top few pages of a Google search are packed with the approved version of the story as repeated on countless news Web sites. Finding alternative versions of the story then requires considerable ingenuity and persistence. Meanwhile information on any commercial product is usually dominated by people who want to sell it to you.

Requirements and Recommendations

Net-Centric

Use the available resources of technical and social networks to capture as much information as practicable, following the principles of *reach*, *richness*, *agility*, and *assurance*.[9]

Post Before Processing

Capture everything, regardless of quality. For example, here is a US Department of Defense ruling on the sharing of intelligence data:

> In the past, intelligence producers and others have held information pending greater "completeness" and further interpretative processing by analysts. This approach denies users the opportunity to apply their own context to data, interpret it, and act early on to clarify and/or respond. Information producers, particularly those at large central facilities, cannot know even a small percentage of potential users' knowledge (some of which may exceed that held by a center) or circumstances (some of which may be dangerous in the extreme). Accordingly, it should be the policy of DoD organizations to publish data assets at the first possible moment after acquiring them, and to follow-up initial publications with amplification as available.[10]

Provenance

Record the source of everything so that you can check the quality of the information and also monitor the quality and independence of the source.

SENSE MAKING

Sense making refers to how well the organization interprets and understands itself and its environment.

Definition

Sense making can be defined as a committed interpretation of what is going on. The word "commitment" means that we are not just talking about casual speculative models but about conceptual models that drive action; in other words, ways of thinking that bind to ways of doing. (Note: some writers use the word "formative.")

All individuals and organizations perform unconscious acts of sense making all the time. Ideas, explanations, stories, and themes emerge from formal and informal meetings and discussions, documents and presentations, e-mail and Internet discussions, as well as a confusing array of external influences. Enterprise 2.0 (such as blogging and Twittering) doesn't replace these, it merely adds further variety to them, as well as sometimes allowing new themes to appear (and disappear) with unprecedented speed.

Motivation

Sense making is possibly the most widely overlooked element of intelligence. People often talk about knowledge management, decision support, or organizational learning as if these activities could be simply fed from pure and unadulterated information — "objective facts." In this view, sense making is either thought to be unnecessary or is implicitly embedded within one or more of the other capabilities (see Figure 2).

There are three reasons why it is useful to separate out sense making explicitly from such activities as

knowledge memory, decision policy, and learning development:

1. Because each of these activities may be distributed (or even fragmented) across the organization, and the quality of sense making on which these activities is based may be highly variable.
2. Because we are interested in the degree of interoperability between knowledge memory, decision policy, and learning development that should result from the congruence or incongruence of shared models and narratives across them.
3. Because it allows us to see sense making as an important social activity in its own right.

Characteristics

An organization may have all the information it needs but fail to connect the dots. We'll look at some notorious examples later in this section. Although the sense-making agenda is a lot broader than merely connecting the dots, sense making is about interpretation — finding meaning and relevance in a mass of information — and so connecting the dots is an important element of sense making.

Another important element of sense making is framing and perspective; that is, appreciating how critical organizational questions can look very different from a different perspective. One of the traditional ways that an external consultant can help an organization is by suggesting ways of reframing a problem so that it appears more tractable. (This is not very different from the way a family therapist might operate, helping a family to see its problems in a different light.)

Dependencies

According to Brenda Dervin, sense making is typically triggered by an event — the recognition of a gap or discontinuity.[11] Thus, sense making is dependent on being receptive to such gaps and discontinuities.

Sense making is clearly dependent on information, and sometimes more information (or more relevant information) can be needed. But there can sometimes be too much information. The real issue is achieving a good balance between three things:

1. The quantity and quality of information
2. The capacity of the people (working collectively) to use the information effectively
3. The demands of the situation

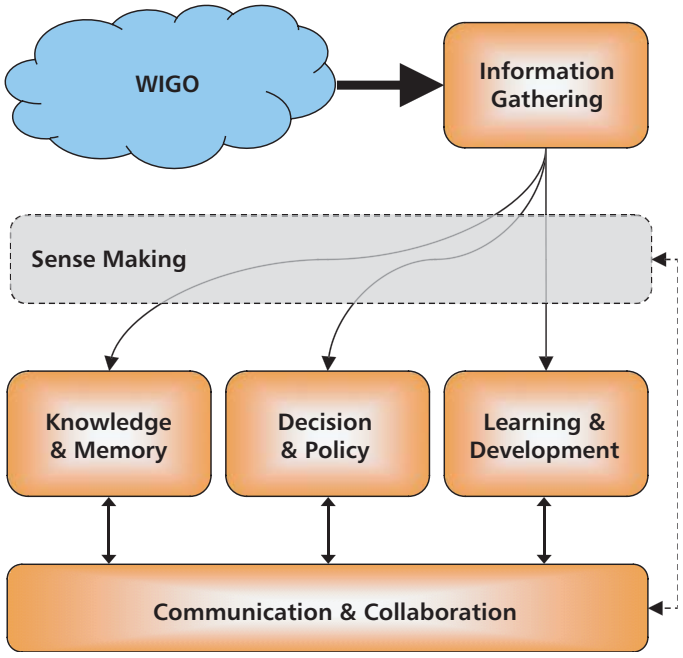

Figure 2 — The invisibility of sense making.

In other words, we need to have just enough good information to support the collective intelligence of the management team in addressing the complexity of the situation. Sense making can also create new notions of relevance, which feeds back to information gathering.

Patterns and Examples

Connecting the Dots

There have been some well-documented failures to react intelligently to weak signals. Gladwell analyzes US intelligence failures before and after the Al-Qaeda attacks on 9/11.[12] It is easy to criticize intelligence agencies for failing to spot connections in a mess of data once we know where the connections are. Even US President Barack Obama falls into this trap in regard to a later incident, complaining that the intelligence community had failed to "connect the dots."[13] But Gladwell regards this kind of criticism as unfair; as he points out, anyone can connect the dots after the event, and things that were confusing at the time often seem a lot clearer with hindsight.

Gladwell also looks at connecting the dots with regard to Enron, as mentioned earlier. He suggests that the evidence of flaws in Enron's business model was not deliberately concealed but merely buried in a mass of confusing data; Enron managers were as confused as everyone else and were no more able (possibly less able) to connect the dots than independent outsiders.

Connecting the dots may always be difficult in any large organization, but perhaps it's going to be particularly difficult in a culture where everyone is "thinking outside the box." (As Gladwell wryly comments with regard to Enron, "Maybe it was the box that needed fixing.") Sometimes there is no substitute for careful and detailed analysis.

Multiple Lenses

Some people expected the auditors to expose the flaws in Enron's business model. The fact that the auditors failed to do this has been attributed to incompetence or unethical behavior on their part. But what seems more likely is that the auditing/accounting lens simply wasn't the right lens through which to view and make sense of Enron's business model.

