Framework for Adaptive Change: Towards Sustainable Innovation

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Abstract

The rapid changes in our dynamic world increase competitions and forecasting future-developments is more and more difficult. Many scientists and new sciences try to find the recipe for long-lasting success. Analysing and testing these advices, using a logical way of reasoning for reaching long-term objectives, challenges the management of the organisations both in 'doing the things right' (the manager) as well as 'doing the right things' (the leader), - as Peter Drucker (2001) stated, - emphasising the role of human resources.

Our discussion paper is based on many years of research work on identifying the continuous developments of an organisation, analysing the requirements for adaptation by the human resources in the different phases during the life cycle of an organisation, the role of knowledge and information, thus the role of education. With this paper, we explicitly invite both scholars and practitioners to participate in the discussion to find solutions for the challenges we are facing in these dynamic contemporary times. The authors believe that organisations can only reach their objectives (reaching competitive advantage in the profit sector or societal effectiveness for governmental organisations and NGOs) via collaboration, networking and by sharing knowledge, skills and expertise. While the technological and managerial innovations and developments are available, the mindsets of human resources to share knowledge- and skills do not yet assure the fit of employees for their future. This discussion paper can thus only be seen as a first step towards improving our toolbox for dealing with change.

How to ensure sustainable success? - that is the question the authors are searching answers for. Given the fact that we are trying to understand the dynamically changing context organisations are facing. However, we are aware that proofing our view is hard. On the moment that we have a relevant set of cases to be studied, the context already changed that much, that any prediction is useless.

Keywords: Resilience, adaptivity, sustainability, innovation, learning

1. Introduction

For several decades scientific literature provides us with countless references to the fact that contemporary developments are characterised as highly dynamic and changeable (Beck, 2006; Christensen, 1997; Singer, 2002; Taleb, 2010; Tsoukas & Shepherd, 2004) There is no doubt that organisations find it very difficult to cope with the rapid changes which come in hand with competitions and societal challenges. Main causes are the growing unpredictability of the developments, which threatens the organisations but at the same time it brings new opportunities to them. According to Scharmer (2007), we live in an era of intense conflicts and massive institutional failures that may result in unforeseen disaster or in hopeful innovations. (Beer & Nohria, 2000) notices that 'it is hardly news that in this environment, firms will have to possess the capacity to adapt or suffer the consequences – low performance and ultimately death and destruction'. It is becoming clear that organisations should pay serious attention to dynamics and learn to live with the opportunities and challenges that real unpredictability brings. Changes, complexity, adaptation and the ways to ensure long-term success are issues, that receive increasingly more attention lately, see a.o. Allen and Varga (2006); Anderson (1999); Benbya and McKelvey (2006); Kauffman (1995). This discussion paper will guide the reader through the probable steps of organisational changes that challenge the human resources, highlighting the importance of cooperation, knowledge and skills sharing, and the ways to deal with the information necessary for managing the process to stay successful. We pay attention to the role of knowledge and learning, that form the base for educational requirements, as we face a growing difficulty in assuring quality in the process of acquiring the necessary information.

2. Context

Under predictable conditions, it is simple for organisations to operate: It requires knowledge and professional capacity to continuously meet customer needs, know in advance what to do and what to expect. When developments are predictable, it is easy to formulate a strategy with a set of actions, while preparing for changes, besides goals, confidence is required. In practice reality is different. In most cases it is impossible to predict the future. Even though some developments are more

predictable (well-defined challenges (Gigerenzer, 2014) with a known initial state and a reachable solution along a known procedure), more and more we meet with real unpredictability (ill-defined challenges (Gigerenzer, 2014) without a clearly defined initial state and neither predictable nor convergent answers), where innovation capacities and gut-feelings of the employees are necessary skills for handling them. Enabling managers to quickly spot the objectives that may be in jeopardy and intervene on time together with the colleagues, is crucial to stay on track or continue exploring new paths. Implementing these ways of cooperation requires strong leadership and an organisational culture of trust. A state of operation within an organisation, where both managers and employees feel confident to exchange information, can expand the predictability within the organisational context and include all company functions for a successful operation for the present and for the future. Managers who embrace such an inclusive system increase the chance for success.

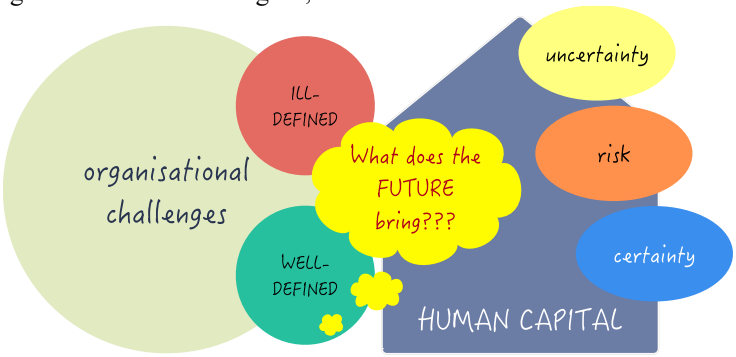

Figure 1: Challenges and Human Capital (c)authors

We can therefore state that the basis for success lays on the human capital, their capacities to recognise the change and/or challenge, co-create solutions and cooperate to operationalise interventions. Not being cautious and prepared for future developments in society, and in the meantime trusting upon old abilities and skills, will lead to a growing risk of decline. Miller (1990) observed that 'success leads to specialisation and exaggeration, to confidence and complacency to dogma and ritual.' Furthermore, 'strength so often seduces us into the excesses that cause our downfall.' (Gunderson & Holling, 2001) point out that from the rigidity that is created by behaviour in the past, systems and organisations inevitably face with 'accidents waiting to happen'. Finally, Christensen (1997) observes that the 'better' the management was in the past, the more chance there is that disrupting developments will not be recognised. Christensen (1997) calls this situation the "Innovators' Dilemma". In general, incremental improvements work well within "sustaining or strengthening" developments, but these are often missed or overlooked from an evolutionary perspective when real threatening challenges are coming.

2.1 Key Characteristics: Organisational Challenges

The ability to deal with disturbances is not only an internal characteristic of the organisation. It highly depends on the type of problem the organisation faces. In general, we distinct well- and ill-defined challenges. Well-defined challenges (Jonassen, 1997, 2000; Simon, 1973) present all elements of the problem and there is at least one problem space in which the initial problem state, the goal state, and all other states may be reached. They have a preferred, prescribed solution process with an explicit set of criteria for testing the proposed solution and they involve concepts and rules that appear well-structured in a domain of knowledge that is also well-structured and predictable. They - as said earlier - have known (well-defined) initial and goal states; the solution is reachable via a known procedure, while for ill-defined challenges, (Jonassen, 1997, 2000; Kitchner, 1983) there are conflicting assumptions, evidences and opinions, which lead to different solutions or no solution at all. Ill-defined challenges present uncertainty about which concepts, rules or principles are necessary for reaching a solution. They lack a clear initial state for which the answers (if any) are neither predictable nor convergent.

