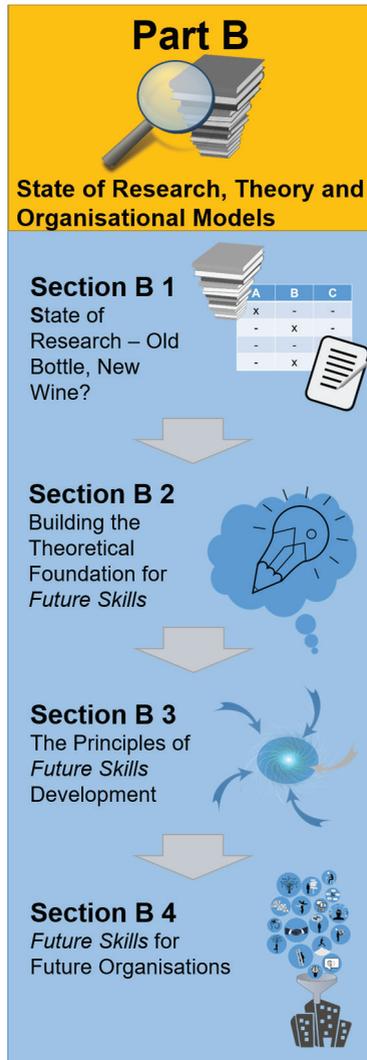

Part B

Future Skills: Research, Theory and Organisational Practice

#in-a-nutshell

Part B of the book is dedicated to the task of reviewing the state-of-the-art literature in *Future Skills* research and related fields. Up to today there is no systematic compilation, review or literature research on this subject available in either German-speaking or English-speaking countries. Chapter B 1 State of Research – Old Bottle, New Wine? gathers research from the past 30 years on different concepts and puts them in perspective, starting with research in the field of graduate attributes. In Chapter B 2 Foundations of the *Future Skills* Revolution: The Theory of *Future Skills* the main theoretical reference framework for *Future Skills* research is then constructed and described. An important concept in this regard will be the so-named “drift-to-self organisation”. For the first time, a systematic review is conducted, a related terminology established and an interdisciplinary architecture integrating different reference theories from a broad interdisciplinary spectrum is built in order to provide a theoretical reference framework for *Future Skills*. For this purpose, theoretical contributions from systems theory, organisational theory, organisational sociology, management theory, physics and education theory are considered and linked. In Chapter B 3 The Principles of *Future Skills* Development, the basic principles underlying the construction of *Future Skills* will be pointed out. Finally, in Chapter B 4 *Future Skills* for Future Organisations: An Analysis

organisational structures, management concepts and models that represent the “drift-to-self organisation” will be analysed, and their relevance for the concept of *Future Skills* will be worked out further.



State of Research – Old Bottle, New Wine?

In this chapter different definitions and approaches of the *Future Skills* will be discussed and the current state of research on *Future Skills* and important terms and concepts will be described. In this chapter it will be discussed how *Future Skills* are defined, what existing *Future Skills* approaches include, and what the state of research on *Future Skills* and on important terms and concepts comprise. Are *Future Skills* something new or just new wine in old bottles? “Old bottle, new wine” is the title of a jazz album by composer, arranger and pianist Gil Evans from 1958, in which he and his band reinterpret famous jazz pieces such as “Bird Feathers” by Charlie Parker. The title plays with the idea of rearranging the familiar in a new appearance. This question also comes with the *Future Skills* concept: What is actually the point of this new, popular term? What is the real content of the concept and what is new about it?

B 1.1 Definition and Concept of *Future Skills*

Future Skills are defined as competences that allow individuals to be (successfully) self-organised capable of acting in highly emergent organisational and practical contexts. Thus, *Future Skills* are competencies in the true sense of the word. They are embedded in the discourse around the goal of higher education and employability as the goal of any educational process that aims at vocational aspiration of any kind. Basically, there are two emerging understandings and usual applications of the term *Future Skills*: First, there is an additive-enrichment-oriented comprehension that understands *Future Skills* as additional components for educational processes that would enrich actual knowledge transfer processes in order to qualify students for future fields of activity. This perspective emphasises the importance of

digital competences or so-called soft skills such as communication or presentation skills. In the discussion about the importance of these skills as additional skills in existing curricula, many centres and programmes for key qualifications were formed at higher education institutions in the 1990s. Representatives of this view of *Future Skills* in Germany are, for example, the “Stifterverband der Deutschen Wissenschaft” with its “*Future Skills-Initiative*”.²⁰

In the last ten years, another understanding gained in importance, which has been competing with the first. In this second view, *Future Skills* are understood in a more integrative way that focusses on the educational process as a whole. Following this approach, the concept of *Future Skills* targets on the reorganisation of educational processes as an integrative concept comprising both, knowledge transfer and development of Skills. In this view, educational processes should lead to higher education programmes that foster the development of competences not only the dissemination of knowledge. Representatives of this view of *Future Skills* are the University of Toronto with a Canadian *Future Skills Initiative*²¹, the World Economic Forum (WEF) with an initiative on “Skills for the Future”²² or the Organisation for Economic Co-operation and Development (OECD) with the initiative *Future of Education and Skills 2030*²³. A distinction is often made between domain-specific competences and generic or cross-domain competences (cf. Villa Sánchez & Poblete Ruiz 2008). The focus of this view on *Future Skills* is the action of an individual or a future professional. Action as a point of reference always integrates portfolio of knowledge, motivation, willingness, attitude and values into a complex framework of dispositions, which can find expression in action as performance.

NextSkills is based on the latter understanding of *Future Skills*. Hence, *Future Skills* are understood as behavioural dispositions that will manifest in complex and unknown future action situations as (successful) behaviour. Irrespective of the point of view, the concept of *Future Skills* has gained relevance in higher education Institutions as, in addition to the factors described above, vocational training became increasingly academic all over the world. Therefore, higher education studies are more and more required to impart employability and skills for a creative and constructive use of knowledge in an increasingly complex environment.

20 <https://www.stifterverband.org/future-skills>

21 <https://futureskillscanada.com>

22 <https://www.weforum.org/focus/skills-for-your-future>

23 <https://www.oecd.org/education/2030-project/>

B 1.2 Terminological Environment of the *Future Skills* Concept

The term *Future Skills* is a new artificial concept that – from a terminological or conceptual point of view – is not anchored in educational science or organisational sociology, nor does it appear in research on learning psychology or in management theory. In the following sections we are going to constitute the term and anchor it through the concepts education, learning, competence and self-organisation.

B 1.2.1 Education and Learning Theory of *Future Skills*

Education and learning play a constitutive role in the *Future Skills* concept. Learning here is understood as a self-active process that takes place in social-ecological spaces and is equally facilitated and limited by them. Furthermore, learning is considered to being linked to the concept of action and as an activity that serves to overcome subjectively perceived barriers through learning activities (Holzkamp 1993). Externally organised learning (e.g. through given curricula that are not directly subjectively relevant) can also lead to learning, which must rather be perceived as *defensive* learning following Holzkamp's (ibid.) subjective learning theory.

Klaus Holzkamp's subject-scientific foundation of learning (1993) is based on an analysis of previous theories of learning psychology and concludes that the subject is not sufficiently represented as a self-directed individual in previous approaches. It analyses the previous (psychological) approaches to the concept of learning as "equating with externally controlled" learning – and refers to behaviourist and cognitivist learning theories. Thus, according to Holzkamp, the idea that the subject might have a vital interest in learning cannot be found in the learning theories he has analysed. According to Holzkamp, the underlying problem is "[...] the fact that learning as a problem does not occur in traditional learning theories from the analytical point of view of the learning subject" (Holzkamp 1993: 14). It stands to reason that that this is one explanation why learning subject-centred theories on pedagogical quality are lacking.

Based on this analysis, Holzkamp explores learning starting from the subject: According to this people exploring the world perspectively and through intentional reference; reality is interpreted by the subject within the context of his own experiences and intentions (cf. Holzkamp 1993: 21). The subject thus has to be considered as a "centre of intentionality", "that experiences other people as centres of intentionality with their respective perspective/intentionality from its own point of view" (ibid.). The world is perceived as meaningful from the individual's point of

view. These meanings become behavioural premises of human beings and by this the basis for reasonable individual behaviour (cf. Holzkamp 1993: 26). Learning is presented as that kind of activity that aims for expanding one's own means of disposal and in this respect differs from other actions.