What other lenses could have been used? We could start with a taxation lens. The fact that Enron wasn't paying much corporation tax — in several years it paid no income tax at all — might have been seen as an important clue to its lack of real profitability. However, those who wanted to believe in Enron's profitability could easily convince themselves that the low level of tax payments represented clever tax avoidance; in other words, interpreting it as evidence of the smartness of the accountants and/or the stupidity of the tax authorities. Meanwhile a bunch of MBA students had done some ratio analysis several years before Enron's collapse, based entirely on the published accounts, which had revealed a pretty accurate picture, but of course they were just MBA students.

This suggests two things: (1) that viewing a complex situation through different lenses may produce useful insights; and (2) that a dominant lens (in this case the accountancy lens) is often used to discredit alternative lenses that might have revealed alternative truths.

Mindfulness

A recent think piece from the CIA calls for "an alternative analysis approach that is more an ongoing organizational process aimed at promoting 'mindfulness' — continuous wariness of analytic failure — than a set of tools that analysts are encouraged to employ when needed" and concludes that "Intelligence Community analytic organizations need to institutionalize sustained, collaborative efforts by analysts to question their judgments and underlying assumptions, employing both critical and creative modes of thought. For this approach to be effective, significant changes in the cultures and business processes of analytic organizations will be required."[14]

Requirements and Recommendations

The requirement is for an intelligence capability that helps us to make sense of too much information, rather than an intelligence capability that merely gathers more information in the hope of resolving something. Examples of this requirement can be found both in national security and in business.

In terms of organizational intelligence, this means achieving a good balance between two capabilities — the information gathering capability and the sense-making capability — and linking effectively into the remaining capabilities (e.g., decision, action, learning). Sometimes merely collecting more information doesn't help solve the problem, especially if we don't have the capacity to interpret the information we already have, or if the new information merely provides an excuse for further procrastination.

If the management team is already overloaded with information, then there seems little point merely trying to get more information. However, if we are overloaded with poor-quality information, then it may be very useful to replace it with higher-quality information. (This entails an ability to ask the right questions and to frame any investigation intelligently.) At the same time, we may wish to increase the reasoning capacity (sense making and decision making) of the management team. If we can't manage to connect the dots, simply having more dots all over the place isn't necessarily going to help, but having dots closer together may help us see the pattern.

DECISION AND POLICY

> It is our choices that show what we truly are.
>
> — Albus Dumbledore
> in *Harry Potter and the Chamber of Secrets* [15]

This capability refers to how effective the (collective) processes of thinking, decisions, policy, and action are.

Definition

If managers mostly work through making decisions, and if management is rewarded higher than other forms of work, this suggests that decision making has significant value in its own right.

Technology may share in the creation of this value. One of the ways IT is supposed to "add value" to business is by supporting better decisions. Management and IT share a common view on the importance and value of decision-making activity.

Motivation

An organization needs to make decisions from time to time, and this is a key responsibility of management. But who exactly is "management"? In some traditional organizations, there is a clear distinction between people called "managers" and everyone else. Furthermore, different kinds of decisions are allocated to different levels of management: the higher-paid managers being thought more capable of "bigger" decisions, where "bigger" means more important, more complex, greater in scope, and/or greater in time horizon.

Characteristics

Normative decision-making models show how managers "ought" to make decisions. Typically this assumes that behavior is rational and that all necessary information is available (see Figure 3a). On the other hand, descriptive decision-making models show how managers actually make decisions. Often managers operate under conditions of imperfect information in which "bounded rationality" prevails (see Figure 3b).

Different writers have focused on different aspects of decision making and judgment. Many writers (including Herbert Simon[16]) have focused on rational choice, which is characterized by the following elements:

- Problem solving focuses on the best means to a given end.
- Comparison implies common basis of measurement.
- If you want to compare two or more options, it seems as if you have to express them in the same units. This is implied by the widespread use of spreadsheets, in which options appear as adjacent rows or columns.
- Goals and values are implicit, buried in the statement of the problem or buried in the choice criteria and weightings, and may be perverted by the hidden limitations of any given measurement scheme.

There are known limits to rational choice, as Simon and others make clear. People and organizations usually have to act on the basis of incomplete or imperfect information, can only explore a limited number of options, and cannot attach accurate values to outcomes. This leads to the notion of bounded rationality; Simon called this "satisficing" (good enough) in contrast to "optimizing" (perfect).

In contrast, Geoffrey Vickers describes decision making in terms of value, focusing on the following elements:[17]

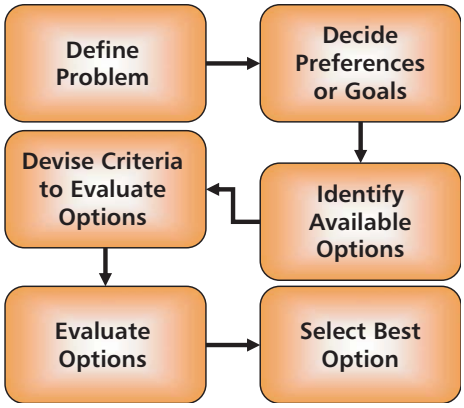

Figure 3a — A normative decision model.

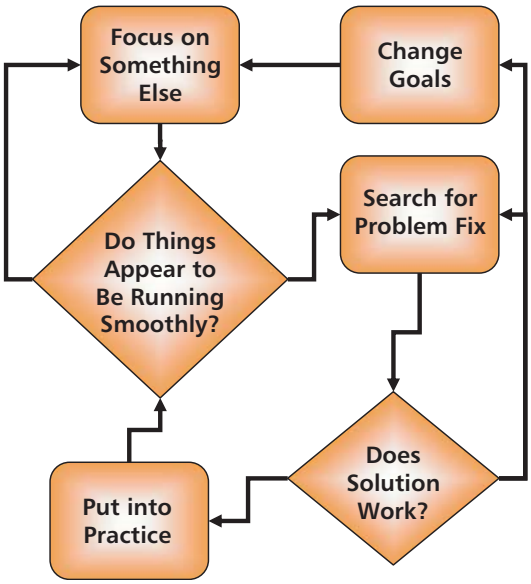

Figure 3b — A descriptive decision model.

- Judgement is value-laden.
- Values run throughout the process and are not contained in a "goal-setting" exercise at the start.
- Decisions may involve balancing economic and ethical considerations.

A third way of looking at decision making and rationality is to consider time. Following French psychoanalyst Jacques Lacan, we can divide the decision-making process into three phases: (1) the instant of seeing (recognizing that some situation exists that calls for a decision); (2) the time to comprehend (assembling and analyzing

the options); and (3) the moment to conclude (the final choice). Lacan's interest is in the opposition between impulsiveness and procrastination, which we can often see played out in organizational settings (see Table 2).