When managers can distinguish the possible challenges and their well- or ill-defined character, they already gain more insights and consciousness to prepare for preventing or solving them. This is the first necessary step for a sustainable and successful operation which for the human resources are responsible.

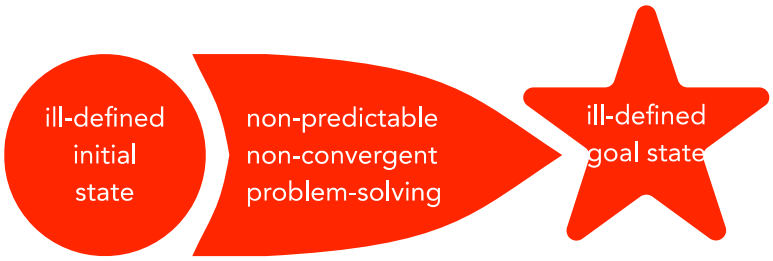

Figure 2: Ill-defines Problems (c)authors

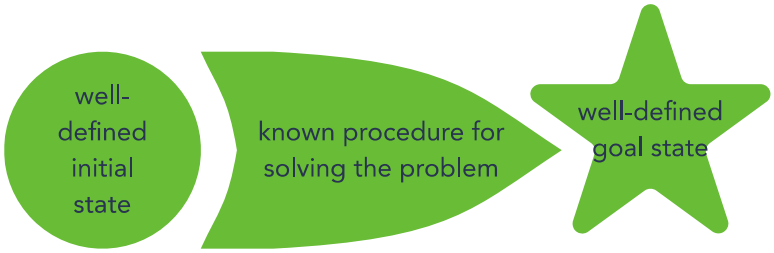

Figure 3: Well-defined Problems (c)authors

2.2 Key Characteristics: The Solutions Space

Answering organisational challenges is determined by the organisational behaviour and decision making which is absolutely in relation with the human resources along with the aspects of (un)predictability, mindfulness or mindlessness and blindness. The solution depends on another factor: the probability of the impacts (see Gigerenzer (2014)), which translates the challenge into decision-making, where understanding the difference between certainty, risk and uncertainty will become relevant.

A condition of certainty exists when the decision-maker knows with reasonable certainty what the alternatives are, what conditions are associated with each alternative, and what the outcome of each choice will be. Under conditions of certainty, accurate, measurable, and reliable information are available to base the decisions on. The decision maker is aware of the cause and effect relationships, and this way the future is highly predictable. Routine and repetitive decisions characterise the day-to-day operations.

When there is no perfect information for the manager or when there is information asymmetry, then risk arises. Incomplete information about options or alternatives strengthen feelings, impressions, divinations which may bring ideas about the probability of outcomes (see Rawat (2018)). Decision-making in a risk setting requires the managers to determine the expectations to different alternatives, using the available information and previous experiences.

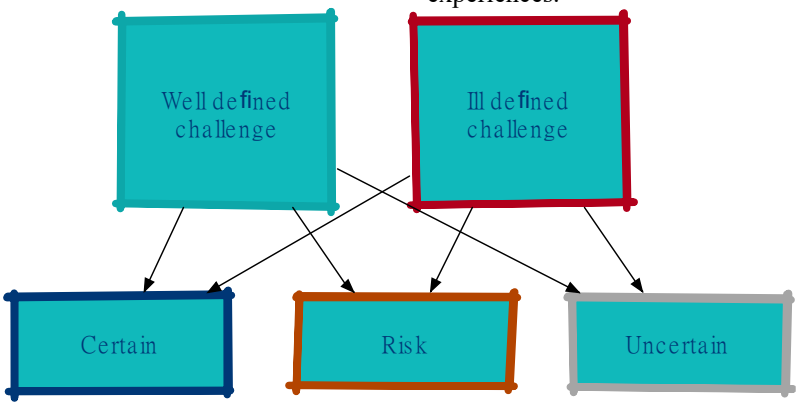

Figure 4: Challenges and the Solution Space (c)authors

The fast-changing circumstances of today's life had led to an unpredictable environment in which we also need to formulate our decisions. In uncertain conditions, we cannot foresee the results of the decisions, as everything is changing constantly. In such a situation, we cannot possess complete information about the possible solutions and be aware of all available alternatives, neither their associated risks nor their consequences or probabilities. Decisions must be made based on uncertain information without being sure if they are entirely reliable or not. Managers make

assumptions about the situation and try to set a reasonable framework for decision-making. The decisions depend on judgments and previous experiences, but also on creative capabilities and the ability of the human resources to deal with unpredictability.

The issue of probability is highly related to the organisational aspects. Thorough analyses to understand the organisations and the dynamics can help finding a balanced solution. When we understand the character and the origin of the challenge, we are better able to determine the set of potential solutions (the solution space). While in a well-defined setting it is clear, in an ill-defined setting it is way more challenging to find the desired solution, whether it is a certain solution, a risk or a setting of uncertainty, where the creative capability within the organisation is necessary for co-creating the solution.

We have to be aware that the assumption of a link between problem-space (well-defined versus ill-defined) and the solution space (certain, risk, uncertain) is not always straight forward. For many well-defined challenges we simply do not know an answer, while an ill-defined challenge might be easily solved when we finally understand what the problem is.

3. Always Successful: The Different Phases of Operation in a Dynamic Context

It became clear that we cannot assume long-term sustainability of current successes. The increased attention on organisational developments and dynamics turns the focus on adaptive and resilient organisations that respond to changes in a robust manner. According to Taleb (2010) the objective of the organisation is to continue operating in a context in which imminent crises or drastic changes are considered "normal" and in certain cases even inevitable, and where "business-as-usual" is an exception. Dealing with short- and long-term developments simultaneously, organisations show resilience when they accumulate their capacities and knowledge from the usual situation and combine them with creative capabilities to be ready for radical change, new combinations, innovation and significant renewal.

Organisational culture is ideally based on past good practices (being proud on the past) and on curiosity, openness and agility for an unknown future (curious to the future). The existing knowledge and practical experience combined with a drive for creativity set the room and the means to the necessary innovation to the changing environment. Being curious for the "new", establishes the ground for strategic choices. Fukuyama (2011) says "The adaptive organisation can evaluate a changing external environment and modify its own internal procedures in response. They are the ones that survive since environments always change", however, we have to remind that this attention for change is not new.

Over the past decades, a number of change approaches have been developed. In many cases their starting point is a disruption that leads to a need for change. For dealing with them, a choice is made to choose a process to get from problem to solution with the objective to solve the specific challenge. Continuous change is introduced when dealing with a number of independent changes. Many of these change approaches lead back to the traditional Lewin approach (Kaminski, 2011; Kritsonis, 2005; Lewin, 1947a; Lewin, 1947b) of - unfreeze – move – refreeze - based on the basic assumption that the organisation should be as effective as possible. The proposed process focuses on unlocking the old assumptions, and facilitating the development of new approaches, preparing the organisation to make the change and make the move and finally reach the objective strived for. After fulfilling this sequence of steps, we are ready: problem solved.