Learning is an important and constitutive process for education, which can support the educational process. Learning is not understood as learning in higher education Institutions in the sense of a given curriculum, but as an activity of a subject educating her/himself, which can also be understood in the sense of socialisation or development. Both processes can also be described as learning, which promotes the educational progression. Education in a holistic sense is understood as the effort to form a threefold relationship to oneself, to an object and to the social environment. This means, that through educating myself, I form a relationship to myself and therefore step into a critical distance to myself. Secondly, in relation to an object, theme or task, I develop a relationship, for instance by acquiring it, informing myself, picking up knowledge about it, qualifying myself. Thirdly, it is about the formation of a relationship between me and the environment, which often also presents itself as the narrow environment, this includes people and social systems in which I am involved. This also implies for the wider environment, my workplace, the organisation I work for or our society. Any of these poles can stand alone or can be considered separately, because in turn my capacity to act in my environment is shaped by my abilities in terms of a knowledge base or certain skills, and also by how I recognise myself, for example my self-concept. In consequence the three poles relate with each other. The concept of education such understood provides a structure of three dimensions that are related to each other. However, this structure does not release us from looking at the dimensions, the object, the self/personality, and the environment/ society. Although they all influence each other in the understanding of education and in educational processes, it is helpful to take a closer look at the three dimensions and their developments.

Within the *NextSkills* Studies on *Future Skills* and regarding the question of what knowledge and competence levels employees will need for future working environments, for all three dimensions of the concept of education transformation tendencies are schematically sketched out, which are to be taken up here. With regard to the subjective dimension, it is emphasised that self-development, autonomy and reflection become more important than ever before. Within the object dimension, it is emphasised that there is a change from objective knowledge to a rapidly changing knowledge bias. In conclusion a relatively high deterioration – virtually inflationary – can be observed regarding the importance of this dimension on successful solutions. With regard to the environmental/social dimension, it can be noted that organisations are undergoing a broad transformation of internal organisation and

structure formation triggered by environmental megatrends such as demographic change, digitisation, globalisation, networking.

Regarding the question which future competences will gain in importance, it must first be noted that the structure of the outlined concept of education will not change, but rather the content-related structure of the interaction of the three dimensions. Thus, the importance of coping-competences for future tasks result from the of the changes. Beyond that, the factor of self-organisation which has significance as a basic requirement and determinant for competent acting has to be added.

B 1.2.2 Future Skills as Competence

What role does competence play for *Future Skills*? What is the purpose of higher education studies? Education through science or development of professional competences? Or both? Competence orientation has become the magic word for teaching and testing and therefore for the design of study programmes. Education cannot be reduced to verifiable competences. Higher education must offer both: Opportunities to acquire subject-specific and interdisciplinary competences, which as such can be verified, and opportunities for education through science, which as a whole are largely beyond control (Reinmann 2014).

Future Skills are a specific profile of existing concepts of competence. In doing so, we assume that *Future Skills* contain competencies that are important for future action situations. The impact on an individuals' abilities is depending on the personal emotional value-related constitution, on the respective state of knowledge and the extend of introducing this to one's environment or how the environment can enrich one's actions (see also Figure 11). The concept of competence as defined by Erpenbeck et al. (2007) comprises exactly this understanding, focussing on action, more precisely on performance. Competence as a concept refers to the capacity to act not only in relation to knowledge, but also in relation to individual personal values, attitudes, opinions and emotions. And moreover, to the system of action in which a certain activity takes place, namely the operating context in which an action is to be carried out, thus the performance environment. Competence is not context-neutral, but always refers to a specific context. For example, the competence to communicate is context-specific, as it differs in the context of a business environment from a private environment. With regard to competence, another dimension has to be added, that of self-organisation.

B 1.2.3 Self-Organisation

Self-organisation is an anchor concept for *Future Skills*. Self-organisation as a concept was first scientifically and systematically defined by Heinrich Haken. As a physicist, he refers to the ability of particle systems to independently form orders and structures. Erpenbeck has consistently developed and transferred this concept to the field of competence development where he has highlighted self-organisation as one of the central characteristics of competence. To a certain extent, self-organisation is thus an indispensable meta-dimension to the three dimensions mentioned. Only self-organisation as a meta-category is able to harness the concept of education as a concept of competence.

Self-organisation is, so to speak, the fourth dimension in the threefold structural relationship of the concept of education mentioned above. The factor of self-organisation influences the respective dimensions of the educational concept and thereby, as a requirement, changes the content of the educational process. Self-organisation in this sense can not only be understood as a structural condition of every future educational process, but also as an important normative element in the educational process, which recharges the various components with new content.

In relation to organisations, environmental social systems, self-organisation leads to a diminishing influence of hierarchically, given system dimensions. With regard to the dimensions of objects of educational effort, self-organisation as normative orientation is to be understood to provide less given canonical objects of education, and with regard to the subjective dimension of the structural concept of education, self-organisation translates into self-determination and autonomy and less fixed subjective behavioural and life patterns.

The range of competences that will enable people to act in their working, private and social lives are determined by the structural conditions.

Form and substance of what needs to be learned has always been a bone of contention. Indisputable is however the concept of an education for self-determination. Self-determination has always been an important goal of any education in a human, democratic society. If one acknowledges that one of the general goals of a human and democratic education – under the conditions of our historical epoch – needs to be the ability of young people to determine themselves to the greatest possible degree, in short, the ability of self-determination, one must acknowledge self-action as a necessary pedagogical principle (Klafki 2003). It should be emphasised that self-determination must not be interpreted subjectivistic, but always from the angle of a responsible relationship of the individual to his fellow human beings, to culture, society and politics (ibid.).

B 1.3 Future Skills Research: Literature Review

What are the main results of previous research on *Future Skills*? Research on *Future Skills* is divided into two different areas: On the one hand in research work – development of framework concepts or empirical analyses of requirements as well as analyses of academic curricula – on the subject of graduate attributes with a peak in the 1990s. On the other hand – especially in recent times, emerging since the 2000s – on the topic of *Future Skills* or 21st Century Skills.²⁴ Another related research area is the area of employability research, which has been booming internationally since the 2010s. Our analysis of the current state of research includes the most frequently cited research publications on *Future Skills* and Graduate Attributes from the years 2010-2019. In addition, we have analysed more than 40 existing *Future Skills* concepts, and examined and compared their range of content and the categories used (see Chapter B 1.4 Critical Analysis of Existing Future Skills Concepts). The research work of the last 20 years on both topics can be broadly summarized as follows:

1. Research in the area of Graduate Attributes concentrates on determining which competences – as attributes of graduates – are of particular relevance to their subsequent success on the labour market. Apart from this, research is being carried out into which teaching-learning strategies are particularly suitable for the development of such attributes, both of a didactic and curricular nature. After reviewing the literature Trevleavan and Voola (2008), present eleven different terms for Graduate Attributes: key skills, key competencies, transferable skills, graduate attributes, employability skills (Curtis & McKenzie 2001), soft skills (BIHECC 2007; Freeman et al. 2008), graduate capabilities (Bowden et al. 2000); generic graduate attributes (Barrie & Ginns 2004, Bowden et al. 2000), professional skills, personal transferable skills (Drummond et al. 1998), generic competencies (Tuning Report 2008). Rigby et al (2009) summarise these synonymous terms under the umbrella term “graduate skills”. They thus refer to skills that are not only relevant for professional development, but also and above all

24 A search in the Web of Science for the term “21st century competences” and “21st century skills” led to the following result: Three academic publications for the years 2000-2003, one for the years 2004-2007 and 19 for the years 2008-2010, 158 for the years 2011-2014 and 299 for the years 2015-2019, 39 publications in 2019 alone. Publications in the Education Resource Center (ERIC) show a similar result: 77 publications for the year, 143 publications since 2018, 309 publications since 2015, 468 publications since 2010 and 511 publications since 2000.