Dependencies

Complexity

The challenge for the intelligent organization is aligning the complexity of what the organization does with the complexity of the demand.

In complex situations, we need information not merely to support the decision itself but also to support the timing of the decision.

In the OODA loop, defined by military strategist John Boyd, decision making occurs in a continuous cycle of observe, orient, decide, act.[18] In a competitive situation (including warfare), the advantage lies with the individual or organization that can process this cycle most quickly and can observe and react to unfolding events most rapidly. Boyd describes this as "getting inside" your adversary's decision cycle.

Boyd also advocated a highly decentralized chain of command that utilizes objective-driven orders, or directive control, rather than method-driven orders in order to harness the mental capacity and creative abilities of individual commanders at each level. This view of command and control was later elaborated into the "Power to the Edge" concept (see more on this in the next section).

Connection Between Practice and Fact

Practice and policy should be based on evidence rather than belief. Some organizations faithfully follow standard textbook routines, optimistically believing these to be "best practices," but they do not collect data to objectively verify and improve the effectiveness of these practices, which represent a "triumph of hope over experience."

Connection Between Interpretation and Action

Some organizations carry out a detailed analysis but may lack the ability to convert understanding into action. This may be a sign of "analysis paralysis" or procrastination.

Patterns and Examples

Joined-Up Decisions

An organization can increase coherence by integrating lots of small but related decisions, which avoids coordination failure. However, this increases the complexity of decisions and may introduce circular dependencies: "We cannot resolve A until we've resolved B, but we cannot resolve B until we've resolved C...."

Deconfliction

This means increasing independence and autonomy by decoupling one large decision into a number of small decisions. The risk of coordination failure may be offset by greater agility and speed.

Power to the Edge[19]

This denotes a fundamental transformation in the geometry of the organization away from a hierarchical command-and-control structure. (Such structures are still as common in civilian/commercial organizations as in the military, if not more so.)

This Power to the Edge doctrine, advocated in the military domain as a good response to increased uncertainty, volatility, and complexity, is also relevant to civilian enterprises, both commercial and public sector.

Table 2 — The Time Dimension of Decision Making

Delay/Procrastination	Haste/Impulsiveness
It is always possible to find a reason (excuse) for deferring a decision: • More information is needed. • More options could be developed. • More stakeholders need to be consulted.	Because it is always possible to find a reason for delay, conversely it is always possible to dismiss these reasons — to refuse to take them seriously.
Some individuals/organizations take ages to make any decision: • Committees and subcommittees. • Referrals and due diligence.	Some individuals/organizations are impatient with anything that inhibits action.

Power to the Edge is dependent upon an improved flow of information — quality and complexity as well as quantity and speed.

Differentiated Service[20]

An intelligent organization can exercise greater differentiation in how it handles different customers or other situations, based on relevant and accurate contextual information, without losing overall coherence and integration. It can cope with policies at higher levels of abstraction with more degrees of freedom. As a consequence, it should be able to generate and extract higher amounts of value from a complex and competitive landscape.

Requirements and Recommendations

Decision support has long been seen as one of the key roles of computers in an organization. The possible benefits of decision support include the following:

- Greater quantities of information available
- Improved quality of information available
- Tools to manage and analyze large quantities of data
- More efficient communication and data sharing
- Mechanisms for feedback and learning
- Enforcement of general policy
- Ability for tasks to be assigned to lower-paid staff

It has always been difficult to assess the value of this support as it depends on:

- The quality of decisions produced
- How good (clever, lucky) the managers would be without this support
- How critical this decision is for the business

KNOWLEDGE AND MEMORY

> All doing is knowing and all knowing is doing.
>
> — Humberto Maturana and Francisco Varela[21]

This capability refers to how the organization retains experience in a useful and accessible form.

Definition

"Individuals come and go, but organizations preserve knowledge, behaviours, mental maps, norms and values over time."[22] An organization has a "memory," and its knowledge is not simply the aggregation of all the knowledge possessed by the individuals within it. Some of the organization's knowledge may be represented in various ways and stored in databases and libraries, both online and on paper. Some of the knowledge may simply be embedded in practice; in other words, "the way we do things around here."

Motivation

There are basically two ways that knowledge may be of value to an organization:

1. An organization can embed knowledge in its products and services or use specific knowledge to enhance and differentiate its products and services. This can be realized in the following ways:
   - The knowledge is of direct value to the organization's customers. For example, a news media organization gathers and evaluates knowledge of a particular kind and then packages and delivers it to its readers or viewers.
   - The knowledge is used to differentiate the products and services for different customers. A business can use information about the customer context to customize the service offering.[23]
   - The knowledge is demanded by market forces or regulation; for example, increasingly stringent food labeling regulations. And of course there is a vast quantity of knowledge that must be deployed in order to get approval for new pharmaceutical products.
2. An organization can use knowledge to develop and improve its strategies, capabilities, and processes, as well as to support organizational learning. Thus, the context for defining the value of knowledge to the enterprise is that it contributes to organizational intelligence. Here are some examples:
   - To make a decision about a particular case, we need to have some relevant knowledge of the case, together with some policy or practice that tells us what knowledge is relevant and what conclusions follow.
   - To make a decision about a policy or practice, we need to know what outcomes the policy or practice is intended to produce, and how effective it has been (is being) in contributing to these outcomes.
   - The architecture of the enterprise itself depends on systematically using various kinds of knowledge about the business and its environment to structure the organization, its strategic partnerships,

its capabilities and processes, and its systems and technologies.

Characteristics

What characterizes the intelligent organization is not just having more knowledge than its competitors, or even doing better at sharing the knowledge it has, but how effectively it invests its entire knowledge capital to increase its own viability and survival. This is not a technology question, or even a best practice question, but a strategic question.

Dependencies

In any given organization or other social context, there are a great many knowledge claims: standard working assumptions and principles, so-called best practices, people regarded as experts, and so on. Intelligence is not measured by the quantity of your knowledge but by the quality of your knowledge processes: how you develop new knowledge while subjecting your current stock of knowledge and knowledge claims to ongoing critical appraisal. A fixed stock of knowledge, even if it was once valid, will degrade over time as circumstances change and new evidence becomes available. The value of knowledge is therefore dependent on a healthy learning process.

Wherever possible, knowledge needs to be grounded in evidence, and that of course means properly interpreted evidence. Therefore, knowledge is dependent on the ability to verify evidence, including tracing it back to its sources (see the "Provenance" section under "Information Gathering").