For further deepening these approaches, the research focuses on the type of change organisations are facing. Does organisations have to deal with single changes of do we look at incremental developments. In practice, distinctions have been made regarding the characterisation by the rate of occurrences (Kritsonis, 2005; Todnem by, 2005). Todnem by (2005) identifies the following change characteristics (Balogun & Hailey, 2008; Burnes, 2004; Grundy, 1994; Luecke, 2003; Senior, 2002)

Type of change	Balogun and Hope Hailey (2008)	Burnes (2004)	Grundy (1993)	Luecke (2003)	Senior (2002)
Discontinuous			x	x	x
Incremental		x			
Smooth incremental			x		x
Bumpy incremental			x		x
Continuous	x	x			
Continuous incremental				x	
Punctuated equilibrium	x	x			

Todnem by (2005) also identifies that a different approach to the characterisation of organisational change is relevant to mention, based on the question how the change comes into practice.

- ***Planned change:*** When we are aware of the change that we could predict, we are able to prepare ourselves for the challenges.
- ***Emergent change:*** Dealing with challenges that emerge, often have a disruptive character, which for the organisations need to prepare. The change capabilities have an infrastructural character.
- ***Contingency:*** When a set of alternatives can be formulated for different challenges, and the organisation is well prepared for changes in the external world.
- ***Choice:*** Not all changes initiate from the external context of an organisation. Todnem By (2005) refers to Burnes (2004), who said "There is certainly evidence that organisations wishing to maintain or promote a particular managerial style can choose to influence situational variables to achieve this".

These approaches search for solutions for dealing with or prepare for a single challenge. There is a growing need for identifying change as a continuous process, while until now it was mainly studied from a 'discrete event' way of thinking, thus as a sequence of single event challenges. Although such theories, like the Kondratiev cycle (Tinbergen, 1981), Thompsons Organisations in Action approaches (Thompson, 1967), Perez with her Technological revolution approach (Perez, 2002) etc. exist, it is ecology that stresses the focus on resilience and adaptive organisations (Ensor, 2011; Gunderson & Holling, 2001; Holling, 1996, 2001; Walker & Salt, 2006) and suggest to deal with disruptions.

The concept of resilience explains how systems deal with disruptions, with a distinction between engineering and ecological resilience. Engineering resilience is the ability to deal with disturbances and bounce back to the old state of equilibrium. In case a disturbance is so disruptive that it is no longer possible to get back to the initial state, the system will experience the need to find a new way. In ecological systems the 'new' state is not a topic to be studied in full detail. The new state emerges from the circumstances. While in societal systems, influencing the new state that a system is reaching for, it is important to understand and guide the necessary change process. For this reason – among others - (Ensor, 2011) introduces the concept of social resilience, which is the ability to contribute to the newly developing state of the system. As in ecology, in business studies and in political science the reasoning is based on the assumption that dealing with disruptions is a continuous process, a fourth type of resilience is introduced: the ability be able to deal with a never-ending sequence of disturbances. In this article we link the change approach to these four types of resilience and developed the adaptive cycle of resilience, that will be further explored in the next paragraph.

3.1 The Adaptive Cycle of Resilience

Ensuring continuity within developments by any kind of organisations (public, private, NGO, etc.), the adaptive cycle of resilience model (Abcouwer & Parson, 2011; Abcouwer & Smit, 2015; Abcouwer, Takács, & Keményffy, 2018) can serve as a good starting point for identifying the necessary management skills and knowledge requirements in the different status, where the organisation finds itself. According to the ACoR model, every organisation goes through a cyclic development following a standard path, beyond the boundaries of the want-must-can tensions (Heene, 2002) of the organisations. The model is based on the assumption that change never ends, this cycle can be seen as a continuum with multiple states in which an organisation resides in a sequential way. We describe the model briefly.

The on-going process starts from a presumed state of equilibrium (see bottom-left of the cycle). In Quadrant I: 'Equilibrium', the organisation is in balance with its environment, there are no signs for threatening change (certainty), so business as usual, efficiency and effectiveness are key. In this setting the organisations know what they want, and they trust their abilities to operate. It is a simple phase from a management point of view, because the goals and the methods are clear and unambiguous, and there is not a reason to change the good old way of working, only preventing problems from happening. The trust in the capabilities of the organisation is high, and there is enough confidence that they are capable to cope with the possible threats by using the currently applicable management tools and skills, as available within the existing dominant coalition. In this quadrant, improvements take place, while the status-quo and the prevailing operational model remains unchanged. When external influences distract the equilibrium or if a 'Black Swan' occurs (Taleb, 2010), the organisation can get too far from finding a way out of the new situation, and a 'challenge' (uncertainty) may emerge.

Becoming aware and accepting the urge for change suddenly moves the organisation to Quadrant II: 'Challenge', where uncertainties regarding what the organisation wants and can do require managerial intervention to find new solutions and apply appropriate skills and attitude. The start of a challenge usually demonstrates that the existing dominant coalition is no longer applicable and capable to deal with the situation with its previous experiences. There is a need for creativity to develop new varieties to the action repertoire, facilitating the organisation to design new solutions and look for new futures.

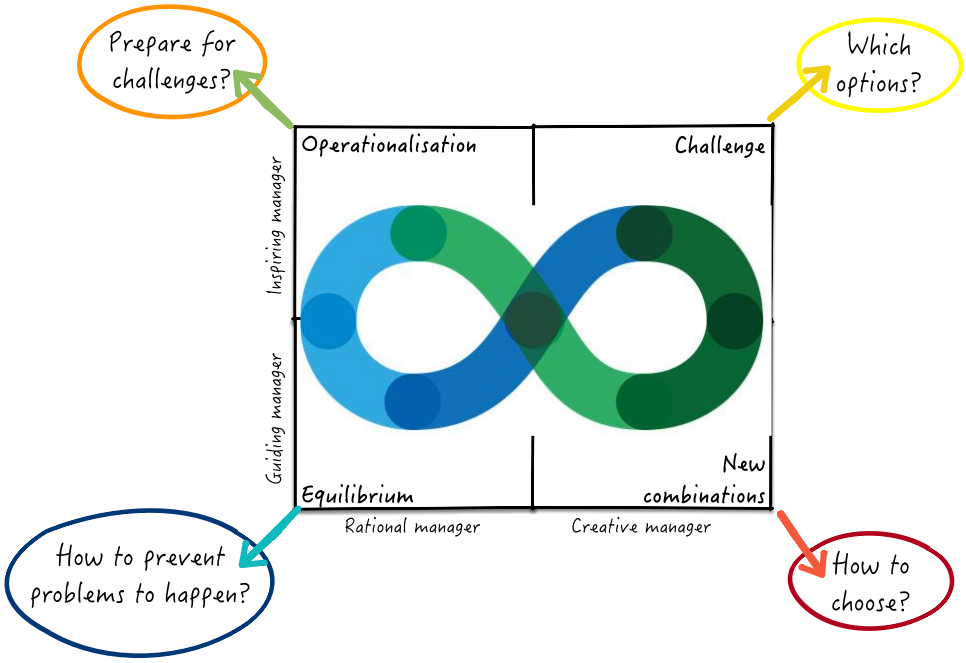

Figure 5: Objectives in the ACoR (c)authors

This development leads the organisation to Quadrant III: 'New combination, where leadership and awareness are critical'. A thorough analysis (pilot studies, impact assessments, scenario analyses, etc.) must take place to develop realistic and viable options for the future. Following the compilation of the set of options, a decision must be made as a defensive reaction to the internal and external threats, to choose the most appropriate intervention in the actual setting.

