Improved Information Exchange as an Advanced Governance Tool

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Abstract: Whereas many organisations focus on the optimal functioning of their processes to achieve their goals, we nowadays see organisational challenges spreading to their functioning within networks. This poses a significant question for management and leadership: Are their decisions shaping or controlling their own or the network partners' functioning? However, modern networks grant partners autonomy to make their choices, believing that the collective outcome of these autonomous decision processes can also yield results. However, cooperative decision-making between network partners is pivotal in today's society. Finding a balance between control over the network, autonomy of the partners and cooperation between them leads to what is often referred to as the emergent behaviour of the network. So, 'context is leading' requires reacting fast and efficiently to become a resilient organisational network. It is becoming evident that the resilience within network functioning lies in the exchange of information and data availability. In current practice, partners often seek solutions by striving for unity of language and/or data dictionaries. Unfortunately, this approach doesn't lead to optimal results in day-to-day practice. We propagate the adoption of a different approach. This article presents a non-invasive perspective on micro-contexts and their emerging information systems. By engaging these systems in their current form through formalised abstractions, we suggest effectively linking information and data sources to enhance information exchange and data availability. Improving information exchange will show itself instantly as an advanced governance tool

Keywords: Managing Uncertainty, Information Management, Adaptive Cycle of Resilience, Governance, Cooperation

1. Introduction

Many organisations still focus on optimising their processes to achieve their goals best. This approach has worked well for decades, but it increasingly appears that it does not support the adequate tackling of today's challenges, which are characterised by the degree of uncertainty and the extent to which they are well—or ill-defined.

Dealing with well-defined challenges usually requires a clear view of the solution's direction and knowing or finding the applicable knowledge when it is unavailable.

However, in modern circumstances, challenges are initiated by disruptive and unforeseeable changes. Forecasting the knowledge necessary to deal with the challenge is impossible. This uncertainty makes the search process difficult, if not impossible. The search process cannot be structured in a traditional way. It must be based on combining different insights without knowing what contribution the knowledge elements will have.

This process is even more complicated when we consider the network of partners we usually work together with, and who also contribute to managing the current challenge. Whether and how the network partners contribute is uncertain upfront.

However, cooperative decision-making between network partners is pivotal in today's society. This leads to a different type of requirements management and leadership will have to deal with. Finding a balance between control over the network, autonomy of the partners, and cooperation between them leads to what is often referred to as the emergent behaviour of the network.

In a complex setting like this, we must know that every network partner works within its context. Given the complexity of contemporary society, combining the different micro-contexts into an integrated valid one appears difficult.

Even though, 'context is leading' requires reacting fast and efficiently for a resilient organisational network. It is becoming evident that resilience within network functioning lies in the exchange of information and data availability.

This leads to a situation where separate micro-contexts exist both in networks and the data models that determine network partners' information systems. Thereby, the underlying assumptions for the design of the organisational information systems and the data models are far from being in line with each other, which is an obstacle to achieving optimal information exchange and data availability between the network partners. In current practice, partners often seek solutions by striving for unity of language and/or data dictionaries. However, this approach doesn't lead to optimal results. We propagate the adoption of a different approach for advancing the information exchange, which we introduce later on. But first, we need to understand organisations' challenges.

2. Challenges and Solutions

In general, management is searching for an agreement on the problem space being close to certainty with processable problems and agreements on dealing with them. In such a setting, they can make power and policy decisions, control the challenges, and predict potential futures based on clear visions and shared insights.

However, as mentioned in the introduction, current-day challenges are often far from certain without agreements on the nature of the problem (see Figure 1). For a better understanding, we must dive deeper into the characteristics of organisations' issues.

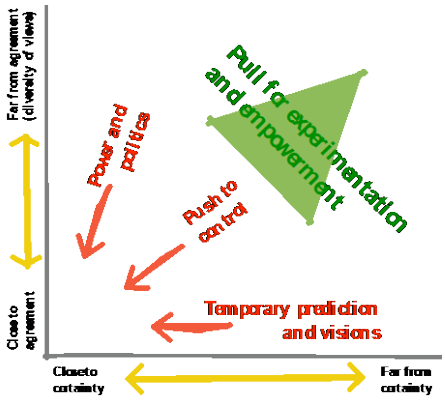

Figure 1: Tensions for restructuring the challenges (Abcouwer, Takács, Schilstra, et al. (2022))

2.1 Well Defined Versus Ill-defined Challenges: the Problem Space

To identify the problem space, we distinguish between well- and ill-defined challenges (see Figure 2).