Even the most intelligent people have some fixed beliefs and assumptions; this is perfectly normal, indeed necessary. This then raises the question about the fixed beliefs and assumptions within an organization. In an organization that gives voice to a diversity of beliefs and mindset, weak beliefs and assumptions are more likely to be challenged and tested. Therefore, knowledge is dependent on communication and collaboration (community).[24]

The value of knowledge is also dependent on how it is used. Knowledge management isn't just about grabbing and hoarding stuff but about deploying it intelligently — not "knowledge as a resource" to "knowledge as a process," as a number of writers have suggested.[25] This points us toward concepts like evidence-based management, where knowledge is collected, analyzed, and deployed within a management loop, although some versions of the evidence-based management concept fail to mention the importance of sense making and talk as if there was an "objective" problem out there, to be solved by a set of steps, supported by unambiguous evidence.[26]

This kind of approach shifts the emphasis from knowledge sharing to knowledge embedding, grounding the work in the best available and critically evaluated knowledge, as well as actively seeking well-grounded knowledge to support organizational learning. Obviously collaboration is important here, but there is a distinction between collaborating-in-the-work (e.g., shared responsibility for decisions) and collaborating-in-the-knowledge (e.g., shared responsibility for collecting and interpreting intelligence; connecting the dots). A key question here is the relationship between decision and intelligence: how closely the expertise and authority should be coupled/aligned to the work itself.

Patterns and Examples

Bridging the Gap Between Knowing and Acting

As Esko Kilpi writes, "Organizational reality is often seen in terms of processes and actions that are based on plans and designs. Acting should thus be based on this knowledge."[27]

From Best Practice to Next Practice

Organizational memory does not only consist of rules (best practices) but also all sorts of other knowledge (including evidence, interpretation, and stories) that may be relevant to developing next practice.

Requirements and Recommendations

A lot of this knowledge will surely be maintained in electronic form, not just in people's heads; the information may be structured or semistructured, using a broad range of social software.

So are social networking tools the solution to improving organizational memory? Now that would be easy enough if nothing ever changed and if last year's best practices still worked. But formal guides and detailed documentation fail because of continuous change. There is a tension between efficient adaptation and effective adaptability.

Some elements of organizational memory may be best retained in the heads of the people in the organization. And because captured organizational memories fade rapidly over time, you must reinforce your organizational memories by constantly revisiting and updating them.

What's the role of social networking tools here then? To the extent that these tools are not yet up to the job of real-time knowledge capture, we must fall back on an old favorite: finding the person who knows what we need. Better than nothing perhaps, but way short of what is needed.

LEARNING AND DEVELOPMENT

This capability refers to how the organization develops and improves its knowledge, capabilities, and processes.

Definition

Learning involves acquiring and validating new knowledge, new conceptual models, and new practices. Intelligent people and organizations can learn more stuff in a given amount of time. Learning also implies unlearning — modifying or abandoning false beliefs and practices that aren't working.

For practical purposes, we aren't just interested in theoretical learning — acquiring new models and abstract knowledge — but practical learning. As Chris Argyris and Donald Schön explain, the point of organizational learning is not to change the espoused theory (the models people pay lip service to) but the theory in use (the models that actually drive behavior).[28]

Motivation

An intelligent organization needs to constantly adapt its behavior to fit the current demands of the environment, as well as maintain or increase its general adaptability and agility in anticipation of future changes in demand.

Characteristics

Simple goal-directed behavior involves a feedback loop from outcomes back to actions. This allows us to get better at achieving a fixed set of goals, more generally referred to as governing variables (see Figure 4a).

Argyris and Schön introduced the concept of double-loop learning, which involves a second feedback loop, allowing us to question our mental models and alter the governing variables (see Figure 4b).[29] This is clearly a critical step for organizational learning.

While single-loop learning is based on the information we are already monitoring, and leaves the organization and its systems basically unchanged, double-loop learning may involve paying attention to additional kinds of information, as well as stimulating sense-making activity and developing or altering the corporate stock of knowledge.

Double-loop learning should not be confused with Gregory Bateson's concept of Deutero-Learning, which means learning how to learn.[30] Clearly this is another important requirement for an intelligent organization: increasing the capacity to assimilate and accommodate new thinking and organizational change.

Dependencies

Connection Between Action and Learning

Some organizations repeat actions without improvement. There is a lack of self-awareness. There is no feedback loop, so improvements in performance are haphazard and unremarkable.

Figure 4a — Single-loop learning.

Figure 4b — Double-loop learning.

Connection Between Abstract Learning and Practical Learning

Sometimes lessons are learned on paper, at an abstract intellectual level, but these are not translated into an authentic transformation of working practices. People are able to say what they have learned, and can articulate a plausible theory of what they should be doing or might be doing, but they seem unable to deploy their learning in real situations.

Patterns and Examples

Learning from Weak Signals

Once a major event has occurred, we can always look back with hindsight to see the early warning signs that might have allowed us to anticipate the event. We can then build detection of this class of signal into our routine scanning.

However, there is a structural problem with this kind of learning. It assumes that future events will follow the pattern of past events; it adds to the range of signals that must be monitored and may give us no protection against surprise. We can see this tendency in airport security: one terrorist tries to smuggle a bomb in his shoe; for years afterward, millions of travelers must take off their shoes before boarding an airplane, Meanwhile terrorists merely switch to an alternative tactic. Focusing security on last year's terrorist tactics does nothing to make us safer in the future and may even distract security from paying attention to emerging weak signals.

Furthermore, the strength or weakness of a signal is not a pure attribute of the signal, but is relative to the perceiving system, which can change (learn) over time.

For example, William Hershel's 1781 discovery of Uranus was based on his interpretation of some extremely faint signals from beyond the limits of what was known of the solar system at the time. Hershel had to convince his contemporaries not only that these signals really existed, but also that they indicated the presence of a previously unseen planet. However, once Hershel and his supporters had won the argument, it became easier for other astronomers to see these signals, not only in new observations but also in previously recorded observations that had not been properly analyzed. In other words, prior knowledge of the existence of Uranus affects the perceived strength of its signals.

Resistance to Learning from Weak Signals

There are two levels of resistance to accepting a given strategic argument based on weak signals: first, an unwillingness to accept the conclusions of the argument, and second, an unwillingness to embrace a more complex world in which these signals play a significant role.

One-Sided Learning

There are several systematic patterns of learning error. Where you have a choice between two options, you get feedback on the option you actually chose, but you may not get much feedback on the option you didn't choose, and this introduces a systemic bias into your learning process. The late Russell Ackoff used to argue that true learning requires paying attention to the "road not taken."[31]

For example, if the police targets a particular section of the population to search for illegal weapons, or a sales force targets a particular type of customer with a sales offer, it is relatively easy to monitor the percentage of successful arrests or successful sales from the campaign, but if that's all you ever do, you won't have any idea what the percentage would have been in the remainder of the population. In other words, you can estimate the number of false positives (people wrongly searched) but not the number of false negatives (people who should have been searched but weren't).