The transition from Quadrant III to IV: 'Operationalisation' is when the organisation makes a definite choice. Apart from deciding about the option to be implemented in cooperation, there is a ground for involving different specialisms and for creativity. The choice to be implemented is often made by intuition and gut-feeling and entails uncertain results. In this phase, new initiatives are no longer sought, and one strives to promote the cooperation and support of relevant staff once again. This fourth stage, which is about ensuring the successful operationalisation and upscale of the chosen opportunity into a 'New state of equilibrium'. Again, rationalisation of processes, attention on efficiency and effectiveness, re-establishing routines result in a new business-as-usual situation.

3.2 Change and ACoR

When we reason through the ACoR we can use several angles to approach this issue to better understand the challenges facing. Consecutively we focus on the objectives strived in the different quadrants of the model, to the process bringing the organisation from quadrant to quadrant and we focus on the human factor.

Objectives Through the ACoR

Every quadrant can be characterised by the objectives striving for (Abcouwer, 2015; Abcouwer & Parson, 2011; Abcouwer & Smit, 2015; Abcouwer & Takács, 2018a).

- **Equilibrium quadrant**: Rationalising forms the base for trying to prepare to deal with coming challenges and to prevent to be hit by a crisis. Focus on efficiency and effectiveness is the 'normal' approach. The main focus is thus: *Prevent problems from happening*
- **Challenge quadrant**: When the organisation is facing a challenge (or even a crisis), there is an urging need for creativity forming the base for the organisations. Focus should be on the capability to find solutions for the disruptive change and if this capability is not available on building it. The main focus is thus: *Designing new solutions*
- **New combinations quadrant**: After having found a set of potential solutions a choice will have to be made to prepare evolving towards operationalisation. An analysis will have to be made to judge which combination should be best helping the organisation to deal with the challenge. This requires leadership but awareness of management issues is crucial. The main focus is thus: *Choosing the appropriate intervention*
- **Operationalising quadrant**: After having chosen a preferred approach for dealing with the challenge, the chosen solution(s) require cooperation and involvement of different specialisms. Main focus is on management and optimisation based on leadership choices. The main

focus is thus: *Prepare for implementation to deal with the challenges*

Dynamically moving through the ACoR

We have focused on the individual objectives per quadrant, although the main approach assumes that organisations move dynamically through the phases. These developments mean a continuous change in attention (Folke et al., 2002; Gunderson & Holling, 2002; Holling, 2001; Westley, 2002).

- from equilibrium to challenge – **Release**

At a given moment, the complexity of the situation becomes that high, (also) as a result of unthought-of and unexpected external developments with a large impact, that the existing organisation is no longer capable of dealing with these developments. As soon as the organisation becomes aware of this, a so-called Gestalt switch occurs, bringing the organisation from confidence to insecurity, which cannot be explained by the actual events. Therefore, the point that marks the challenge coming into being is based mainly on perception! In the ACoR model, the transition to the challenge quadrant is fact. In literature the term Release is used for this transition.

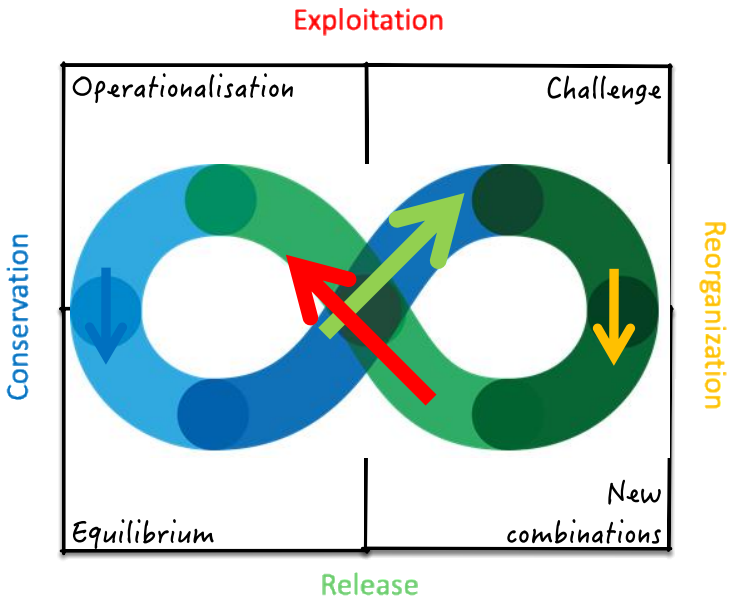

Figure 6: Change Phases in ACoR (c)authors

- from challenge to new combinations – **Reorganisation**

If during the challenge, the management's basic attitude is uncertainty, the creative powers, which came to fruition within the organisation, will create a situation where the future can be looked at with a nucleus of confidence. It leads to an optimistic and hopeful look towards the future. Because this should enable a far-reaching restructuring of the organisation, In literature this phase with the term Reorganisation.

- from new combinations to business – **Exploitation**

In terms of perception of the situation, the making of a definitive choice means that 'hopeful about the future' is replaced by 'confidence in the future' in the belief that the right choice was made. This choice was not made on purely rational grounds. Intuition and emotions play an important part in the decision-making process. Future success can hardly be proved. However, new initiatives are no longer sought, and one strives to promote the solidarity within the organisation towards the chosen solution. In literature the term Exploitation is used for this phase.

- from business to equilibrium – **Conservation**

As soon as the choices are made, one needs to pay attention to their operationalisation and improvement. Rationalisation of processes, attention to efficiency and effectivity become important, involving the regaining of bureaucratic structures, re-establishing routines that result in the organisation is being able to end up in a new business-as-usual situation. At that stage, solidarity reaches a peak again and the qualities in terms of potential of the remaining parties concerned are optimally utilized. The state of mind of the manager is changed from conviction regarding the choice for the future into confidence in the present. It is important to acknowledge that the business-as-usual situation thus achieved is not the same as the old one. Holling (2001) argues that the organisation's successfulness is determined by the extent to which it has the ability to achieve a new, different, business-as-usual situation. In literature the term Conservation is used for this phase.

3.3 Traps and Thresholds

Research on organisational change showed that there are several traps and thresholds that a successful change process should deal with. In

ecology (Gunderson, Allen, & Holling, 2010; Gunderson & Holling, 2002; Holling & Gunderson, 2002) these traps are identified related to the process indicators as discussed before. Based on these traps we will identify the state of mind humans often face when confronted with these phases of dynamic change. Briefly described these phase transitions can be characterised as follows:

- Release -> Lock in -> Fear for future

If the organisation is unable to break free from the old, lock-in is likely to arise. From a human point of view, fear for the unknown is often the base for this trap. Characteristic for this setting is that if becomes obviously clear that the traditional way of problem-solving no longer works. Old proven approaches no longer work, and the management will have to let go the old way of working. An intensive process of searching for alternative and new ways of working has to be started. Due to high performance reached in the past, where a constantly focus was on raising performance by being more efficient the system has lost many resources to be resilient. A natural tendency arises to stay what they are. Where the old way of working performed well, losing that certainty should thus be avoided.