Well-defined challenges have a well-defined initial state (which is known), a well-defined goal state (the solution is reachable) and a known procedure for solving the problem (solution process) (Jonassen, 1997, 2000; Simon, 1973).

Ill-defined problems, on the other hand, are characterized by conflicting assumptions, evidence, and opinions, which can lead to multiple or even no solutions. They lack a guaranteed procedure for resolution, as well as a standard method for evaluation (Jonassen, 1997, 2000; Kitchner, 1983).

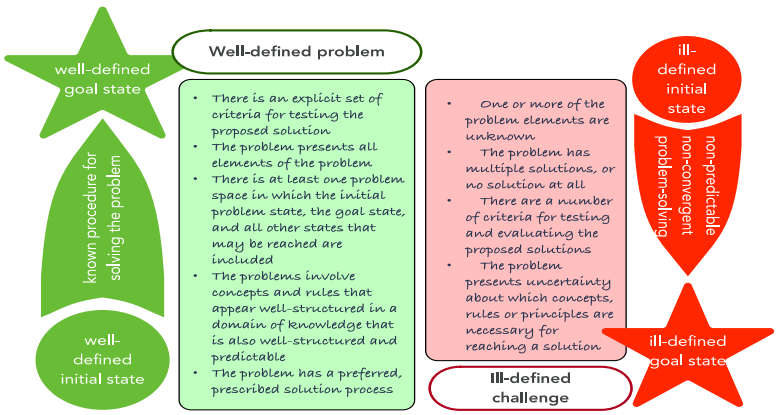

Figure 2: Well-defined problems vs ill-defined challenges (Abcouwer, Takács, Schilstra, et al. (2022))

2.2 Problem Solving in an Ill-defined Context: the Solution Space

Organisations can benefit from classic strategy models and processes in stable settled environments. In such a setting, the initial state of the organisation is known (the IST situation), the target state is known too (the SOLL situation), and the focus is mainly on the process an organisation will have to go through to get from IST to SOLL. Still, knowledge-intensive organisations face a competitive environment with unclear market circumstances and more demanding and knowledgeable customers, where traditional strategy is no longer appropriate. Also, rapid change and technological innovation require flexibility. Another important reason is the dependence on individuals' knowledge working in the system, lacking creative processes and inclusion of individuals that cannot be dealt with adequately in traditional strategy models. Researchers also mention these: Hamel and Heene (1994) highlight the requirement for a proactive rather than reactive approach to competing in competitive spaces.

Mintzberg (2009) says that uncertainties and rapid change mean that a planning approach to strategy does not function in most cases and that the distinction between formulation and implementation is unsustainable. Kanter (2002) suggests that companies that want to overtake the competition throw out "the script" and improvise their way to new strategies. Barney (1991), Collis and Montgomery (1995) emphasise the internal resources for sources of competitive advantage in an uncertain market: competence and other intangible assets such as brands, intellectual property or relationships, where innovation and the ability to propel ideas to market quickly become crucial. Collins and Porras (1996) and Davidson (2004) said that values, beliefs and vision become critical when people are the key value drivers, as they guide and align the behaviours of employees.

Depending on how people create value, the critical role of strategy is to provide a vision and purpose for being, leading to a shared context for decision-making and guidance for employees and managers (Rylander & Peppard, 2003). The challenge lies in balancing stability and flexibility (Lindgren & Bandhold, 2003) or resilience, especially when the challenges which are either well- or ill-defined, can be 'certain', 'risk', or 'uncertain' (Gigerenzer, 2015). In line with Gigerenzer (2015) we can describe Certain, Risk and Uncertain as follow.

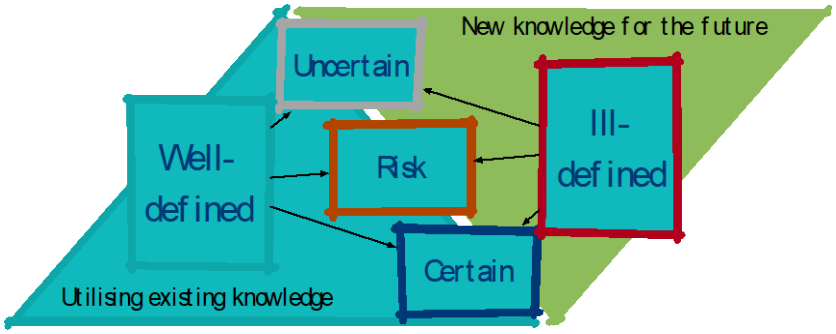

Figure 3: Balancing problem space and solution space (Abcouwer et al. (2018)

In ***Certainty***, the organisation is in a well-defined 'Certain' situation when its goals and knowledge that supports problem-solving are clear. When the Challenge is ill-defined, the objectives and required knowledge can still be clear. The focus is then on accessing it and assuring quality and integration.