Requirements and Recommendations

There are two key requirements for effective learning about a complex environment. First, you need sufficiently good feedback loops to be able to conduct single-loop learning efficiently, in order to provide a sound foundation for double-loop learning. Second, you need sufficient experimental variety in the conditions to explore cause-and-effect relationships. This is an application of the requisite variety principle.

In general, organizations lack a coherent evidence base for learning from experience, and this is a critical requirement for improving information systems in support of organizational intelligence.

COMMUNICATION AND COLLABORATION

The sixth and final capability refers to how people and groups work together, including how they exchange information and knowledge and how they share ideas and meanings.

Definition

As Karl Weick writes:

> The distinctive feature of organization level information activity is sharing. A piece of data, a perception, a cognitive map is shared among managers ... [and enables them] to converge on an approximate interpretation.[32]

Motivation

In many contexts, the word "sharing" has become an annoying and patronizing synonym for "disclosure." In nursery school we are encouraged to share the biscuits and the paints; in therapy groups we are encouraged to share our pain; and in the touchy-feely enterprise we are supposed to share our expertise by registering our knowledge on some stupid knowledge management system.

However, the key factor that turns a bunch of clever and not-so-clever individuals into an intelligent organization is their ability to communicate and collaborate.

This is because the intelligence of a system is not a simple arithmetic function of the intelligence of the subsystems. So to make an intelligent organization, it isn't enough to recruit the brightest people, locate them in state-of-the-art buildings, and provide them with the smartest computer tools and networks. Super-intelligent individuals are often poor at talking to one another and sharing knowledge, let alone coordinating their work effectively.

All sorts of communication and collaboration are important, but for the purposes of this report we are particularly interested in those aspects of communication that specifically relate to the other capabilities we have discussed; in other words, information gathering, sense making, decision and policy, knowledge, and learning and development.

Characteristics

At one extreme, too much agreement becomes a kind of corporate dogmatism or groupthink. At the other extreme, too much disagreement results in a lack of coherent action or strategy. Therefore, intelligent communication and collaboration needs a healthy balance between agreement and disagreement.

Dependencies

The effectiveness of communication and collaboration within an organization is significantly dependent on questions of organizational psychology and culture. (There is a substantial literature on these topics, and there isn't room in this report to summarize it all.)

Another important success factor is the range and quality of communication mechanisms and platforms. What is at issue here is not the abstract technology (the pure software) but the technology in use; in other words, how these tools are actually used within the organization. (The gap between these two is a major issue for any kind of technology adoption, and especially here.)

Patterns and Examples

Cosy Conformity

It has often been argued that corporate culture can inhibit innovation and that groups responsible for experimental products and processes tend to perform better if they are put into a separate organizational unit at some distance from the main offices. In recent years, many companies have set up R&D units in special science parks, colocated with similar units from other companies, usually with links to a nearby university. This is essentially applying architectural thinking to the geographical location and distribution of certain classes of capability and reflects a common belief in the importance of these factors.

But interaction and clustering is nowadays much less dependent on physical geography and much more dependent on virtual online communities and networks. Viktor Mayer-Schönberger of the National University of Singapore argues that today's software developers work in social networks in which everyone is closely linked to everyone else: "The over-abundance of connections through which information travels reduces diversity and keeps radical ideas from taking hold."[33]

What Mayer-Schönberger sees as an overabundance of connections can be understood as a form of tight coupling. If we want to build the capability for radical innovation, we need to create a decoupled space to support a loosely coupled knowledge cycle, which means careful attention to the effects of social networking on organizational intelligence.

Creative Conflict

Harold Wilensky tells the story of British and American intelligence trying to interpret German propaganda during the Second World War.[34] One journalist at the time described the propaganda analysts as "the greatest collection of individualists, international rolling stones, and slightly batty geniuses ever gathered together in one organization." Despite this fact, they achieved an extraordinarily high rate of accuracy, especially when they worked jointly and systematically and not as isolated mavericks.

Elsewhere in his book, Wilensky praises US President Roosevelt for maintaining a state of "constructive rivalry ... structuring work so that clashes would be certain."

The Talent Myth

This refers to putting the emphasis on recruiting and rewarding individual talent while neglecting collective capabilities. In his essay on the talent myth, Gladwell points out some of the characteristics of the superstar culture (as practiced at Enron) that may impair both organizational intelligence and organizational success:[35]

- Overvaluing abstract knowledge and undervaluing grounded (tacit) knowledge
- Moving people around frequently so their true performance cannot easily be assessed; hence, "performance evaluations that aren't based on performance"
- Making the needs of Enron customers and shareholders secondary to the needs of its stars

From a psychological point of view, narcissism is more about identity (who we are) than about viability (what we do). Narcissists (both individually and collectively) may not be very good at assessing what is really going on, are likely to be one-sided when "sharing" knowledge and ideas, and will generally try to interpret events as confirmation of how wonderful they are rather than as opportunities for learning. So that's several problems with organizational intelligence right there.

Requirements and Recommendations

Web 2.0 and Enterprise 2.0 offer a broad range of support facilities relevant to this aspect of organizational intelligence, but the key is to align these facilities with organizational culture. Typical focus areas include:

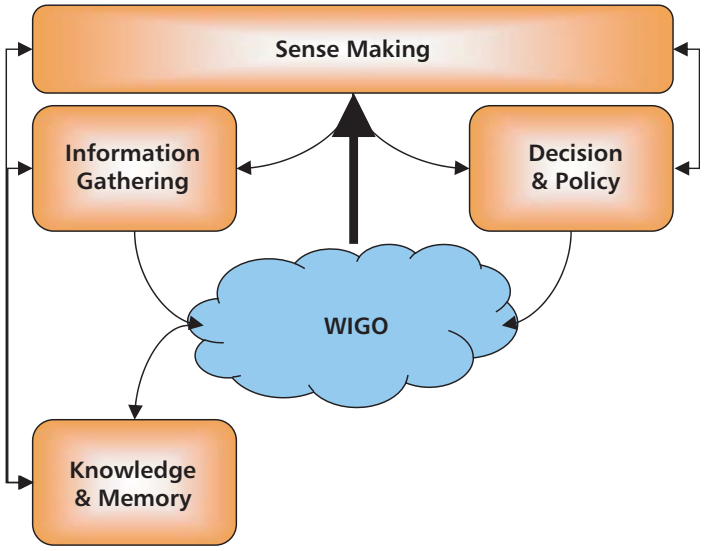

Figure 5 — Business intelligence loop.

- Social networking:
  - Development of horizontal communities within the organization
  - Creation of "neighborhoods"
- Decoupling information processing from decision making:
  - Allowing critical decisions to be made by the most appropriate people in the organization, using the most powerful tools
  - Collective discussion: blogs and wikis
  - Prediction markets
  - Allowing critical decisions to be rapidly disseminated through business operations

SELECTED LOOPS

There are many ways of tracing loops through the six capabilities of organizational intelligence, most of them emphasizing some capabilities more than others. Many organizations will already have some of these loops in place; the architectural challenge is to put them into a coherent and complete framework.