- focus on personal development and the holistic education of the individual to become a committed member of society (ibid.: 4).
2. Employability, in the sense of a lifelong employability, can be scientifically defined and empirically investigated. Competences and skills that are relevant for employability can be determined. Research shows that Graduate Attributes are important for employability.
 - a. In a comparative literature analysis of the years 2006 to 2014, including 39 studies, Osmani and colleagues (2015), collected a comprehensive set of 53 Graduate Attributes.
 - b. The Australian Chamber of Commerce and Industry, in cooperation with the Business Council of Australia, has identified a set of competencies and personal attributes that workers assessed to correlate with higher work performance (2000).
 - c. The NCVER Report (2003) relates Graduate Attributes to Employability and concludes that graduates with Graduate Attributes have a competitive advantage over those with weak or low levels of competence in terms of graduate attributes.
 3. Those competencies or skills that are particularly relevant to employability are often transferable and referred to as interdisciplinary competencies, generic competencies, key competencies or soft skills.
 - a. The labour market is undergoing change (Jackson 2014; James et al. 2004), which should be reflected in university curricula. Rigby et al (2009) identify a necessary shift from pure content knowledge towards process knowledge in curricula. This change also has an effect on a changed pedagogy: The knowledge transfer paradigm has to be enriched by constructivist teaching/learning models (Rigby et al. 2009: 5), which, according to Tenenbaum et al. (2001), is not necessarily reflected in practice despite its anchoring in existing curricula. The main reason for this may often be the uncertainty of the teaching staff: Who should teach Graduate Attributes and how and which methods can be used for evaluation? (Freeman et al. 2008).
 - b. As research shows, graduates must not only develop Graduate Attributes in the sense of skills, but also the readiness and willingness to apply them in practice (Trevleavan & Voola 2008; Hoban et al. 2004; Kember & Leung 2005).
 - c. According to Rigby et al. (2009), the core problem for anchoring graduate attributes in higher education curricula is that there have been two opposing opinions in the literature on how graduate attributes can best be conveyed: 1) Train Graduate Attributes along with subject-specific course content, whereby the graduate attributes to be trained should be relevant in the respective disciplinary context (Barrie & Ginns 2004; Sin & Reid 2005; Thompson et al.

- 2008; Bowden et al. 2000; Star & Hammer 2007; Drummond et al. 1998; Bath et al. 2004). 2) Graduate Attributes Disciplines – teaching independently in separate course formats (Cranmer 2006). While the first approach is based on the assumption that forms of teaching must adapt to changing market demands (Biggs 2003), the latter seeks to retrofit skill deficits of individual students by a *modular principle* without focusing on the necessity of changing teaching concepts. Osmani et al (2015) propose a “double approach”, that anchors graduate attributes in the curriculum on the one hand (1) and offering additional employability programmes and workshops on the other.
4. It can be stated that there is a general deficit of the curricula of higher education Institutions in promoting competences that are particularly relevant to employability.
 - a. In their study, Finch, Hamilton, Baldwin and Zehner (2013) identified factors that have an impact on the employability of graduates, showing that employers attached the greatest importance to soft skills; academic reputation was rated as the least important. Similar findings can also be found in the studies of Daud et al. (2011) or Finch et al. (2013).
 - b. In the report on employers’ satisfaction with the level of the Graduate Attributes among their employees, Hager et al. (2002) have shown that the performance of employees was only evaluated as “appropriate”. This is to be understood as a hint for higher education Institutions, which have so far failed to adequately train their graduates in the skills that are critical for the market.
 - c. In this context, Rigby et al. also speak of an “implementation gap” (2009: 8), Osmani et al. (2015) call it a “broad mismatch” (see *ibid.* 367).
 - d. According to Tran (2015), graduates of higher education Institutions are poorly prepared for the labour market and its demands, as curricula are often outdated or irrelevant.
 - e. Study results by Gibbs et al (2011) and Stone, Lightbody and Whait (2013) suggest that cooperation and dialogue between stakeholders (higher education Institutions, employers, students, ...) is the key to adequately exploring and reconciling skill needs and training opportunities. Daud et al. (2011) come to the same conclusion. In their study they revealed a gap between the Graduate Attributes of graduates of business and management studies demanded by employers and the performance of these graduates after their studies. The authors therefore conclude that curriculum design should always take into account the employee’s perspective and consider which competencies future graduates will need in their future field of work.
 - f. Dewey and colleagues (2008) analysed the expectation gap between competences postgraduates exhibit after accomplishing their graduate studies

- and those considered essential by employers. It turned out that there were discrepancies between the expectations of the employees and the competences imparted in the educational programme.
- g. In US literature, the gap between the skills demanded by industry and those taught at higher education institutions is documented by a number of empirical studies (e.g. Aasheim, Williams & Butler (2009); Cox et al. (2013); Koppi et al. (2009); Koppi et al. (2009)). I.e. Koppi and colleagues (2009) examined, how the curriculum of US bachelor students could be better adapted to the requirements of the labour market. It turned out that it was not the division of business and technology courses that needed adjustment, but that the curriculum should instead be aligned at focusing on communication and teamwork skills.
5. 21st Century or *Future Skills* are a recently emerging research topic by the World Economic Forum, UNESCO, the European Commission or the OECD, which deals with the question which graduate attributes are particularly relevant in order to act in an increasingly globalised and digitised world in a socially creative, responsible, sustainable way and in accordance with the Millennium and Sustainable Development Goals (Osmani et al. 2015; Rigby et al. 2009). Despite many years of discussion and research the embedding and integration of effective skill development is still considered “difficult to operationalize effectively” (Drummond, Nixon, & Wilkshire (1998: 21).
 6. The approaches to 21st century skills from the last 10 years and to *Future Skills* from the past 5 years, are often oriented towards the design of policy framework recommendations and are not always empirically based or based solely on sectoral data collection. Therefore, the present study is particularly relevant for closing this gap by empirically operationalising *Future Skills*.
 7. The existing approaches generally consist of lists of more or less important skills but are not based on sound competence theory approaches (Barrie 2004; Clanchy & Ballard 1995; Sin & Reid 2005). There has been no modelling so far that makes it possible to critically classify the models with regard to their substance and scope.
 8. In most of the existing approaches, it becomes apparent that they go far beyond listing what graduates should know (knowledge) and be able to do (competences) and besides relate to a wide range of personal characteristics (Rigby et al. 2009). Therefore, they not only subsume individual skill components under Graduate Attributes, but also the attitudes, values, dispositions, abilities and competences of individuals.

9. An interesting approach is to understand attributes and skills for employability not as lists of characteristics and abilities, but in a broader sense as part of the identity that is to be developed holistically within the framework of academic studies. These approaches mainly refer to Bourdieu (e.g. 1986 1990) and include habitus (internalization of cultural norms) and capital (social, cultural and economic capital) as components. These approaches do not focus on the acquisition of a set of individual skills, but rather on supporting students in their transformation into their professional role in working life. These more holistic approaches appear promising, but still are rare. Osmani and colleagues (2015) therefore recommend including graduate attributes in higher education curricula in order to meet the demands of tomorrow's world of work at best.

B 1.4 Critical Analysis of Existing *Future Skills* Concepts

What *Future Skills* models and concepts are currently available and how are they structured? A research on the currently available *Future Skills* approaches, models and concepts can only remain incomplete. This field is too dynamic and the understanding of what belongs to *Future Skills* is too diverse, what maybe is called *21st Century*, but actually means *Future Skills*, or what relates to certain educational sectors – such as schools, teacher training, higher education Institutions, individual university disciplines, such as engineering (i.e. *The Engineer 4.0*) or economics (i.e. *Leadership Skills for Managers*) – or content domains, such as MINT/ STEM Skills.²⁵ Due to this heterogeneity a contentwise analytical comparison of the approaches is not useful. However, the approaches can be presented side by side using uniform criteria of skills in order to get an impression of the scope and coverage of the respective approaches. In order to ascertain these criteria, a metaanalysis has been carried out.

25 STEM comes from English and means Science, Technology, Engineering and Mathematics. Comparable to STEM is the German acronym MINT, which refers to mathematics, computer science, natural science and technology.