Risk occurs when managers and leaders are unaware of or do not entirely know the nature of the problem - the case of an ill-defined challenge - or in a well-defined challenge. The solution might not be available right away, or several solutions are available, and the question of which solution must be chosen is unclear. In such situations, the organisation faces a risk situation.

Uncertainty is when managers and leaders are completely unaware of the nature of the problem or the solution to be chosen; the problem sets can be called a crisis, a state in which the traditional way of problem-solving does not work anymore. Finding new countermeasures is the key for being able to solve problems and requires scenario analysis to the set of opportunities that can facilitate a contingency approach. In this setting, the required knowledge has yet to be known and being experimental might be the only way to deal with the situation. Monitoring and communication will be crucial to identify the necessary knowledge to solve problems.

In the past, the challenges in an organisational context were more well-defined, in many cases related to process optimisation, etc. Still, now we see developments towards ill-defined challenges and/or undefined solution spaces (see Figure 3).

Organisations need to find answers to problems they have yet to learn, and the traditional problem-solving approaches no longer work well - some call it a crisis. Often referred to approaches, like the ***plan-do-check-act*** sequence, assume that the objectives for the change processes and traditional change approaches are leading. Planning and applying the change, checking its effectiveness, and adaptation often leads to a false belief that every problem can be solved. In practice, '*turning the corner at right angles*', necessary when we must let go of the old and insufficient problem-solving approaches, is complicated because the challenges are different and not adequately supported. For example, in the telecom world, a ***plan-do-check-act*** approach, or agile working will never change a Nokia 3310 into an iPhone.

3. Reality and Models: Deciding on Abstractions

When describing the actual state of the system (whether it is an individual, organisation, network, society, etc.), we develop models to reduce the complexity of the context. Reality is too complex to consider everything, so abstracting helps to describe the problems up to a required level of detail (see Figure 4). Abstractions depend on the challenge and the organisation's objectives. The reality must be translated into data and process models by applying necessary abstractions. These data and process models form the basis on which knowledge and information systems are built, where we must consider the capabilities of the applied technology. Given that, a second layer of abstractions must be made. It leads to a situation where the relevant knowledge and information within the organisational context will be two abstraction levels away from the real world. These abstractions in every type of human activity (individual, team, organisational, or societal), are determined based on the micro contexts. One of the biggest problems in information and knowledge management is aligning the systems with the reality they represent.

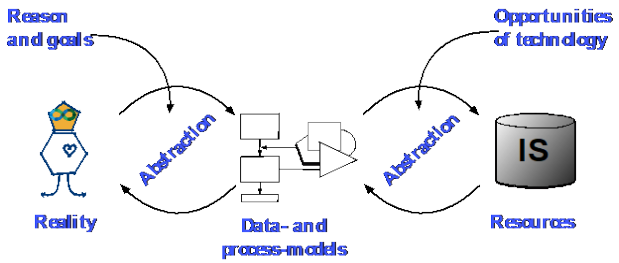

Figure 4: Abstraction of reality (Abcouwer, Takács and Banga (2022))

The model supports abstractions depending on the organisation's micro context and objectives. Based on that, choices regarding the organisation's strategy and structure guide the operations without imposing a direction, such as having strategic objectives first or basing yourself on competencies. Combining the abstraction approach and the strategy-structure-operation dimension leads to the Amsterdam Information Management (AIM) model, which combines the organisational and resource-based approaches (see Figure 5).

However, looking at the information issue in contemporary developments, the reality of current automation shows how difficult it is to align reality and systems, strategy and operations (Abcouwer & Smit, 2015; Chan, 2002; Ciborra, 1997; Coltman et al., 2015; Henderson & Venkatraman, 1993).

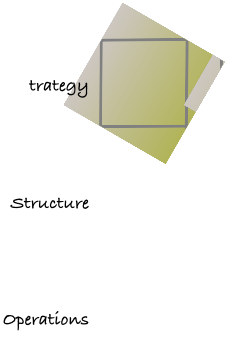

Figure 5: The Amsterdam Information model (Abcouwer, Takács and Banga (2022))

A potential solution in this respect is to develop a method of formalised abstraction where the translation into model and information and knowledge handling is standardised to assure exchangeability. Using a formalised linguistic-based semantic abstraction method, as suggested by Brands (2019) based on a universal ***Who-What-Where-When- (WWWW) approach***, offers the opportunity for automated detection of relationships in the different structured and unstructured data sets being used within the separate micro-contexts. Mind that in this respect only 20% of the data is structured in practice, so 80% is not (Blumberg & Atre, 2003; Mishra & Misra, 2017). The proposed method leads to flexible and resilient adaptive knowledge and information models, assuring that the structured and unstructured data sets can be used for training large language models and artificial intelligence. It is out of scope in the paper to work out this approach in more detail. (Brands, 2019) It also facilitates organisations to understand their own functioning better and allows them to compare their micro-contexts with those of partners they work together within a chain or network. In the next paragraph, we will explore working in a network setting.