Business Intelligence

Closed-loop business intelligence includes environmental scanning, data mining, and analytics (see Figure 5).

In their book *Competing on Analytics*, Thomas Davenport and Jeanne Harris define business intelligence as a set of techniques and processes that use data to understand and analyze business performance, from data access and reporting to analytics proper, together addressing a range (spectrum) of questions about an organization's business activities.[36] They position analytics at the higher-value and more proactive end of this range (spectrum) and offer a graph that appears to correlate the degree of intelligence with competitive advantage.

They acknowledge that intelligence is not just about asking clever questions but includes a number of other capabilities described in their book including fact-based decision making (sometimes known as evidence-based policy) and the capture of learning from organizational experiments.

However, this loop focuses too heavily on efficiency (single-loop learning) and not enough on disruptive innovation (double-loop learning). An intelligent organization will need to be adept at analytics, but that's not the whole story.

Command and Control

Military operations use a command-and-control loop, sometimes known as ISTAR (intelligence, surveillance, target acquisition, and reconnaissance), which emphasizes the top half of the figure seen in Figure 6. Boyd's OODA loop covers a similar space.

It may be worth noting that some organizations deploy this kind of loop with an exclusive attention on external information and completely ignore internal information.

Knowledge Management

Underlying the knowledge management agenda are a number of (usually) unexamined assumptions:

- Most of the knowledge we need already exists in people's heads; we just have to get it out.
- Knowledge is additive; the more knowledge we can "capture" or "extract" the better.
- Explicit knowledge is better than implicit or tacit knowledge; codification is a "good thing."

Thus, knowledge management becomes a combination of documentation/codification and librarianship, plus whatever persuasion or coercion may be necessary to encourage people to participate in this game. Added to this is a kind of open-ended information retrieval (see Figure 7).

Undoubtedly there are some situations where this kind of thing can deliver direct value to the organization; for example, in pharmaceuticals, where any delays in the assembly of regulatory information for a new drug can cost millions of dollars in lost revenue. But is this really knowledge management or just a sophisticated form of information management?

An alternative approach to knowledge management is to leave it in people's heads and provide knowledge maps that tell everyone whom to ask for certain information. The trouble with this approach is that the genuine experts often keep their heads down, for fear of being swamped with inquiries from around the globe, while attention seekers use this as an opportunity to promote themselves. Thus, questions of motivation and excellence must be addressed, and knowledge management becomes a branch of HR.

There are of course some approaches to knowledge management that explicitly address sense making; for example, Cynefin, a framework that relaxes the conventional assumptions of order, of rational choice, and of intent.[37]

Business Process Management

At its best, the business process management loop may include context-based customization and optimization of the business process, based on performance monitoring. This is an example of "learning by doing" as applied to the business process (see Figure 8).

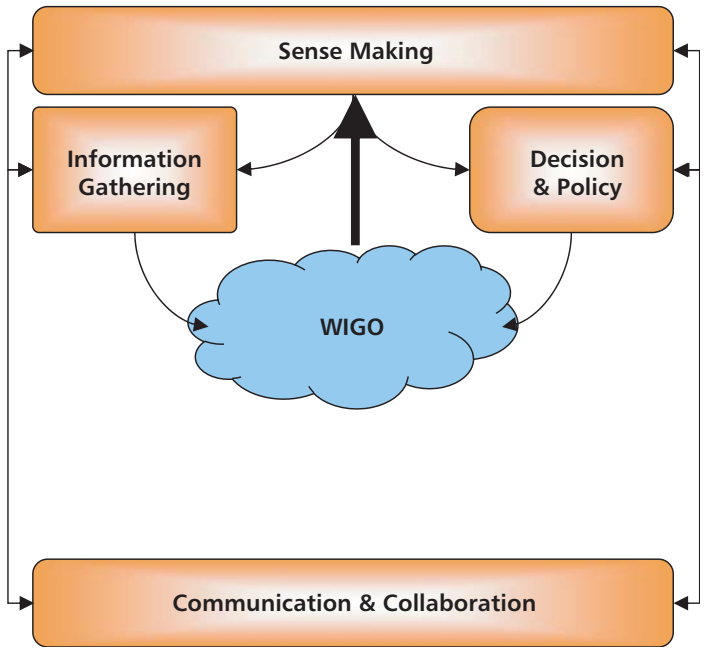

Figure 6 — Command-and-control loop.

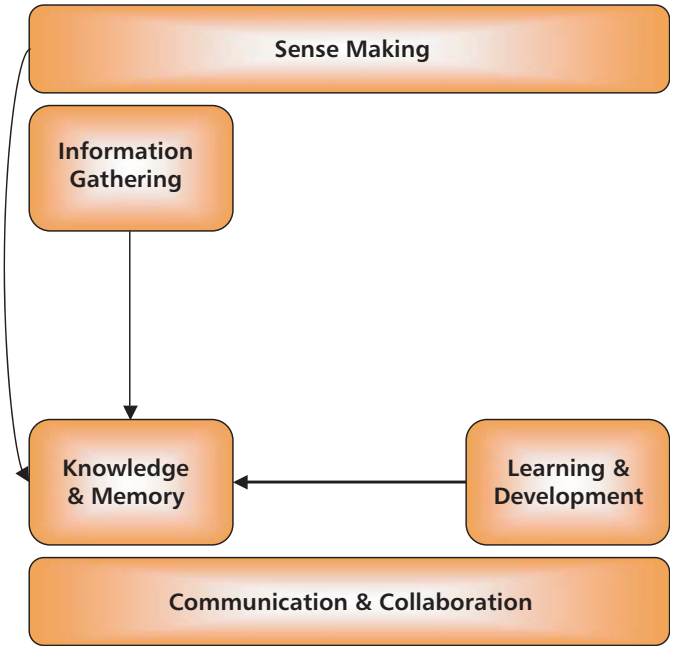

Figure 7 — Knowledge management loop.

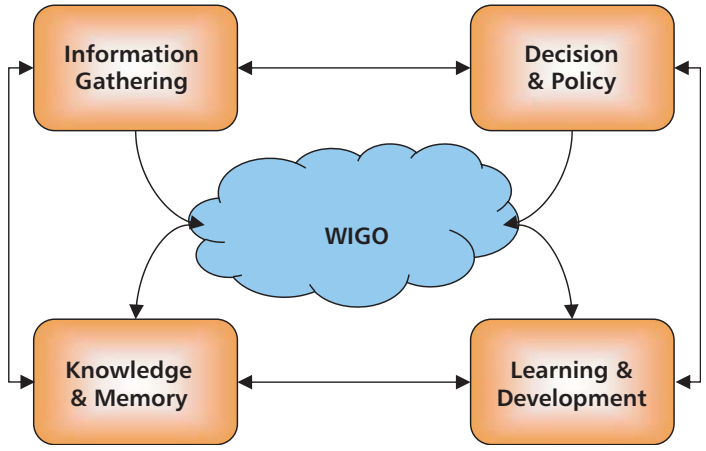

Figure 8 — Business process management loop.