- Reorganisation -> Poverty -> Lacking creativity

While facing a disruptive development, organisations are eager to prepare for dealing with it in the shortest possible timeframe. Highly creative solutions will have to be found. This process of being open to divergent thinking to broaden the view and initiate new insights and alternative interventions highly depends on the ability of being creative. But what if this ability of being creative is lacking? Literature identifies this lacking as the poverty trap. Gunderson states that in many cases the poverty trap is caused by poor management as they lack the resources for renewal what makes they are vulnerable to change into many different states.

- Exploitation -> Isolation -> Lacking courage and persuasiveness

Where in the combination phase the alternatives are developed, on a certain moment, choices will have to be made what to implement to initiate the development towards a new equilibrium. When the organisation is not able to convince that a movement will have to be made the Isolation trap might come into practice. This trap is characterized by relatively high capital or potential capital, in the sense that a number of options are available, but we also see a low connectivity with the organisation. Low resilience is the logical result, especially when those who developed the new alternative options are lacking courage or are not able for being persuasive.

- Conservation -> Rigidity -> Resistance against change

Upscaling the new approaches to optimise the effect of the newly developed problem-solving approaches will only be successful on the moment that the organisation is open to change. However, many are facing an intensive command-and-control culture that brings the all kinds of forces and resistance against change into practice. In addition to the command-and-control culture (Holling, 1996), rigidity traps have other characteristics, including (1) avoidance of learning (from past mistakes), (2) lack of trust among management institutions and stakeholders, and (3) strong feedbacks that maintain core elements of the status quo. Implementing successfully the newly developed ways of working is far from obvious.

Escaping these trap poses some of the most difficult and frustrating issues facing resource managers. These problems are best confronted by active adaptive management approaches that attempt to unravel the complexity of these traps by attempting management actions designed to help understand as much as meet other social objectives.

Integrating the above-mentioned line of reasoning into one grand view on organisational change in contemporary contexts leads from an insight based on confidence to one based on uncertainty. Following the ACoR idea, the organisation might come back to a newly state of confidence based on trust on ones' own capabilities leading to a state of being hopeful about the future.

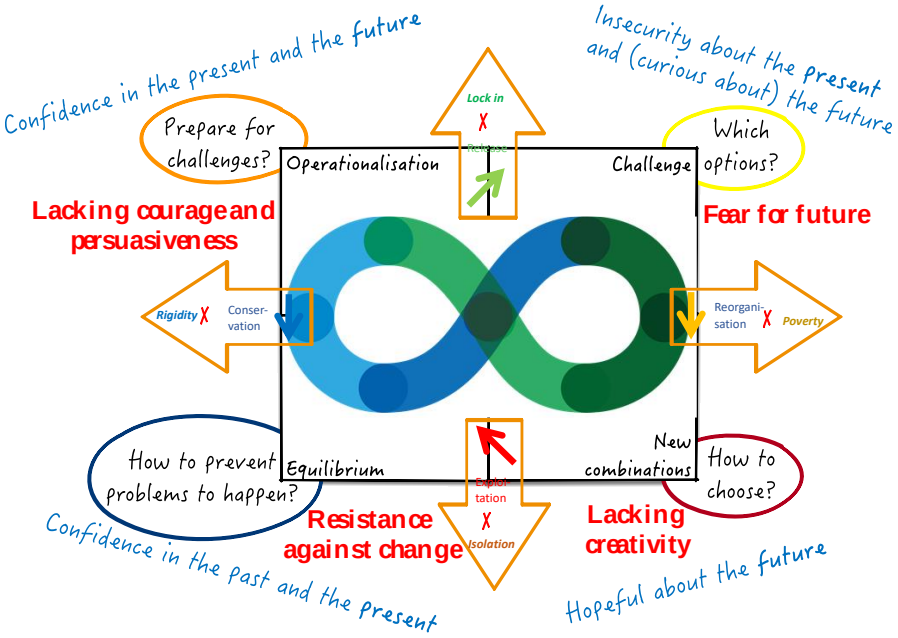

Figure 7: The Grand Picture (c)authors

The process requires different states of minds of the involved humans, which leads to the question how to prepare and equip for challenges those involved in the process. Implications for HR are thus important to further elaborate.

4. Implication for Human Resources

There are many important reasons why the above-mentioned alternative ways of working are of growing importance to deal with challenges modern organisations are facing. The main reason, in summary, is that future developments are unpredictable, and they are leading to an increasingly complex world that can only be approached by focusing on a higher level of specialisation. This leads to two developments:

1. Complexity requires a deeper understanding of the developments with a mono disciplinary tendency in research, reflecting on research-based education where classes are only organised around focused topics of the current institutional research,
2. Large commercial research institutes show the tendency of concentration of research based on profitability instead of on societal benefits. The term 'frightful five' for the major research institutes (Amazon, Apple, Facebook, Google and Microsoft) emphasises this tendency, causing a concentration of research on a limited number of fields.

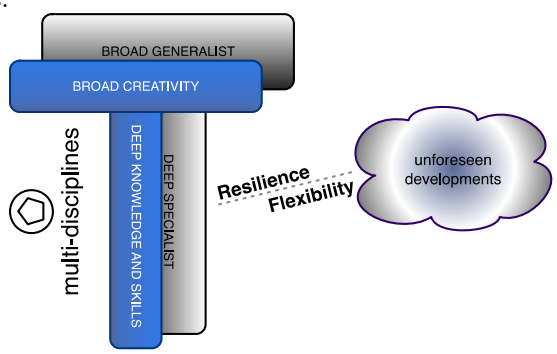

Figure 8: T-shape Competencies (c)authors

Both developments show that specialisation is vital in current research. However, on a societal scale, there is a need for multidisciplinary approaches of contemporary problems. An increasing demand for coordination and flexibility to be able to deal with the impact of the growing complexity.

The uncertainty around the complexity forces organisations to make use of knowledge on a broad range of topics. Problems are in a declining number of cases based on a single area of interest. Combination of different insights is a necessity that is becoming indisputable. So, in conjunction with the need for specialisation, there is also an increasing need for multidisciplinary working. In society, the so-called T-shape competence model is introduced to deal with this need. However, being both a deep

specialist on a specific topic as well as a broad generalist to integrate the different specialisms, is not a capability that is gifted to everyone.

Linked to this development we see growing attention to focus on education, in the sense of being creative and able to integrate and combine different insights, versus training, mainly focusing on building knowledge and skills. As both aspects of learning are crucially important, incorporating these two tendencies will be the challenge for future education. Among others, this means that there is a growing need for finding a balance between focusing on knowledge and in the meantime on the development of appropriate skills and an attitude of curiosity.