4. Working in a Networked Setting

Organisations form a mechanism for coordinating activities based on their objectives/strategies to offer their results for individuals and/or society. In uncertain contexts and rapid changes, organisations should cooperate in networks (Obeng, 2003). While working in networks, the objectives of the network partners are often based on individual interests. Culture, justice, value-and-norm systems, and differences in ethics influence the organisation's behaviour. When many parties work together, the network structures are leading, and in many cases, there is no clear network leader and a common strategy to follow.

From the perspective of an individual network partner, their micro context largely determines how they manage their knowledge and information. Their interests take precedence, as do the two levels of abstraction between reality and knowledge and information systems, which are not automatically harmonised within the network (see Figure 6). This is a key reason why organising information exchange and data availability is daunting. Representing the reality of an individual partner participating in a cooperative context requires the alignment of many specific micro-contexts. Strategy, structure, and operations choices guide the organisation's daily activities within a context. From a network partner, only specific aspects of reality are considered based on the reasoning and – if available - objectives relevant to the partner's micro-context. When a different micro-context representation is made of the same reality, the alignment of reality and representation may not be replaceable. Different abstractions lead to knowledge, information exchange, and data availability problems in these different micro contexts. Specific aspects of reality may be relevant in one micro-context and redundant in another. Systems and channels used in the different micro-contexts cannot automatically exchange knowledge and information. However, it often occurs between the different micro-contexts in networks. Structuring the process of abstraction based on the specific micro-context only, will never lead to the required synergy between the partners. Introducing a formalised approach to describing the different micro-contexts, based on a generic ***Who-What-Where-When approach*** will aid the understanding of complex networks.

Dynamics, the fast-changing context, and the diverse operation fields force society to network/cooperate where limited and unclear mutual interests exist. Higher societal demands push the organisations, irrationality and unpredictability, requiring diverse specialisations. Mutual interdependencies and changing dominant societal and network problems lead the developments in changing directions.

Networks consist of many partners who make rational decisions independently but influence and affect other organisations. Dynamic interactions between partners makes it highly unlikely to view organisational behaviour from a single intra-organisational point of view. This mechanism works in two directions. Inwards the objectives of people match the organisational goals. Outwards, the organisations interact with their partners. The objectives of individuals, organisations and society are equally important here (Scharmer, 2007), we live in an era when a new form of presence power arises. (Scharmer & Yukelson, 2015) identify a development from ego-systems, with a focus on individual partners in the network, to Ecosystems. Ecosystems are special networks. Communities of customers, suppliers, lead producers and other stakeholders interacting with each other with their own specialities, to realize the shared goals. This can be seen as an extension of the classic network-organisation structure, in which organisations cooperate in a network: the stakeholder awareness

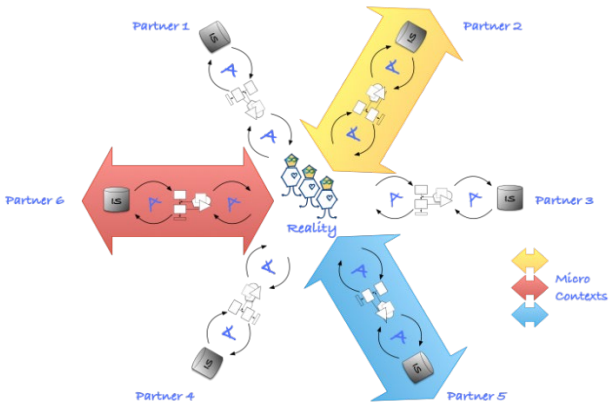

Figure 6: Micro contexts (own source)

Applying ecosystem in nature to an established business or innovation ecosystem, we see that all parties actively cooperate to create a balanced system, maybe even self-regulating. Audretsch et al. (2019) argue that ecosystems are characterized by cooperation and network externalities, demonstrating the relevance of cooperative learning and working in an ecosystem. Working in this context with semantic abstractions may assure the alignment and smooth exchange of knowledge and information. It helps us determine a structured approach for describing an integrated view of the IST and, depending on the degree of well-or ill-defined challenges, on the required SOLL of the network cooperation.