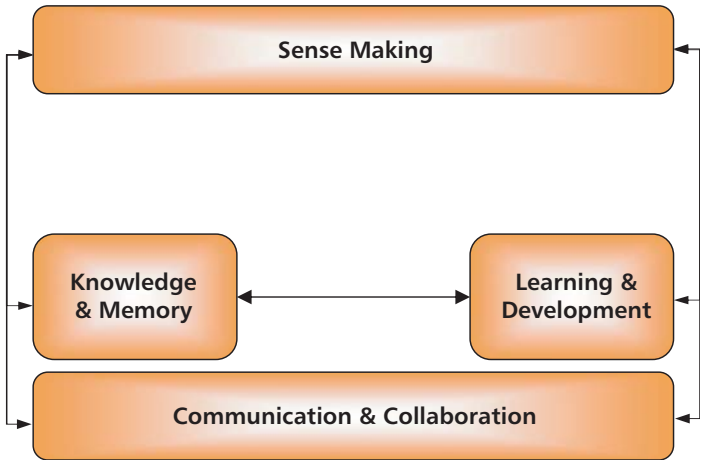

Figure 9 — Enterprise 2.0 loop.

Enterprise 2.0

Finally, let's look at the Enterprise 2.0 loop, as championed by Andrew McAfee and others, which emphasizes communication and collaboration, largely in the interest of sharing information and knowledge, as well as developing shared meanings and learnings (see Figure 9).[38]

There has been a lot of cautious interest in this kind of approach, but it's often unclear how it is supposed to link to other enterprise activities.

CASE STUDY

In this section, I review how organizational intelligence has been implemented in a global insurance company, based on a long conversation with Toby Redshaw, global CIO of Aviva.

Interviewed by *Computer Weekly* about Aviva's cloud-based Web 2.0 platform, which includes an intramural social network, a global knowledge management solution, a collaboration suite, and a sophisticated content management/intranet, Redshaw asserted that the results were spectacular in terms of improving workers' access to expertise, ideas, and solutions and described this as a general increase in the firm's cumulative IQ.[39]

For a global corporation like Aviva, the online world provides a virtual equivalent of the company "campus" that emerged in the 1980s and is still popular with technology companies like Microsoft and Vodafone. A physical campus can be an efficient clustering of coworkers, or it can be a confusing sprawl. But in any case, a physical campus is limited to colocated workers and does not provide a solution for a globally distributed enterprise such as Aviva.

The Aviva Web 2.0 platform provides horizontal connectivity across the globe, helping to integrate the global intelligence of the firm. The benefits are as follows:

- Consistency ("one Aviva, twice the value")
- Reducing cycle time for decision making and problem solving (cut "waste"); improving the quality and efficiency of decision making
- Reducing the innovation cycle time (cut "uninnovation"); innovation involves not only solving problems but getting the solutions out into the mainstream
- Reducing communication time; for example, for disseminating top-down management vision

I asked about the platform's role in picking up weak signals from the environment. Clearly there are specialist functions within any large insurance company, such as investment management, risk management, security and fraud, that need highly sophisticated mechanisms for monitoring the environment, with rapid sense and respond, especially from a financial perspective. While the platform doesn't replace these mechanisms, it provides an efficient and integrated way of communicating insights within each functional specialism.

For more general weak signals, such as picking up new kinds of customer demand or a customer service issue, there may be a greater role for nonspecialists to contribute observations and ideas, which might (if repeated and confirmed around the organization) lead to new opportunities for product or process innovation, with a much more generalized notion of sense and respond. Although the Aviva platform does not yet support this kind of bottom-up analysis, Redshaw sees an opportunity to bring more traditional business intelligence and analytics into the platform, which would allow a data

mining and number-crunching capability to be distributed more efficiently around the organization. Like many organizations, Aviva identifies three levels of business intelligence user. For most people, business intelligence merely means having a reasonably comprehensive picture of what is going on, using dashboards and similar devices offering multiple views but with fairly static schemas. For business number crunchers, the platform could help to bring some coherence and order into a turbulent sea of spreadsheets. And serious data mining and statistical analysis would remain the responsibility of a relatively small handful of experts, but with the power to collect data from a larger and more distributed pool and then disseminate their findings more effectively around the company. In the first instance, the challenge is not to extend business intelligence capabilities as such but to use and share the existing capabilities more efficiently and reduce duplicated analytic effort.

Critical to the success of the platform is its ability to integrate traditional knowledge management and communication with the business process itself, so that the platform is not a standalone adjunct to the day job. The key here is to integrate the platform with business process management tools, both as a construction framework to allow process-related problems to be solved collaboratively and to allow the platform to inject decision-making and problem-solving support into the operational process. Redshaw indicates that this is very much work in progress.

A platform like this cannot be done on the cheap, and Aviva has already invested millions of dollars in the technology alone. Over time the technology will get less expensive, but the effective use of the platform is learning-intensive, and Redshaw believes that 12-to-18 months' worth of cultural change gives Aviva a considerable competitive advantage, which late adopters will find it hard to catch up to. Early evidence for the perceived value of the platform can be measured in terms of the volume of use — the number of forums (running into tens of thousands, some short-term single issue, others more ongoing) and the amount of time spent per employee using the platform. This usage represents a vote of confidence in the usefulness of the platform. In the future, it may be possible to measure the business value in more direct ways.

One of the difficulties managing this kind of technology is knowing how much to spend on ongoing improvements. There is a continuous stream of innovations from suppliers, as well as a constant wish list from the more technically enthusiastic sectors of the workforce, and it is often hard if not impossible to see the business value of any particular improvement in isolation. Furthermore, Redshaw points out that there can often be a huge variation in the prices charged by different vendors for systems with broadly similar business benefits, and says that procurement skills and experience are essential.

It is a common cliché that radical initiatives require senior management support and commitment. But with this kind of platform, it is not enough for senior management just to sign the checks and act as cheerleaders (acknowledging and praising achievements and those responsible for them); they also need to be seen using the platform themselves. Thus, the CEO and CIO blogs are featured on the Aviva platform home page, giving particular prominence not only to the content of their ideas but to their commitment to the process and their belief in its value. (Obviously if senior management blogging were to become more and more infrequent, this might send a negative message to the rest of the workforce.)