Table 2 Comparative analysis of existing *Future Skills* models (sources see list of references)

Consolidated Skill Inventory	Nr. of matches	The OECD Future Skill Framework	PISA Key Competence Framework	European Commission Future Learning Model	OECD Key Competencies	OECD Global Competencies	WEF 21st Century Skills	P21 Partnership for 21st century learning	Tuning Transversal Skill Model	AEGEE Transversal Skills and Competencies Policy Paper	21st century stem model	National Research Council Model: Skills for Work and Life	21st skills envision experiences	Harvard Global Citizenship education	Graduate Employability 2.0	Social and Emotional Learning Methodology	The future of Skills - Employment in 2030	Future Skills Model NextSkills
Subject oriented skills																		
Analytical and critical thinking	10				1	1	1	1	1		1	1	1			1	1	1
Creativity	11	1	1	1		1	1	1					1		1	1	1	1
Learning skills	6							1	1	1	1	1						1
Action & Initiative	6	1		1				1		1							1	1
Health Literacy	4				1	1											1	1
Intercultural knowledge and understanding	9	1		1		1	1	1		1			1			1		1
Taking Responsibility	5	1	1	1	1	1												1
Persistence/grit	4				1	1										1		1
Ability to reflect	3	1								1								1
Curiosity	3					1										1		1
Entrepreneurship Skills	5			1				1	1		1	1						1
Flexibility	3				1	1						1						
Global-mindedness	2			1	1													
Anticipation	2	1								1								
Deal w. ambiguity and uncertainty	2		1															1
Empathy	2		1	1														
Form & conduct life plans, personal projects	2	1								1								
Resilience	2		1					1										
Compassion	1		1															
Falling Forward	1		1															
Reconciling Tensions & Dilemmas	1	1																
Risk Taking	1			1														
Object related skills																		
Digital & Data Literacy	9	1			1	1	1	1			1	1				1		1
STEM skills, complex problem solving	7				1	1	1			1	1	1	1					1
Financial Literacy	5				1	1	1			1						1		
Organisation related skills																		
Communication skills (language, symbols, texts)	14	1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1
teamwork	8	1	1	1					1				1	1			1	1
Context awareness and adaptability	5				1	1	1					1						1
Leadership skills	8				1	1		1			1	1		1	1	1		
Co-operation skills	9	1			1	1	1			1	1	1	1	1	1		1	1
Networking skills	7	1	1	1						1				1	1	1	1	1
Interact respectfully, appropriately and effectively	5				1					1	1	1	1					
Civic Competence	4			1						1						1		1
Co-constructing, shared cognition	2		1															1
Act within the big picture	1	1																
Defend and assert rights, interests, limits and needs	1	1																
Organizational Skills	4			1	1						1	1						
Tot		7	9	13	10	13	13	11	10	12	8	10	11	5	4	14	7	17

This was done as follows: With the help of the keywords “*Future Skills*”, “21st Century Skill”, “Future Learning”, “Future higher education”, it was possible to identify 41 models, approaches, political position papers and concepts that were published between 2012 and 2019. Only explicit and concrete concepts containing skill descriptions and lists of competences were included in the analysis. Concepts of only theoretical nature were not considered in this analysis. They are the subject of the analysis in Chapter B 1.3 *Future Skills* Research: Literature Review.

The next step was to create a *longlist* containing all skill items of all 41 skill approaches. It resulted in a total of 199 items. These were harmonized by means of a content analytical procedure by paraphrasing as well as determination and standardisation of double entries. As a result, the 199 items were reduced to 33 items, that were suitable to function as category grids or comparison criteria for the previously determined overall list of 199 items regarding their depth of formulation and concept scope. In a further step, the 33 comparison criteria were divided into three categories constructed in the *Triple Helix-Model for Future Skills* – such as skills that refer to subjective individual competences, i.e. the ability to reflect, those that refer to items, objects or content-related areas of expertise, i.e. STEM competences (object-related competences), and those that refer to competences in dealing with the social environment, namely organisational competences (see Table 2).

In the next analysis step, 17 of the 41 skill approaches were selected for being included in the comparative presentation. From the previously used skill concepts, approaches and models those approaches were included that explicitly contained *Future Skills* Lists. Afterward, those were compared on the basis of the 33 criteria. The result is shown in Table 2. The *Future Skills*, which are most often seen in the compared approaches, are – with more than 5 entries each – the following skills:

- Creativity
- Analytical and critical thinking
- Intercultural knowledge and understanding
- Learning skills
- Action & Initiative
- Taking Responsibility
- Digital & Data Literacy
- STEM skills, complex problem solving
- Communication skills (language, symbols, texts)
- Co-operation skills
- Teamwork
- Leadership skills
- Networking skills

- Context awareness and adaptability
- Ability to interact appropriately and effectively

Foundations of the *Future Skills* Revolution: The Theory of *Future Skills*

B 2

The increasing importance of *Future Skills* as the capacity to act in emergent contexts can be explained by a multitude of theoretical references from different scientific disciplines. The interaction of complex systems leads to self-organisation and system change. We call this development a “drift to self-organisation. These system changes are characterized by the fact that they cannot be traced back linearly to the previous state and do not emerge deterministically, so that predictions can’t be made. Networking through digital media, global interaction and the abundance of information through digitalization lead to faster changes at the level of social organisations, which reinforce and accelerate themselves at all levels of the macro, meso and micro levels. The correlation amongst the different ecosystem levels leads to an acceleration of self-organised change.

Future Skills is a dazzling term that is currently in great demand, due to its programmatic effect rather than to its conceptual power. In this respect, it is certainly comparable with terms such as lifelong learning, e-learning, competence or digitisation. These are all concepts that stand for broad developments and combine entire bundles of theoretical-conceptual components.

Looking at the current research on *Future Skills*, it becomes clear that there is a very similar discourse to the concept of lifelong learning behind it. Programmatically speaking, this requires the development of (key) competences in order to maintain or develop the innovativeness of work processes. Such terms occur as landmarks in the public debate and are characterized less by clear conceptual sharpness than by their orientation effect. Therefore, in this chapter we present the current state of research on important theories and groundwork about *Future Skills*. We will process the concepts of competence, self-organisation and related terms. The terms emergence and emerging order in self-organised systems will also be thematised.

B 2.1 The “Drift to Self-Organisation”

Self-organisation is a principle that underlies many social developments and is used as an explanatory model in many theoretical approaches. As it develops into a pervasive concept, we described the evolution towards self-organisation as a guiding principle using the term “drift to self-organisation”. Now, the following question arises: How can coherence, synergy and joint action develop in organisations despite or maybe through self-organisation? Is that not inconsistent? Is the emphasis on the self not opposed to a collective order?

B 2.1.1 Self-Organisation and Structure

Self-organisation is a cross-disciplinary research direction that deals with systems that generate order without external intervention.

“Intuitively, self-organization refers to the effect that a systems structure or organization appears without explicit control or constraints from outside the system. In other words, the organization is intrinsic to the self-organizing system and results from internal constraints and mechanisms, due to local interactions between its components.” (Serugendo et al. 2004:2).

Order formation is the subject of diverse scientific fields as laser physics, thermodynamics, evolutionary biology, meteorology, computer science, economics and sociology. As the basic assumptions and concepts of self-organisation differ fundamentally from those of externally structured, externally influenced systems of order Paslack (2013) speaks of a paradigm shift:

“The answers that were found to these and similar questions certainly went beyond the specific question interest and established a completely new view of nature.” (Paslack 2013)

The research direction of self-organising systems establish itself in the sixties. This actually quite late breakthrough of the self-organisation concept in science is not least due to the success of the mechanistic world view in combination with the mathematically manageable theory of linear systems, which is closely connected to the differential calculus. This success led to problems being classified as linear for as long as possible, which impeded the awareness for nonlinear phenomena. Due to the emerging conception of self-management in organisations, the digital networking on micro-, meso- and macro-level and a movement towards highly

emergent systemic phase shifts of social systems, linear models lost more and more explanatory power.

Self-organisation is the principle underlying many social developments. It is developing into such a pervasive concept that we have described the development towards self-organisation in society as a whole, but also in specific areas of society, such as private or public organisations, by the term “drift to self-organisation”.

The trick of the approach to consider systems as self-organised entities lies in the phenomenon of dynamics. Dynamic systems are inevitably unstable systems. However, structure on the one hand side and flexibility of these systems on the other do not occur despite, but precisely because of their dynamics. *It can be concluded: only adaptable systems are stable and only unstable systems are adaptable.* In self-organisation processes, elements in a system interact in a certain but unpredictable way. This process, the emergence of new characteristics or structures of a system as a result of the interaction of its elements, is what we call emergence (Stephan 2006; Stephan 2005).