So, defining the different network elements (stakeholders, partners, government, etc.) using the proposed combined approach of the AIM model and the WWWW approach will help to gain a better insight into the reality everyone is facing.

However, partners working in different micro-contexts on complex change processes raise the central question of who leads or combines knowledge and information. With signalling, this immediately becomes a governance issue.

5. Governance and Responsibilities

Human organisations - just like nature again - consist of relationships (Wheatley, 2011). According to Keidel (1995), there are only three ways in which people can relate without conflicts: **Autonomy** (separation), **Control** (subordination) and **Cooperation** (integration), resulting in decentralised, centralised and team-oriented organisational structures (see Fugure 7). **Autonomy** is where everyone strives to fulfil their objectives to the best of their ability.

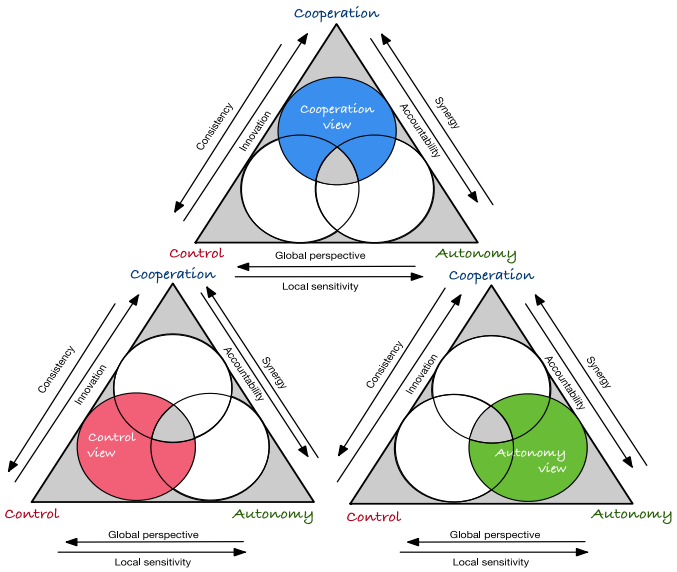

Figure 7 : Autonomy – Control – Cooperation (based on (Keidel, 1995))

Control-based working leads to hierarchical structures where a clear leader takes responsibility for the future behaviour of the community. **Cooperation** takes advantage of the competencies, abilities, and resources available in the community, where everyone contributes their best. In practice, all forms need to be present at an actual organisation. Based on the organisation's context, it is a bias for the direction of the ideal form an organisation is striving for.

An organisation's success factor is how it cooperates within and among organisations. From a societal point of view, the needs of the many determine the way. Aligning all individual needs with societal ones is extremely hard. Individual needs are different and dependent on that individual's specific context. Striving to align those objectives requires a strict hierarchy, a high level of control or a highly developed way of cooperation. In cooperation, the consultation will be the leading principle on which partners agree upon their objectives. Autonomous working is also an approach that can lead to great results. In this case, we assume that everyone can decide what is best for reaching results. This form of working together may lead to emergent behaviour in the organisation. So, cooperation and synchronisation of the activities may be centrally enforced (control), can be based on working together (cooperation), or assume that the participants' autonomous behaviour leads to emerging behaviour of the organisation or network. For success, trust is the principle on which participant base their cooperation.

As a next logical step and returning to the change process related to our challenges, we need to focus on the change process that enables the network to evolve from IST to SOLL. Understanding change in general is crucial to dealing with that specific challenge. The Adaptive Cycle of Resilience can support the change process, which we briefly describe in the next paragraph.

6. The Flow of Change

Over the past decades, numerous change approaches have emerged. Organisations function in an open, dynamic, complex and networked setting. Their starting point is usually a disruption that leads to unforeseen changes. To solve the specific challenge, a process must be chosen to transition the problem to a solution. Continuous change deals with several independent challenges. Many change approaches, like the traditional Plan, Do, Check, and Act approach, are not applicable in such a context. They originate often from Lewin's 'unfreeze-move-refreeze' (Kaminski, 2011; Kritsonis, 2005; Lewin, 1947a, 1947b) to remain effective. It unlocks the old methods and facilitates new approaches to change, move and reach the desired objective, thereby resolving the problem. However, change is not a single event when considering incremental developments. (Kritsonis, 2005; Todnem By, 2005).

Change means we must prepare for solutions. There is a growing need to identify change as a continuous process, while until now, it has been mainly studied from a 'discrete event' way of thinking, thus, as a sequence of single event challenges. Although theories like the Kondratiev cycle (Tinbergen, 1981), Thompson's Organisations in Action approach (Thompson, 1967), Perez's Technological revolution approach (Perez, 2002) etc. exist, ecology stresses the focus on resilience and adaptive organisations (Ensor, 2011; Gunderson & Holling, 2001; Holling, 1996; Holling & Gunderson, 2002; Walker & Salt, 2006) and suggests dealing with disruptions.