Is this venture limited to Aviva's own workforce? Based on Sun Microsystems founder Bill Joy's remark "Not all smart people work for you," which Redshaw quoted, there are clearly opportunities to extend this platform into the Aviva ecosystem; for example, external providers and channel partners, one day perhaps even customers — thus, leveraging the intelligence of the ecosystem as a whole. There are some obvious challenges here — not just technological but commercial — so this isn't going to happen overnight, but it would undoubtedly be an interesting development for any company of Aviva's reach.

In any case, regardless of these speculative future visions, Aviva is clearly embarked on a promising and ambitious journey of systematically improving its organizational intelligence, and I look forward to following its progress in the future.

GENERAL REQUIREMENTS AND PRACTICAL STEPS

Where to Start?

Achieving and enhancing organizational intelligence typically requires both organizational change and technological change, including:

- **Assessment** — what are the overall strengths and weaknesses of your organization; what are the process, structural, and technological roadblocks to organizational intelligence?

- **Opportunity planning** — what are the priorities for improving organizational intelligence, and how can these best be implemented; what is the business case to support any necessary investment?
- **Organizational development** — what working practices are needed; how can the organization use the available tools and platforms more coherently and effectively?

The assessment is carried out in three stages:

1. A quick review of each capability separately, to assess whether it is broadly fit-for-purpose
2. Modeling how the capabilities are joined up (integrated) across the enterprise
3. Evaluating the actual and potential contribution of well-balanced intelligence to the performance and viability of the organization as a whole

Requirements

Table 3 shows some typical requirements for the intelligent organization.

CONCLUSIONS

It would be wrong to draw simple conclusions from this material. We have seen organizations with vast resources, including access to the latest technology and research, falling short of some idealized notion of

Table 3 — Typical Requirements

Capability	Key Organizational Requirements	Key Technology Requirements
Information gathering	People picking up and sharing relevant signals and trends from a broad range of sources. Situational awareness.	Net-centric information systems (possessing reach, richness, agility, and assurance). Ability to tag and annotate items to improve context and relevance. Rich dashboards to monitor "what is going on." Data mining and analytics.
Sense making	Tolerance of diversity, ambiguity, and uncertainty, sometimes called "equivoque." "Lenscraft" — the use of multiple system lenses.	Broad range of simple visualization and modeling tools (e.g., mind mapping). Open and relatively unconstrained discussion platforms (e.g., blogging).
Decision & policy	Power to the Edge — enabling decisions as close as possible to the key external relationships.	Sense and respond — ability to deal with urgent events immediately. Traceability and feedback — ability to monitor and improve the outcome of key decisions and policies.
Knowledge & memory	Establishing multiple knowledge communities across the organization. Encouraging knowledge flows.	Ability to monitor the provenance and use of knowledge — where does it come from, what outcomes are dependent upon it? Simple statistical tools to verify the evidence base of knowledge in use.
Learning & development	Flexible organizational structures. Experimentation — exercising diversity to test differentiation of outcomes.	Flexible processes and systems, allowing new information and knowledge to be rapidly assimilated and disseminated.
Communication & collaboration	No-blame culture.	Social networking platforms.

organizational intelligence. We have seen large organizations sometimes struggling to deal with the complexities of the business, sometimes moving surprisingly quickly to anticipate opportunities or threats. Those who tend to see their own organization in a positive light may feel that achieving higher levels of organizational intelligence is merely a matter of fine-tuning the structures and mechanisms that already exist; others may feel discouraged by the difficulties faced and errors made even by the most impressive organizations and that the dysfunction within their own organization results in such irredeemable stupidity that any improvement would be too little, too late.

If you really believe that of your own organization, all I can say is that it must be horrible to work there. But I think there are grounds for optimism: if you can pay attention to more of the things that matter, if you can deal with more of these things, if you can make errors and learn from them, and above all if you can do these things collectively rather than privately, then you are going in the right direction. There are a lot of tools that can help; none of them are perfect, all of them can waste you a lot of time, money, and trust if you get bogged down in the technology and lose sight of the real reason for using these tools in the first place. Above all, there is a lot of wasted brainpower, knowledge, creativity, and energy in most organizations that cannot be merely waved away with slogans of "empowerment"; the organizational intelligence framework described in this report offers practical ways of making this mental energy more productive — and not just for the sake of making workers more happy and fulfilled, but to focus this mental energy on the organization's mission.

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APPENDIX: GLOSSARY

This glossary of key terms used in the *Executive Report* includes a short definition, a primary source (located in the Endnotes section), and related terms.

- **Appreciation** — reality judgment; understanding what is going on. Source: Vickers. Related term: sense making.
- **Bounded rationality** — satisficing ("good enough") instead of optimizing ("perfect"). Source: Simon.
- **Deutero-Learning** — learning how to learn. Source: Bateson. Related term: double-loop learning.
- **Double-loop learning** — learning involving a second feedback loop, allowing mental models and governing variables to be adjusted. Source: Argyris and Schön. Related terms: single-loop learning; Deutero-Learning.
- **Enterprise 2.0** — social software for the enterprise. Source: McAfee.
- **Equivoque** — tolerance of diversity, ambiguity, and uncertainty. Source: Weick.
- **Espoused theory** — what people say they do, the models they pay lip service to. Source: Argyris and Schön. Related term: theory in use.
- **False negative** — an instance that is incorrectly omitted from a category. Related term: false positive.
- **False positive** — an instance that is incorrectly included in a category. Related term: false negative.
- **Interpretation** — see sense making.
- **Lenscraft** — the use of multiple system lenses.
- **OODA** — Boyd's observe, orient, decide, act.
- **Orientation** — see sense making; based on OODA.
- **Power to the Edge** — the ability of an organization to dynamically synchronize its actions; achieve command-and-control agility; and increase the speed of command over a robust, networked grid. Source: Alberts and Hayes.
- **Requisite variety** — the principle that the variety (complexity) of a control system must match the variety (complexity) of the system being controlled. Source: Ashby.
- **Satisficing** — a decision-making strategy that attempts to meet criteria for adequacy rather than to identify an optimal solution. Source: Simon.
- **Sense making** — committed interpretation. Source: Weick. Related terms: appreciation, orientation.
- **Single-loop learning** — a feedback loop that affects action only, leaving the mental models and governing variables unchanged. Source: Argyris and Schön. Related term: double-loop learning.
- **Theory in use** — the models that actually drive behavior. Source: Argyris and Schön. Related term: espoused theory.
- **Theory X** — a management approach based on incentives and punishment, using close supervision and control. Source: McGregor. Related term: Theory Y.
- **Theory Y** — a management approach based on participation and self-control. Source: McGregor. Related term: Theory X.
- **Weak signals** — "Weak signals are warnings (external or internal), events and developments that are still too incomplete to permit an accurate estimation of their impact and/or to determine their complete responses." Source: Ansoff and McDonnell.

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