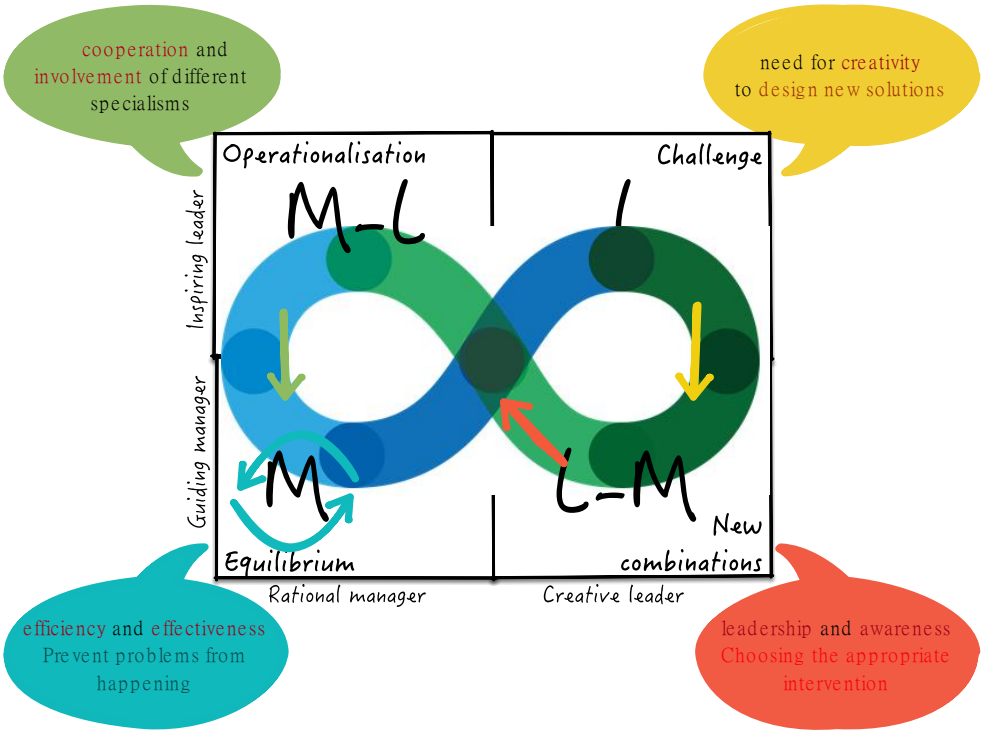

Figure 9: Management and Leadership in ACoR (c)authors

The development as described above will be necessary for organisations to deal with future and unforeseen developments. It is clear that there is an absolute need for being flexible and resilient.

The heart of the solution is in the people: managers, leaders and the available human resources (Choudhury & Haas, 2018; Donaldson-Feilder, Lewis, & Yarker, 2019; Dover & Dierk, 2010; Joseph, Orlitzky, Gurd, Borland, & Lindgreen, 2019; Kotter, 2000; Mintzberg, 2009). They are placed in the middle of the problem-solving process:

They are the ones who can make sound judgements on the actual situation, by analysing the challenge based on their knowledge, experiences and feelings; who can decide on which interventions are the ones able to make the change, by designing possible solutions for the identifies challenge; and who can choose among the available responses and plan the change process to solve the problem/challenges by making decisions on which solutions to use to intervene. The chosen intervention will have to be operationalized, implemented and up scaled to a successful one.

According to the identified setting of the analysed challenge, for the particular phases of the ACoR model, we need different kind of professionals. To be successful in the whole cooking process, we need an excellent person playing the leader/manager-role, however, it will have to be accompanied by a team of business professionals to ensure a good performance. For this reason, we think that it is crucial to choose both the right leader/manager supplemented with good fellow workers cooperating in a team, to ensure proper design and implementation of the necessary change process. The focus in the different change phases and people requirements can be linked to the different phases in the ACoR.

The different requirements towards the managers and teams of an organisation, the roles of education and knowledge management appear. When developing education programs to the staff of an organisation, needs and evaluation are very important, especially in the setting of our dynamic world.

Figure 10: Management / Leadership and the Solution Space (c)authors

On the left side of the ACoR, HR need to

- Organise creativity from within the organisation and where necessary with external help, which we call Reorganisation
- Recognise challenges: Release (and recognise to switch)

Requirements for HR for the management tasks on the left side of the ACoR are:

- Focus on rationality
- Strive for stability and for reaching a new equilibrium
- Optimisation is key
- First order learning focusing on continuous and stepwise improvement

On the right side of the ACoR, HR need to

- Dare to innovate: Exploitation (and recognise the switch here)
- Implement innovation: Conservation

Requirements for HR for the leading tasks on the right side of the ACoR are:

- Innovative / intuitive behaviour
- Change oriented
- Capability to be innovative is key
- Second order learning aiming at dealing with change

The crucial role as mentioned is in identifying the switch. The main capabilities to recognise the switch are:

- Ability to smell the need for change
- Dare to innovate
- Operationalise innovation

5. The Importance of Life-Long Learning and Continuous Feedbacks

From the HRM perspective to satisfy managers and the participating teams requires knowledge and information on their needs and requirements, thus again, evaluation and adjusted educational programs.

HRM in innovation needs an intelligent solution which collects the knowledge of the employees, and offers a platform for information, communication, co-creation and managing collaboration, which can serve as an innovation sack.

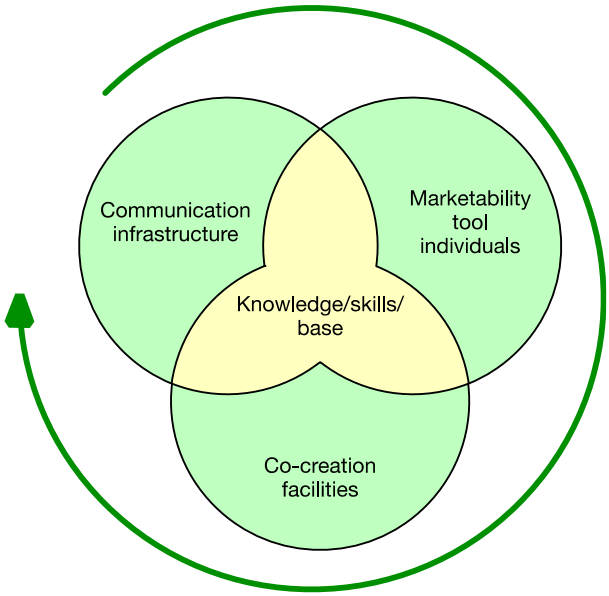

Figure 11: Knowledge Handling (c)authors

As education in current practice is mostly organised regarding learning objectives and end-terms of the curricula and measurability of the effectiveness of our education the capacity of reacting flexibly on upcoming challenges is not well developed. The requirements for education are changing while the general structures in our educational systems stayed the same. We indicate the

relevance of these issues by raising some important topics:

The need for understanding dynamics in society

From a theoretical perspective, we referred to a model that found its origin in both organisation theory as well as ecology: in the adaptive cycle of resilience, disruptions originate in any development both internal as well as from any source of growth outside the system. The theory explicitly stressed that any operationalisation would probably lead to the initiation of a new challenge. This cyclical aspect of consecutive challenges is one of the main reasons for the need for flexibility in education, based on this learning is also a continuous concept.