The concept of resilience explains how systems deal with disruptions, distinguishing between engineering and ecological resilience. Engineering resilience is the ability to deal with disturbances and bounce back to the old state of equilibrium. If a disturbance is so disruptive that it can no longer return to the initial state, the system will need to find a new way. In societal systems, it is important to understand and guide the necessary change process to influence the desired new state. For this reason – among others - (Ensor, 2011) introduces the concept of social resilience. In further exploring the change processes, a fourth type of resilience is introduced: the ability to deal with a never-ending sequence of disturbances (Chandler, 2014).

The Adaptive Cycle of Resilience (Abcouwer & Parson, 2011; E. Takács & A. W. Abcouwer, 2020) manages change as an ongoing process (see Figure 8). Organisations strive to be in 'Equilibrium' (I), where they know what they want, can and must do, but 'Challenges' (II) can reach the extent when they lose this certainty. They need to find 'New combinations' (III) for 'Operationalisation' (IV) to get a new 'Equilibrium' (I), until a new 'Challenge' (II) appears, and the flow of change starts again.

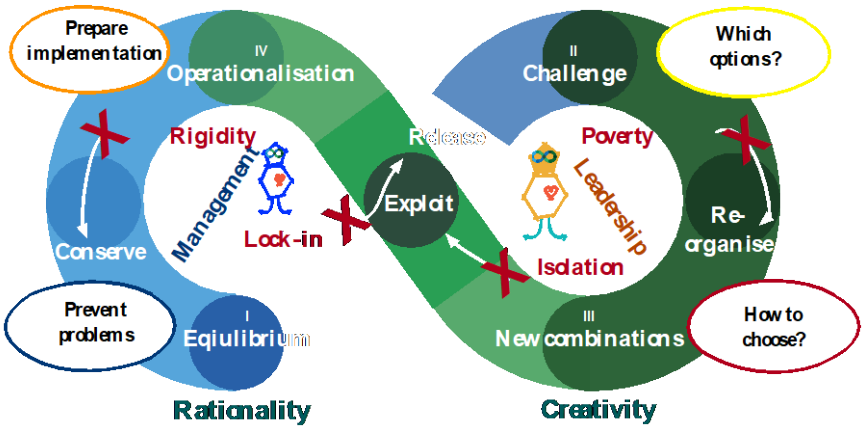

Figure 8: The Adaptive Cycle of Resilience (Source: E. Takács and A. W. Abcouwer (2020))

Managing change requires Management and Leadership skills and knowledge to avoid the traps of ***'Lock-in'*** because of fear of the future missing opportunities and/or withering due to slow response to a challenge. (Scheffer et al., 2022; Scheffer & Westley, 2007), ***'Poverty'*** in finding new solutions is due to a lack of creativity or resources for renewal (Gunderson & Holling, 2001; Holling, 1996), ***'Isolation'***, is due to lacking interconnectedness to implement solutions, inability to deal with the changing environment (E. Takács & A W Abcouwer, 2020) and ***'Rigidity'***, when an organisation encounters a heavy resistance against change (Gunderson et al., 2010).

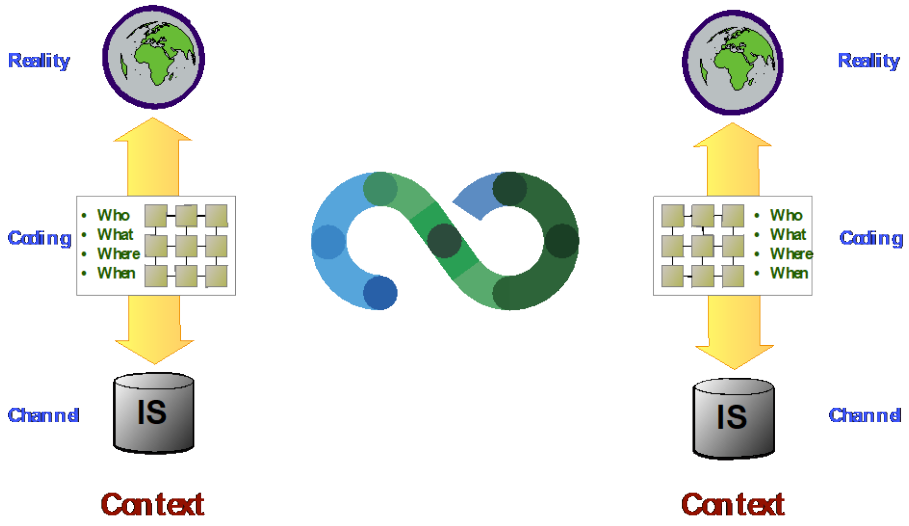

Figure 9: Change and different micro-contexts (own source)