Erpenbeck and Heyse (1999) point out that in practice corporate management can be described as an interaction of deterministic approaches and the creation of a framework that enables employees and groups of employees to make decisions and take actions within this framework of implicit and explicit knowledge. Thus, the task of any kind of *organiser* in human social systems is to create and renew conditions that increase the degree of freedom or choice and thus increase the potential for self-organisation and innovation for all participants (Probst 1987:113).

B 2.1.2 Self-Organisation as a Social Trend

The *principle of self-organisation* is the basic principle of the *Next Organisations* – the new working and living reality of people in ever-increasing parts of society – the *Next Societies*²⁶. As a principle, it underlies many social developments. It develops into such a pervasive concept that we refer to this development as “Drift to Self-Organisation”.

Apart from institutional actors and political guidelines and in combination with a higher degree of self-responsibility it seems to be increasing. As a result, the first phenomena of a “progressive we”, emerge as Kruse (2009) calls them, describing them as a continuation of the new social movements of the nineties. Other and new forms of community and solidarity emerge. Depending on one’s

26 For the term see also <https://next-society.de>

perspective, self-organisation as the central concept of *Future Skills* and the future world of work can quickly be understood as neoliberal action – especially if it is provided without a protective net. The economist and sociologist Oliver Nachtwey, for example, describes the transition to the newly designed German welfare state in the “regressive modern age” beyond the “paternalistic principle of leadership care” and identifies self-organisation and personal responsibility as the increasingly dominant concepts (Nachtwey 2016). It is important that any vision of the future that focuses on self-organisation and self-responsibility does not lose sight of these political, social and societal contexts.

Klaus Schwab, head of the World Economic Forum, examines in his book “The Fourth Industrial Revolution” its potential impact on companies, states, countries, society and individuals. He emphasises that self-organisation is the most serious effect of digital transformation: “One of the most far-reaching changes in all these areas will be due to a single force: empowerment” (Schwab 2016). Empowerment to self-determination changes everything: the relationship between the state and its citizens, between companies and their employees, between shareholders and customers, between superpowers and smaller countries. This adds a new quality to the solely systemic considerations of Bronfenbrenner’s ecosystem theory (1981), which emphasizes systemic interrelations between the different levels (the micro-level, the meso-level, and the macro-level). The quality is that the actors acting at the different levels produce a new unpredictability and uncertainty through a new orientation of self-organisation and personal responsibility. The disruptive effect of what Schwab calls “The Fourth Industrial Revolution” (2016) will make it necessary for actors to see themselves as parts of a widespread system that can only be successful with cooperative forms of interaction. In their study “Next Germany” Brühl et al. put it this way:

“By their very nature, these systems are no longer limited to local or regional contexts but are at various levels communicatively and processual interwoven organizations or social systems that influence each other in their digital processes in an accelerating way.” (Brühl, Koppel, Schomburg & Schuldt 2017)

Self-organisation as a principle, self-responsibility as an impulse from within and active intervention as an expression of growing impatience – this is how Handelsblatt editor Gabor Steingart describes in his book “Weltbeben. Leben im Zeitalter der Überforderung” (Steingart 2016) (“Earthquake. Living in an age of Overload”, translated) the zeitgeist of the Next Society. In the chapter on democracy, subtitled “Citizens’ Uprising,” it says:

“The coming uprising will be one that will change the Western more than any election in the past decades. The centre of this change is not a party or a religion, a leader or a guru, but a self-confident bourgeoisie that wants the overthrow depending on respective circumstances that are perceived as unfavourable”. (Steingart 2016)

Due to the demonstrations of the pupils and students against the climate catastrophe, which are currently taking place every Friday since 2019, this diagnosis appears correct and in a new light.²⁷ Steingart reports that the aim is to fundamentally change the procedures for gaining and exercising power: He emphasizes transparency, participation, communication and co-determination as the guiding principles of this silent revolution. This time the disenchantment will not turn in the idle run of the individual sensitivities but will become effective as change energy. All in all, a new awareness has now become evident in a historically unique way: Self-organisation and personal responsibility are the new basic principles for the functioning of social systems and organisations. Until now there have often been poles of social and organisational development that have been perceived as contradictory or thematized, either the expansive new development (“everything is designed independently bottom-up”) or the restrictive counter-movement (“it is important that someone has been top-down, taking things in hand from above”), these seemingly contradictory poles dissolve further and further in the direction of synergetic forms.

Today’s organisations find themselves in this area of tension. On the one hand, stable structures, departments and outlasting objectives are important for continuous development, on the other hand, there is the necessity to allow and promote more and more governance through agile, rapidly changing decentralized organisational units. Paying attention to both poles at the same time and to maintain the resulting tension without simply dissolving it is the new balancing act that organisations and societies have to perform. Depending on the point of view, either powerlessness or belief in hierarchy are in the foreground – or the departure into a new exciting togetherness.

B 2.1.3 Self-Organisation Strategies in Organisations

Self-organisation strategies are adequate, suitable means for our time. In his book “Acceleration” the sociologist Hartmut Rosa uses the term “drift” as a possible “reaction of late modern subjects to the complex roaring world” (Rosa 2005: 379ff).

²⁷ <https://fridaysforfuture.de>

The *Drifter* lets itself carry by the flow of life, does not want to control or to plan, but instead to develop a situational self. This raises the question what effect and what extent self-organised individuals with a high degree of self-responsibility can have. What about the duration and commitment of such approaches for long-term development and what significance do they actually have for practice?

A closer look at the current state of modern management literature reveals that new forms of organisation and management are being tried out under the principle of self-organisation and that we are situated in a field of a worldwide experimentation. Most observers who write about new forms of organisation, self-management, self-organisation and self-responsibility, such as *Holacracy*²⁸, *democratic organisation*, *sociocratic management* or about other types of self-organised organisations, are judging very pointed and adopt extreme points of view. Either the flat hierarchies and work environments *without leaders* are praised for their flexibility and commitment, or they are condemned as naïve social experiments that ignore how things really have to be done.

As so often, the truth lies in between, at the centre of the management of the field of tension. In order to adopt more accurate, balanced perspectives, it is important to look behind the buzzwords that describe these new structures – *post-bureaucratic*, *post-structuralist*, *digital*, *organic*, etc. There is a need to examine which new forms have formed and on what basis they function. Both in the efforts of the lowlands and trenches of operative organisations as well as on the level of organisation-wide strategy formation and policy development.

In the general debate about new forms of organisation, repeatedly extreme positions are adopted, evangelists take one side or the other. However, in a first step rather basic positions and resulting structuring concepts should be examined neutrally – how they work and how appropriate they are for the different organisational requirements. The discussion centres around two opposing pairs that form the poles of the field of tension to which today's organisations are exposed: Reliability on the one hand and adaptability on the other. Reliability as a principle means generating a multitude of things such as predictable profits for shareholders, adhering to rules, being compliant, having stable employee requirements and employee numbers and last but not least meeting customer requirements and the requirements of clients and stakeholders in the public sector. Adaptability on the

28 Holacracy – also Holacracy – is a composite of *holos* (ancient Greek for complete, whole) and *kratía* (ancient Greek for dominion) and is a decision-making system attributed to the entrepreneur Brian Robertson of Philadelphia (USA) in his company Ternary Software Corporation. It's about equipping all organisational levels with the greatest possible transparency and opportunities for participation.

other hand means being able to act situationally in situations, beyond structural principles and rules, being flexible, being able to make small adjustments in the production or manufacturing process and services to meet local requirements, but also being able to make major strategic changes and structural adjustments. Organisations are always caught between stability and adaptability, but most often they are seen as opposing pairs in an *either-or* quandary rather than poles referring to a field of organisation-cultural tension, a tense togetherness.

However, the *NextSkills* Studies indicate, that in the perception of the participants one often excludes the other. Uncertainty exists if too much emphasis on adaptability will generate fragmentation and lead to the loss of the benefits associated with focus and scaling. And although managerial hierarchies often fail in different directions, they are strong proponents of rather stable, hierarchical organisations. Employees are just as dependent on stability and reliability as they are on flexibility and adaptability. In order to do their work effectively, they need a stable environment, access to critical resources and clear objectives and responsibilities. But they also need a space in which they can adapt to changing conditions and take ad hoc decisions, as managerial hierarchies often fail to provide the necessary flexibility. Under the keyword “adhocracy”, Friedrich Lindenberg has been addressing this fact in the latest development since 2016.²⁹ As a manager it is not easy to find the right balance between reliability and adaptability. Therefore, approaches of self-management, decentralized organisation, networked organisation with flat hierarchies or further approaches under the keyword Holacracy, sociocracy, democratic organisation or adhocracy have been developing recently as a new large field of experimentation of dynamic organisations in rapidly changing environments.