The relevant probability for determining the solution for appearing problems

Regarding the availability of solutions, we linked to the theoretical insights of Gigerenzer (2014). He identifies three forms of probability: Certain – Risk – Uncertain. To summarise, in case of certainty, the solutions are possible. When there are several solutions available, and there is a problem regarding the choice which one is the best, combined with an unpredictability regarding the outcome of the countermeasure, Gigerenzer identifies this as a setting of risk. The different countermeasures are known, the final choice an effect of it is unsure.

The final setting the system may face is that of uncertainty. When the real nature of the problem is unknown, the solutions are unknown, the impact of any countermeasure is unknown, and the knowledge necessary to find a solution is also unknown. It is clear that these three states and probabilities of solutions lead to entirely different requirements regarding organisational behaviour and thus to varying requirements for education.

The kind of knowledge we need for finding a solution that fits the challenge

In the above-described approach to dynamics, regarding the required expertise, we can make a distinction between the phases as identified. Due to the unpredictability of the process, those involved in these phases need to trust the creative capabilities and should show an attitude of curiosity in shaping the search processes. In some cases, the uncertainty of the outcomes of the countermeasures makes it impossible to think first. Doing first, trying something and see what impact it will have, is an often-used approach in these types of settings. In the latter case learning objectives and learning outcomes regarding required knowledge are hard to define, as are the requirements regarding education.

The extent of dealing with challenges

As mentioned before, the requirements of organisations are different in the consecutive phases of dynamic developments. The differences in certainty regarding the needed knowledge and skills are enormous. The extent to which individuals have a fit with respect to the requirements leads to the identification of three types of fit are identified. (1) The Person / job-fit, focuses on the issue of whether someone can fulfil the job today (Carless, 2005), (2) the Persons / organisation-fit has a focus on the ability to follow the developments of the organisation where main developments are more or less predictable (Cable & Judge, 1996) and (3) the Person / future-fit where we face uncertain futures (Abcouwer & Takács, 2018a, 2018b). Up to a great extent, the growing unpredictable future and the unforeseen challenges of organisations require flexibility and adaptive capabilities.

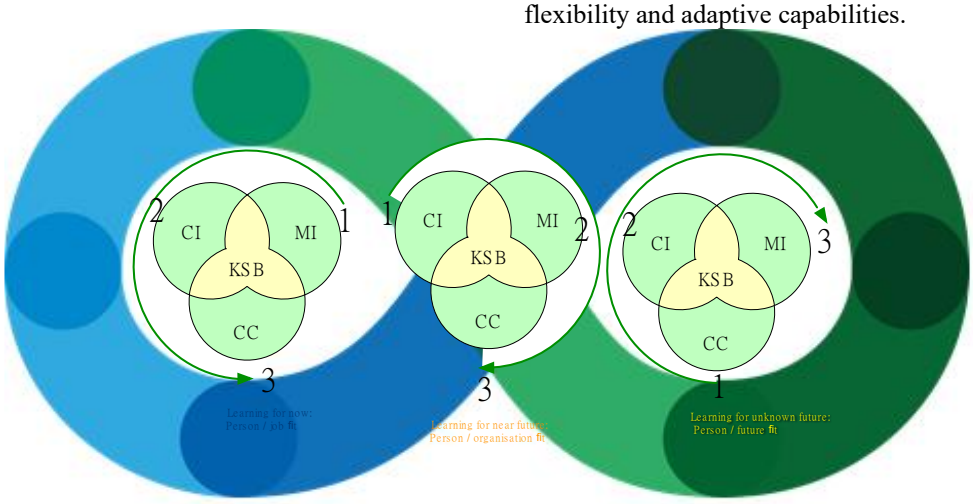

Figure 12: Knowledge and the ACoR

6. The Practical Relevance of Our Findings

With the adaptive cycle of resilience approach, we better understand the phases an organisation goes through while dealing with challenges. Even though the cycle on its own shows a sequential phasing, in current reality things are not that simple. The most significant risk for organisations is the vulnerability regarding disruptive change. In the

traditional approaches to management, it is suggested that we have to understand the challenge before being able to (co)create a solution for that challenge. After that analysis, a structured approach should be used to develop a countermeasure that should reach to the proposed solution. In general sense it means that the application of a ceteris paribus approach: all external factors stay equal is with a limited value. In a dynamic changing environment, the context is constantly changing, and the organisation should adapt to a new and always changing environment.

Our approach suggests that people should be aware of the phase the organisation is in with its imminent impact on the objectives they strive for. Secondly, being aware of the phase transitions we should identify the character of it and also the risk and traps we are facing when we are not alert in being aware of the changed circumstances. We also asked attention for the reasons that cause that these traps often occur. As we stated, in many cases, these causes are based on a troublesome state of mind of the involved people. Being aware of HR aspects of organisational change in that sense is logical and unavoidable.

Based on these insights we suggest investing in the development of a continuous learning effort to prepare employees for being better able to deal with unforeseen changes, whether that is dealing with challenges now, in the foreseeable future of even in unpredictable future(s). By doing this, the ability to deal with vulnerabilities will be strengthened by improving the adaptive capabilities through strengthening resilience in the organisation. Recovering from disruptive change will be easier, without any proof that this will be effective, but that is a characteristic of real life.

As this discussion paper sketches a bird-eyes view on contemporary developments, the proof of this view can only be found in applying these ideas in real practice, as the proof of the pudding is in the eating.

References

Abcouwer, A. W. (2015). Adaptive cycle of resilience. Retrieved from www.adaptivecycle.nl

Abcouwer, A. W., & Parson, B. (2011). Sustainable assertiveness: The adaptive cycle of resilience. Retrieved from http://www.adaptivecycle.nl/images/SUSTAINABLE_ASSERTIVENESS_THE_ADAPTIVE_CYCLE_OF_RESILIENCE.pdf

Abcouwer, A. W., & Smit, B. J. (2015). Business IT alignment: A never-ending story. Working paper UvA. Universiteit van Amsterdam.

Abcouwer, A. W., & Takács, E. (2018a). Cooperation in a changing world. Paper presented at the innovation ungovernance, Utrecht.

Abcouwer, A. W., & Takács, E. (2018b). Digital collaboration for life-long-learning. Paper presented at the 6th International Conference on Management, Leadership and Governance, Bangkok.

Abcouwer, A. W., Takács, E., & Keményffy, O. (2018). IT support to improve organisational problem-solving abilities. Paper presented at the ECMLG 2018, Utrecht.

Allen, P. M., & Varga, L. (2006). A co-evolutionary complex systems perspective on information systems. *Journal of information technology, 21*(4), 229-238.

Anderson, P. (1999). Complexity theory and organization science. *Organization science, 10*(3), 216-232. Retrieved from http://www.jstor.org/stable/2640328

Balogun, J., & Hailey, V. H. (2008). *Exploring strategic change*. Pearson education.

Beck, U. (2006). Living in the world risk society. *Economy and society*, *35*(3), 329-345.

Beer, M., & Nohria, N. (2000). *Breaking the code of change*. Boston, MA: Harvard Business School Press.