Following the adaptive cycle of resilience, organisations can release from their binding past, reorganise towards new ideas for their future, exploit the best possible intervention, and conserve their stability for their new challenges. However, partners working in different micro-contexts, working on their complex change processes, raise a central question of who leads or combines the knowledge and information. Governance in the network can answer the question of dealing with the knowledge/skills issue.

7. Managing and Applying Knowledge and Skills

The need for knowledge and information is vital to satisfying managers and the participating teams in a network. An intelligent solution can support innovation needs by collecting employees 'knowledge, and offering a platform for information, communication, co-creation and collaboration.

The ACoR model with the method of semantic abstractions (AIM and WWWW) helps to understand disruptions and dynamics in society and that any operationalisation leads to the initiation of a new challenge. This cyclical aspect of consecutive challenges is a reason for flexibility in knowledge management, as learning is also continuous.

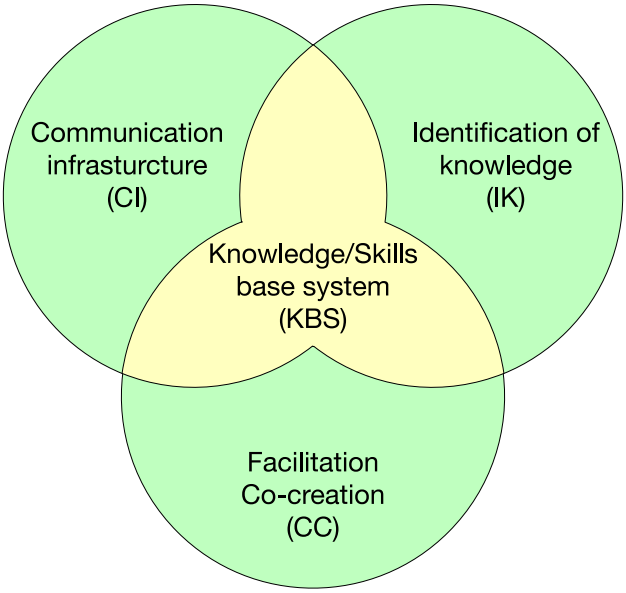

Figure 10: Intelligent solution for managing and applying knowledge and skills (E. Takács and A. W. Abcouwer (2020))

The solution probability can be Certain, Risk, Uncertain. In certainty, finding knowledge and skills for solutions is possible. In risk, there are several possible solutions, and it is hard to choose because of the unpredictability of the effects. In uncertainty, neither the nature of the problem nor the solutions are known, so the necessary knowledge is also unknown. Organisations requirements are different in the consecutive phases of dynamic development, and so are the needed knowledge and skills. Complex and uncertain challenges with various micro-contexts require various knowledge and skills. An intelligent solution is to build a 'Knowledge/Skills base system' (KBS), where the 'Identification of knowledge' (IK) is possible, along with a 'Communication infrastructure' (CI) for the 'Facilitation of Co-creating solutions' (CC). The process of understanding the network reality can be based on structured analysis using the AIM and WWWW approaches.

Using such an intelligent solution may have different sequences depending on the change situation (see Figure 11).

In certainty, the managers know what they want, can and must do, so, first they identify the necessary knowledge or the information source (1), then they use the knowledge and discuss with experts (2) to co-create the best solution to the given problem (3). With clear objectives and available information, identifying and realizing the nature of the problem, categorizing characteristics, and applying appropriate countermeasures is relatively easy. The goal is to reach a new equilibrium state as quickly as possible.

In risk, the managers and leaders are not entirely aware of the nature of the problem, making it difficult to find the perfect solution. The dynamics of the developments require different types of knowledge usage. First, it is necessary to agree on the situation via communication, so they enter the challenge for discussion (1) to identify the relevant knowledge (2) necessary to co-create the solution (3). By trying to identify analogies, we can take advantage of solutions that were previously successful. Entrepreneurship ability and analysis can lead to co-create a solution for the problem.

In uncertainty, when there is no idea how to manage the challenge, so managers and leaders create a solution together (1), that they can discuss and analyse the results (2), so they can identify the (extra) knowledge and skills needed (3) for better managing the challenge.