B 2.1.4 Self-Organisation and Self-Management

Self-organisation as a form of organisation has existed for quite a while. Not until industrialisation the initial holistic work process was divided into sub-steps and through industrialisation processes then subdivided into the smallest production and value-creation units. In fact, the era of self-organisation goes back a long time ago: 65 years ago, Eric Trist³⁰ – a member of the British Tavistock Institute – observed

29 Friedrich Lindenberg has developed an open source software called Liquid Democracy for online participation for organisations and institutions within the scope of his Bachelor thesis.

30 Eric Lansdown Trist was a leading British social psychologist on the field of organisational development. He was co-founder of the Tavistock Institute of Human Relations in

that teams working according to self-management principles could substantially increase their productivity in coal mining (Trist & Bamforth 1951). At that time, the unquestioned standard procedure was to carry out coal mining as a small-step process. Each team only worked on one small step and the steps were carried out one after the other. The model was based on Frederic Taylor's management approach and Henry Ford's assembly line concept. One team had to finish the shift before the next could start. But the miners in South Yorkshire, England, began to reorganise their work spontaneously and self-organised. Autonomous working groups were formed, equipped with comprehensive skills, performing changing roles and shifts with minimal guidance and supervision were created, able to mine coal 24 hours a day without waiting for the results of the previous shift. As a result, so-called "Self-Managed Teams" (SMT) gained popularity. In the seventies and eighties of the last century more and more attempts were undertaken to introduce this form of management. In Europe, participative management was born (Sexton 1994). Furthermore, the concept of so-called "industrial democracy" was introduced (Korsch 1968).³¹ In Japan, these concepts developed into quality circles and continuous improvement concepts (CIP). In the US, out of these concepts the organisational principles for so-called Innovation Task Forces arose.

The development towards "Self-Managed Teams" helped many organisations and companies to achieve breakthroughs in manufacturing and service practice. The Volvo factory in Kalmar, Sweden, was able to reduce its production defects

London. In 1949 Trist published a well-known article "Some Social and Psychological Consequences of the Longwall Method of Coal Getting" (Trist, Bamforth 1951) about his work on organisational theory in an English coal mine in Yorkshire. The Tavistock approach and the socio-technical research methods emerged from these investigations. In the socio-technical system, the technical and psychosocial systems were linked. Together with Fred Emery, Trist developed the socio-technical approach to "work design" – an application of organisational development in favour of the so-called humanization of work (improvement of job satisfaction, efficiency, quality, absenteeism, etc.): Internally managed, self-regulating working groups would be more productive and motivating for workers than the previous conventional hierarchy.

- 31 The German Marxist Karl Korsch, after a longer stay at the Fabian Society in London (1912/13), translated the term Industrial Democracy, which goes back to Sidney and Beatrice Webb, into German for the first time (The Fabian Society, founded in January 1884, is a British socialist intellectual movement, which became known for its groundbreaking work in the late 19th century until the First World War.) In his paper "Labour Law for Works Councils" (1922) he not only used the term "industrial democracy", but also expanded its content. While the Fabians mainly thought of self-administration/co-determination/participation of the workers in the company and enterprises, Korsch also included the inter-company level, e.g. in the form of economic and social councils at sectoral and overall economic level.

by 90 percent in 1987. FedEx was able to reduce service errors by 13 percent in 1989. In the late eighties and early nineties C&S Wholesale Grocers developed an innovative warehouse concept with self-managed teams that offered 60 percent cost advantages over competitors. General Mills increased productivity of their factories that deployed self-managed teams by 40 percent. The method became more well-known in the 1990s. The concept promised benefits in terms of higher productivity, especially in complex and dynamic fields of work.

In the organisations in which they were introduced, only a fractional amount of the employees were involved in the conception of self-management. Mostly in areas where adaptability was more important than stability and reliability. Over time, these work environments evolved into work ecosystems where employees could easily check their own performance and iteratively improve it. Over time, the question arose why self-management should only be introduced at team level? After all, it seemed as if the strongly transforming organisational structures, partly structured as a matrix, partly very hierarchical and complex with comprehensive reporting schemes, were hindering the development of such self-managed organisational units. C&S Managing Director Rick Cohen reports that when working with self-managed teams, the greatest difficulty is to keep the managers outside and enable the teams do what is necessary (DeLong et al. 2003). Thus, the question arose why entire organisations were not based on the principles of self-management.

B 2.1.5 Self-Organisation as Management Paradigm

And indeed, organisations have begun to go in that direction. Management pioneers such as Warren Bennis and Henry Mintzberg, who in his famous article in the Harvard Business Review in 1981 posed the question “Organization Design: Fashion or Fit?” noticed already in the 1980s a change towards new structures called adhocracy: flexible informal management structures. A decade later, the Internet itself became the model for the conception of the so-called “networked firm”, the virtual company. The Free Software / “Open Source” movement in 1983, the emergence of agile work and planning methods, such as “Scrum”³² in

32 Scrum is a process model of project and product management especially in the field of software development. It was originally developed in software technology but is independent from it and now being used in many other areas. It is a Lean Management usage for project management.

1986³³ and Sharing Economy platforms and business models such as Uber, originally founded as a limousine service by Gerrett Camp and Travis Kalanick in 2009, or Airbnb, the accommodation platform founded in San Francisco in 2008 by Brian Chesky, Joe Gebbia and Nathan Blecharczyk, have led to the emergence of participatory and responsive organisational structures in many areas. Holacracy, Podularity (a concept by Dave Gray from 2013 rooted in agile software development, published in Gray, Vander Wal (2014)) and many related organisation-specific variations of self-organisation were added. These new forms oppose hierarchical management constructs and principles. But in a certain way, and contrary to public perception, they resemble the construct of bureaucracy as Max Weber defined it in the early 20th century (Weber 1921). According to him bureaucracy authority is not located in status, class or wealth but within depersonalized rules and roles. Weber's idea was to define bureaucracy as a concept in which individuals were exempt from the dictatorial right of bad leaders. Self-management systems share the same objective, with less rigidity. To some extent, they could be understood as bureaucracy 2.0.

B2.2 Self-Organisation and Competence in the Post-Knowledge Era

This chapter describes the importance of competence as a basis for self-organised action. We are entering an era in which the value of knowledge in comparison to agency, and the capacity to act is changing. However, it is not vanishing – the post knowledge era is characterised by the need to enhance knowledge with additional component which lead to competence and professionalism. The post-knowledge era asks for knowledge plus – where the plus is defined as motivation, value impregnated, emotionally anchored knowledge, expressing through capacity to perform actions in unknown, complex problem situations. From learning to education, from knowledge to competence. The concept of competence has long been anchored in educational science and psychology. In educational science he was introduced by Heinrich Roth (1971), in psychology he goes back to Franz Weinert (2001). Its different definitions are united by a common core: At first, all definitions provide different sections of competences – which we call competence fields – such as social competence, personal competence, technical and methodological competence. These, in turn, contain further competences. Second, all concepts of competence

33 Scrum was first mentioned as a term in the Harvard Business Review in 1986, in an article by Nonaka and Takeuchi (1986) on The New Product Development Game.

include a number of factors that link them to actions, such as cognitive factors – that is, knowledge relevant to action, volition – thus, the will to act, motivation – as extrinsic and intrinsic motives for an action, social factors of an action, and value-related factors in an action situation. Thirdly, all competence concepts assume that competences can be acquired through learning. And fourth, beyond the mere reproduction of processes they describe a person's ability to solve unknown problems in unpredictable, complex problem situations. According to Erpenbeck we define competence as follows:

“Competences are the ability to act self-organised and creatively in open problem and decision situations. Competences are self-organisation dispositions.” (Erpenbeck in Faix et al. 2012)

Compared to the previously described characteristics this definition emphasises the important role of competence for *Future Skills*. It is geared at future unknown actions and also refers to action disposition – not to a fixed, predefined ability. From the point of view of educational science and learning psychology this disposition to a self-organised action makes the concept so fruitful for the concept of *Future Skills*. *Future Skills* therefore represent specific competencies described above. In the concept of *Future Skills*, the concept of competence is applied to a certain extent and related to the area of emergent action contexts. These are precisely those contexts in which unforeseen, newly emerging connections have to be grasped and unforeseeable problems to be overcome. The concept of unpredictability also includes self-organisation. The *NextSkills* Studies indicate that future organisations will demand self-organisation dispositions over prepared approaches to solutions.