Benbya, H., & McKelvey, B. (2006). Using coevolutionary and complexity theories to improve IS alignment: a multi-level approach. *Journal of information technology, 21*(4), 284.

Burnes, B. (2004). *Managing change: A strategic approach to organisational dynamics*. Pearson Education.

Cable, D. M., & Judge, T. A. (1996). Person–organization fit, job choice decisions, and organizational entry. *Organizational behavior and human decision processes*, *67*(3), 294-311.

Carless, S. A. (2005). Person–job fit versus person–organization fit as predictors of organizational attraction and job acceptance intentions: A longitudinal study. *Journal of occupational and organizational psychology*, *78*(3), 411-429.

Choudhury, P., & Haas, M. R. (2018). Scope versus speed: Team diversity, leader experience, and patenting outcomes for firms. *Strategic management journal*, *39*(4), 977-1002.

Christensen, C. M. (1997). *The innovator's dilemma: when new technologies cause great firms to fail*. Boston, MA: Harvard Business School Press.

Donaldson-Feilder, E., Lewis, R., & Yarker, J. (2019). What outcomes have mindfulness and meditation interventions for managers and leaders achieved? A systematic review. *European journal of work and organizational psychology*, *28*(1), 11-29.

Dover, P. A., & Dierk, U. (2010). The ambidextrous organization: integrating managers, entrepreneurs and leaders. *Journal of business strategy*, *31*(5), 49-58.

Drucker, P. F. (2001). *The essential Drucker: Selections from the management works of Peter F. Drucker* (1st ed.). New York: Harper-Business.

Ensor, J. (2011). Uncertain Futures. In *Uncertain Futures: Adapting development to a changing climate* (p. 5). Practical Action Publishing.

Folke, C., Carpenter, S., Elmqvist, T., Gunderson, L., Holling, C. S., & Walker, B. (2002). Resilience and sustainable development: building adaptive capacity in a world of transformations. *Ambio, 31*(5), 437-440. Retrieved from https://www.ncbi.nlm.nih.gov/pubmed/12374053

Fukuyama, F. (2011). *The origins of political order: from prehuman times to the French Revolution* (1st ed.). New York: Farrar, Straus and Giroux.

Gigerenzer, G. (2014). *Risk savvy: How to make good decisions*. New York: Viking.

Grundy, T. (1994). *Implementing Strategic Change: A Practical Guide for Business*. ERIC.

Gunderson, L. H., & Holling, C. S. (2001). *Panarchy: Understanding transformations in human and natural systems*. Island Press.

Gunderson, L. H., & Holling, C. S. (2002). *Panarchy: understanding transformations in human and natural systems*. Washington, DC: Island Press.

Gunderson, L. H., Allen, C. R., & Holling, C. S. (2010). *Foundations of ecological resilience*. Washington, DC: Island Press.

Heene, A. (2002). *Praktijkboek strategie*. Schiedam: Scriptum.

Holling, C. S. (1996). Engineering Resilience versus Ecological Resilience. In P. C. Schulze (Ed.), *Engineering with Ecological constraints* (pp. 31-44). Washington D.C.: National Academic Press.

Holling, C. S. (2001). Understanding the complexity of economic, ecological, and social systems. *Ecosystems*, *4*(5), 390-405. Retrieved from http://www.jstor.org/stable/3658800

Holling, C. S., & Gunderson, L. (2002). Resilience and adaptive cycles. In L. Gunderson & C. S. Holling (Eds.), *Panarchy, understanding transformations in human and natural systems* (pp. 25-62). Washington: Island Press.

Jonassen, D. H. (1997). Instructional design models for well-structured and III-structured problem-solving learning outcomes. *Educational technology research and development*, *45*(1), 65-94.

Jonassen, D. H. (2000). Toward a design theory of problem solving. *Educational technology research and development*, *48*(4), 63-85.

Joseph, J., Orlitzky, M., Gurd, B., Borland, H., & Lindgreen, A. (2019). Can business-oriented managers be effective leaders for corporate sustainability? A study of integrative and instrumental logics. *Business strategy and the environment*, *28*(2), 339-352.

Kaminski, J. (2011). Theory applied to informatics–Lewin's change theory. *Canadian journal of nursing informatics*, *6*(1).

Kauffman, S. A. (1995). At home in the universe: the search for laws of self-organization and complexity. New York: Oxford University Press.

Kitchner, K. S. (1983). Cognition, metacognition, and epistemic cognition. *Human development*, *26*(4), 222-232.

Kotter, J. (2000). What leaders really do. *The bottom line*, *13*(1). https://doi.org/10.1108/bl.2000.17013aae.001

Kritsonis, A. (2005). Comparison of change theories. *International journal of scholarly academic intellectual diversity*, *8*(1), 1-7.

Lewin, K. (1947a). Frontiers in group dynamics. *Human relations*, *1947*(1), 5-41.

Lewin, K. (1947b). Group decision and social change. *Readings in social psychology*, *3*(1), 197-211.

Luecke, R. (2003). *Managing change and transition* (Vol. 3). Harvard Business Press.

Miller, D. (1990). *The Icarus paradox: How exceptional companies bring about their own downfall*. HarperBusiness.

Mintzberg, H. (2009). *Managing* (1. ed.). San Francisco, CA: Berrett-Koehler Publ.

Perez, C. (2002). *Technological revolutions and financial capital: The dynamics of bubbles and golden ages*. Cheltenham, UK; Northampton, MA: Edward Elgar.

Rawat, S. (2018). Decision-Making under Certainty, Risk and Uncertainty. Retrieved from http://www.businessmanagementideas.com/decision-making/decision-making-under-certainty-risk-and-uncertainty/3371

Scharmer, C. O. (2007). *Theory U: Leading from the emerging future as it emerges*. the social technology of presencing.

Senior, B. (2002). *Organisational change*. London: Prentice Hall.

Simon, H. A. (1973). The structure of ill structured problems. *Artificial intelligence*, *4*(3-4), 181-201.

Singer, P. (2002). *One World*. The Ethics of Globalization.

Taleb, N. N. (2010). *The black swan: the impact of the highly improbable* (2nd. ed.). New York, NY: Random House Trade Paperbacks.

Thompson, J. D. (1967). *Organizations in action; social science bases of administrative theory*. New York, NY: McGraw-Hill.

Tinbergen, J. (1981). Kondratiev cycles and so-called long waves: The early research. *Futures*, *13*(4), 258-263.

Todnem By, R. (2005). Organisational change management: A critical review. *Journal of change management*, *5*(4), 369-380. doi:10.1080/14697010500359250

Tsoukas, H., & Shepherd, J. (2004). *Managing the future: Foresight in the knowledge economy*. Malden, MA: Blackwell Pub.

Walker, B., & Salt, D. (2006). *Resilience thinking: Sustaining ecosystems and people in a changing world*. Island Press.

Westley, F. (2002). The devil in the dynamics: Adaptive management on the front lines. In L. H. Gunderson & C. S. Holling (Eds.), *Panarchy* (pp. 333-360). Washington: Island Press.

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