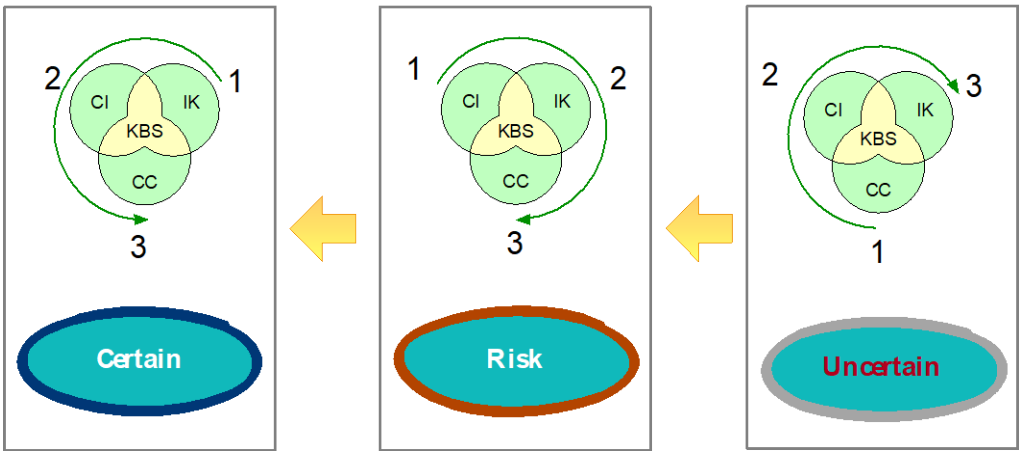

Figure 11: Managing in Certainty, Risk and Uncertainty (own source)

The actual reality of ill-defined challenges and uncertain solution spaces, the propagated approach to information and knowledge handling urges network partners to strive for certainty.

8. Day-to-day Practice

Given the limitations of this article, we can only illustrate the relevance of this approach by discussing a single example. The workings of our proposed worldview are highly relevant in health care. As a case, we briefly highly specialised medical case in Healthcare that was studied recently. The network proves the need for improving information exchange for better governing change. In treating complex health issues, specialised knowledge is necessary. So, the treatment community is organised in networks. Starting at the general practitioners diagnosing the patients, the treatment continues at the local hospitals. The micro-context of a patient for a general practitioner is broader and thus more superficial than the micro-context of a specialist in a regional hospital. But when more complex cases must be treated, we switch to specialised centres in the Netherlands. For example, we have a specialised centre for treating child cancer and the National Cancer Research Institute in the field of oncology. Also, we have specialised centres in other healthcare fields. The different levels of treatment all have their own micro-context in their work. The information the highly specialised Institute requires is too complex and unnecessary for a general practitioner.

But how can a general practitioner treating a high volume of patients stay informed about the new knowledge outside one's practice, make the right decision, and send the patient to the appropriate specialist? Even though there is overlap in the level of detail on the different levels, the exchange of information and data availability is highly helped by applying a formalised way of describing the specific micro-contexts. It facilitates working in resilient networks and enables the exchange of information, data availability, and cooperative decision-making, which, in the end, allows the network partners to react faster and improves the quality of the treatment. In a setting like this, the governance structure identifies the need for coordination between the partners (based on control or cooperation), leaving the autonomy of the different network partners intact. For a patient with a very complex healthcare issue, the highly specialised institutes clearly take the lead, leaving the autonomy of the general practitioners and the local hospitals for the less complex forms of treatment intact. While separate micro-contexts and data models may hinder efficient information exchange and data availability between partners, engaging the systems effectively by linking information and data sources provides practical efficacy and instils confidence in its potential, making it a compelling approach for management, leadership and governance.

9. Concluding Remarks

This discussion paper describes an alternative view of data availability and knowledge/information exchange to support an advanced governance approach. In society's practice, defining unity in language should sufficiently support contemporary reality's complexity, but in practice, it doesn't. That is why we suggest a different approach.

By describing reality in a formalised way of abstraction in different micro contexts, we stimulate the specificity of the different network partners without obstructing their own functioning, aiming to facilitate improved information/knowledge exchange and data availability. The advantage of an approach like this is that it provides a globally unique solution to make all types of data, structured and unstructured, accessible in a flexible and user-friendly way. This method also helps us make the next step in AI by introducing a semantical approach to analyse the different data sources. With this method, we can also provide many services like real-time adaptive summarisation, automated pseudonymisation, integrated sentiment and mood detection and automated identification of key elements in data and documents. In our current research, sentiment analyses, privacy and ethics shed an even more comprehensive light on the complex reality of Information and knowledge exchange. But for now, we consider these topics beyond the scope of this discussion paper.

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