The understanding of a self-organised ability to act, as it is covered in the *Future Skills* approach, aims at the abilities of people to act successfully in future, uncertain, previously unknown contexts.



Fig. 21 Stage model of professional competence (Source: Wildt 2006)

It is important to understand that knowledge and competence, action and professionalism are not mutually exclusive or alternative concepts. Rather, they are integrated into the concept of competence. For example, Figure 21 shows that knowledge is located at a lower level than competence and professionalism but represents a necessary step on the path to competence and professionalism.

Finally, according to Erpenbeck (2007), we propose to regard self-organisation as an independent competence that has the quality to combine other competences, i.e. to serve for interaction and combination of competences. This conception understands the different fields of competence in a certain relation to each other. Competences for handling organisational requirements, competences for cooperation and communication, as well as competences for setting priorities and coordination have “medium character” (also Erpenbeck & Heyse 1999). They serve for attainment of the objectives of value creation actions, handling of disruptions, for quality work and the handling of physical environmental conditions – i.e. the ability to make better use of other competences. Based on these considerations and on studies by Erpenbeck and Heyse (1999), we conclude that self-organisation competence and its development manifest themselves as follows:

- self-organisation as a particular quality of competence that exists among other competences (e.g. technical, methodological, social or personal competence) and/or
- self-organisation as a level of competence; i.e. as a degree of expertise that can be found in all fields of competence (e.g. technical, methodological, etc.) and/or

- self-organisation as a competence that describes the development from one level of competence to the next, and/or
- self-organisation as a special form of interaction and combination (interaction and combination action) between different areas of competence.

On a Note... Myths and Misunderstandings About Competence in Higher Education

The discussion about competence in higher education is often characterised by misleading myths, misunderstandings and incomprehension. Such as the common reservation that (1) competence could not be the goal of learning at school or university, rather it had to be focused on knowledge, otherwise learners would not learn anything substantial. And: if at all competence is suitable for higher semesters in higher education, when knowledge is already conveyed, competences can then be developed in addition. A (2) second myth is certainly that competence can best be acquired in a separate specific seminar, e.g. on key competences, and not linked to the actual study of the subjects. By introducing additional competence or key competence courses many higher education Institutions have managed to restructure their programmes towards a competence-orientation, without, however, any changes within the actual courses. A (3) third misunderstanding is that the area of competence is anyway very unclear and esoteric, and the term competence cannot be clearly defined, let alone operationalised for teaching.

Still, in many discussions it becomes evident that the concept of competence deeply permeated the perception of those responsible for education and is currently in a design phase in which sorting, discarding and replanning are taking place. Competence orientation actually requires a complete rethinking of the teaching approaches, which has so far been rather strongly based on an underlying metaphor of transfer.

B2.3 Anchoring *Future Skills* in Educational Theory

Education is the process that should lead to the development of *Future Skills*. But how is that to be understood? In what particular way can the concept of *Future Skills* also be understood in terms of education theory?

First of all, it is obvious that the actors involved in the pedagogical process – such as learners, professionals, management/organisation and state/society – have different perspectives and criteria with regard to the quality of educational outcomes, i.e. how *Future Skills* should be structured. The different perspectives are unlikely to generate *Future Skills* automatically through education. Basically, we argue within the framework of a medium-purpose relationship, thus according to the idea that educational resources can be designed to develop *Future Skills*. Consequently, the development of *Future Skills* is a question of means and methods by which educational processes are stimulated and *Future Skills* are acquired among the users of educational services (hereinafter referred to as learners) by specific (pedagogical) forms of teaching in the broadest sense.

In addition to the question of the relation between purpose and means, there is another question, namely whether it makes sense in normative terms to impart *Future Skills*. With regard to this question, it is assumed that the social and educational services provided in a democratically legitimized state should guarantee material, social and intellectual participation in social developments. Such participation enables citizens to live a largely self-determined and self-responsible life. Participation and attendance in social processes is a constitutive characteristic of this. In this respect, *participation* can be understood as securing opportunities for shaping society. If participation in the social democratic process is endangered by external, material, financial or social problems, politically initiated support takes place. In the field of education, pedagogical services are used where the subjective abilities and competences of citizens are either (newly) developed, exist in a form that is in deficit or at risk, or have partly been lost.

Pedagogical contexts of action that are intended to trigger educational processes always contain components of (1) enabling, (2) preserving and (3) restoring skills and competences that establish opportunities for participation. However, these components are significantly different within the different areas of pedagogy: measures to introduce the next generation into social life are primarily aimed at enabling (e.g. vocational training), measures to prevent dissociation, primarily aim at maintenance, and measures fostering rehabilitation, primarily aim at restoring subjective participation competences. Action contexts that are geared for the development or maintenance of participation competences in their three variants can also be described as *pedagogical action contexts*. Their arrangement,

realisation and cultivation are socially entrusted to the field of education and its instance of reflection, educational science. In this sense, the promotion of *Future Skills* through education is aimed at developing and securing the participation of individuals in the social system.

Education in such a sense is structurally understood as a threefold relationship of the individual to the material world, to society and to himself (Meder 2007: 199ff; Meder 2000: 36f; in detail also 1999: 25ff). This concept of education demonstrates that education as an object of research is not a substrate or a substance, but a correlation – thus a relationship. This tripartite structure has been adopted in the present *Future Skills* Concept, that contains competence fields for all three areas. What can be recognised in the individual results from the relation, that can be described as behaviour (Meder 2007). Education functions as a process of formation of the aforementioned relations. However, the structural perception of this concept of education only provides the perspective of a pedagogical analysis, but not a decision criterion for intervention, i.e. whether there is a case on hand for implementing a pedagogical arrangement of action towards a specific goal. Criteria, standards and/or values are needed to make this decision. Therefore, the concept of education as a concept of the triple relationship must be normatively charged, so that it is clear what the *right* relationship to the world, to society and to oneself looks like. This is the only way to decide whether professional intervention is needed.

In addition, further normative orientation is required. If, for example, it has been professionally diagnosed that the existing relationship to oneself does not permit participation and that intervention on the part of the education and training system is therefore necessary, there is still no orientation what needs to be done in order to transform the undesirable actual state into a socially and individually reasonable target state. Hence, there is no standard for implementation that defines a qualitatively meaningful professional action in the pedagogical field. Such knowledge of action is, in addition to hermeneutic and everyday knowledge, a basic condition for any kind of professionalism. In this sense, the *Future Skills* concept is a normative design of the goal of *securing participation*, in the sense of a pedagogical transfer of participation competencies.

B 2.4 Emergence and Self-Organisation

Emergence is like the stage on which the development of organisations, processes and social coexistence in modern societies takes place. It is, so to speak, the key to understanding systems and their properties. Emergence provides information

on whether and on which rules self-organisation is based in social systems. If processes are no longer predetermined or rule-based, the question arises whether there are other than the acknowledged regularities that make it possible to foresee and understand developments. Emergence as a concept provides the basis for this.

The point is that emergent properties of a system cannot – or at least not obviously – be traced back to the isolated properties of the individual elements of the system. For example, in the field of brain research and in the philosophy of the mind, some scientists hold the opinion that consciousness is an emergent characteristic of the brain (Stephan 2016).

Stephan (ibid.) explains that emergent phenomena are described in physics, chemistry, biology, mathematics, psychology or sociology. Thus, emergence theorists would clearly deny that a full description of the world is possible solely on the basis of knowledge of the elementary particles and general physical laws. However, the recognition of emergent phenomena does not have to lead to a renunciation of scientific explanation. On the contrary, the developments in synergetics, systems theory and chaos research show that emergent-related phenomena such as self-organisation and their formation conditions are accessible to systematic and objectively comprehensible explanations (see also Greve & Schnabel 2011). However, due to a hierarchical derivation from universal laws, the unity of science is replaced by a transdisciplinary dialogue whose aim is to compare analogous structures of complex systems on different emergence levels. In most cases, emergence occurs on the basis of spontaneous self-organisation. The term Emergence describes the appearance of system states that cannot be explained by the properties of the system elements involved. In a sense, at higher levels, newly emerging qualities derive from previous conditions. It should be noted that the newly emerging qualities should not already exist but have to occur for the first time. It is commonly expressed as follows: *The whole is more than the sum of its parts*. The concept of emergence stands for this *more* and its genesis.

The phenomenon of emergence can be illustrated by the example of temperature. If you look at a single chemical molecule, such as the water molecule, then you cannot determine a temperature for that molecule. However, if you have a large amount of these single molecules, then it is possible to determine a temperature. Temperature only occurs when many molecules collide, so temperature can be seen as an emergent property of many molecules. Thus, the temperature of the water is an emergent property of the water molecules.

According to Stephan (ibid., also Stein 2004), emergence describes a specific transformation process between two system states in systemic terms. If a system has the current system state A and this system is transferred to a new system state B, a transformation from system state A to system state B takes place. The trans-

formation is the result of a transformation process. The transformation process is called emergent if the system state B does not result directly from system state A and its particles or subsystems (Stein 2004). This consideration of emergence in the context of a transformation process also contributes to the scientific clarification of the concept. It can now be asked which transformation rules actually work. If no transformation rules are recognisable or known, one would no longer speak of emergence. During the transformation process, new qualities emerge which cannot be attributed to the summation of the individual properties.

This raises the question of whether the emergence phenomenon can be reduced to simple transformation rules at all. Emergence focuses on two principles:

- Principle 1 – Irreducibility: the new state of a system cannot be (historically) linearly reduced back to the old state but represents a qualitatively new state.
- Principle 2 – Unpredictability: neither in terms of time nor content the transformation of the new system can be predicted.

In the following, the transformation process will be discussed further. How does it take place – which explanatory models for the transformation exist, which rules work and are there systematics recognisable? We will address these questions in detail below. The centre of the transformation process is the phenomenon of self-organisation, which plays the essential role in explaining the emergence phenomenon.

Modern self-organisation theories come from physics and biology and increasingly permeate scientific thinking. They form the basis for the emergence of new needs in the labour market, which we call *Future Skills* in this book. We won't fully introduce the large areas of emergence, self-organisation, synergetics and more or less radical constructivism. Instead, we will concentrate on a few limited examples from the fields of synergetics, the ecosystem approach, media theory and autopoiesis.

B 2.5 Synergetics and Self-Organisation

The scientific discipline of synergetics is described as the first explanatory model. Synergetics is the science of interaction (Haken 1991: 17). It was developed in the sixties by Herrmann Haken, a Stuttgart physicist. It was at this time that he discovered laser technology. It was of interest to find out why the different light waves emitted at a diffuse light source bundle to form a single light wave, thereby forming the laser beam. The question arose why different light waves result in a self-organisation process in which a single light wave occurs. This question also

addresses the definition of the term self-organisation. According to Stein (2004) self-organisation is defined as system state caused solely by the system elements and the relations between them, *without the* influence of the environment. Synergetics recognises itself as an interdisciplinary scientific discipline, similar to mathematics and statistics (ibid.). Haken (1991) stresses that synergetics cannot only be applied to the natural sciences, but to social sciences such as sociology. Synergetics can be understood as a doctrine of interaction and as a concept to explain order formation in systems with many interacting units. Haken uses synergetics to investigate how a large number of individual elements organise themselves into higher structures. John Erpenbeck and Volker Heyse (1999) cite the following example based on the physicist Hermann Haken:

“Let us think of a swimming pool where the swimmers are to swim in one direction to the other edge and back. If the swimming pool is very full, as it is the case on hot summer days, many swimmers are on the move and hinder each other when swimming back and forth. That’s why some pool attendants come up with the idea of requesting the swimmers to swim around in circles. The mutual obstruction is much smaller. A collective movement has been prescribed to the swimmers by the personnel. But even without a pool attendant, swimmers can come up with the idea of swimming in a circle. At first there may be only a few, but more and more are joining them, as the circular path is also more comfortable for them. In the end, a collective movement emerges, without an external regulation, that is what is called self-organized.” (Hook & Portugali 1995)

Thus, a self-organised state of order or briefly regulation establishes. Nobody stands outside at the edge and calls to order, standardising: “Now let’s all swim in a circle, left or right! In the tangle of swimmers some might swim rather coincidentally in one direction, to the left or to the right. This instability quickly, almost abruptly, forces all those who are still moving unorganised onto the circular path. The circle forms a regulation. This regulation, here, the circular movement and its enslaved parts, the swimmers, are mutually dependent regarding their movement patterns.

“The collective movement of the parts creates the regulation. The regulation, in turn, “enslaves” the parts by forcing them into the state of order.” (Hook & Portugali 1995)

Haken describes a phase transition that is formed by the “enslavement” of the individuals through the regulation. During the phase transition, properties of both phases, the old and the new, are already visible. However, there is no causality between the phases. It cannot be predicted which new state will be caused by the regulation. Another example:

“A staircase with pedestrian traffic in Germany. It is very likely but not inevitable that “right-hand traffic” will occur. Just a few English tourists on a staircase are enough to perhaps create a regulation for “left-hand traffic”. (Hook & Portugali 1995)

Haken (1991) understands “nonlinearity” that smallest changes in the system structure may have a huge impact on the system state. The complexity is reduced by the regulations. It is not necessary to know the exact behaviour of the individual; it is sufficient to know which regulations are decisive for the individuals (Haken 1991: 23). Haken cites the genetic material DNA (deoxyribonucleic acid) of living organisms as an example. Despite the enormous size of the DNA, it does not contain the information for every single body cell. Rather, the DNA only contains information for the different cell types as well as information for the formation of regulations that structure the cells. During self-organisation it can happen that several states are equally probable after the phase transition. In this situation, coincidence decides which state results after the phase transition. Consequently, predictability is not possible. The system tends towards non-determinism (Erpenbeck & Heyse 1999).

In order for a phase transition to occur, energy must be supplied to the system. In social systems, information takes the place of energy. Before having a closer look at the special significance of information as inducing factor for phase change of social systems and at digitisation, let us discuss the basic principles of self-organisation in Haken’s theory.

According to Mainzer (1992), self-organised systems cannot be completely directed and controlled from the outside in principle. They are subject to inner conditionality and determination. Their structures are therefore primarily determined by internal factors. Their future is real, open. Erpenbeck (2018) describes the transfer of Haken’s self-organisation theory to the process of human actions and evaluations and names important principles for self-organised systems that form an important background for the development of *Future Skills*:

1. He explains that, firstly, in all such systems, the already described principle of the order parameter applies. Hence, usually there are special movements that coordinate, consensualise and sometimes enslave all sub-movements. In the figurative sense, this also applies to spiritual and symbolic action, which is coordinated by superordinate order parameters, namely values and norms. The emergence of such regulations is hardly predictable and difficult to administer.
2. Secondly, he states that all self-organised systems cannot be well predicted. In principle, their developments cannot be predicted for the very long term, sometimes not even for the short term. Rather, the principle of historicity applies.

Structures and processes created by development and evolution can only be understood in the context of their concrete history.

3. Thirdly, the principle of complexity is important for social, self-organised systems. Due to their complexity, most systems can only be described incompletely. Inner states influence themselves. The system behaviour can be derived neither from inputs nor from internal states. The complexity cannot be reduced.
4. Fourthly, the principle of redundancy applies. Information is distributed throughout the system. There is no exclusive principle of hierarchy. The system can be designed and controlled from subsystems. Different values with analogue functions, but also analogue values with different functions can arise, exist peacefully coexist but also fight each other heavily.
5. Fifth, the principle of self-referentiality of self-organised systems has to be considered. Their system behaviour is the product of an inner connection. Every action has an effect on the system itself and is the starting point for further action.
6. Sixth, the principle of autonomy. Although the self-organised system is not informationally independent, it is self-determined with respect to the environment in the sense of self-design, self-direction and self-development.
7. Seventh and last, Erpenbeck points out that social systems are always self-organised and creative; always value- and will-driven, meaning- and purpose-oriented, based on communication, symbols and learning.

The importance of information for the change of the phase composition of social systems, its influence and the significance of digitisation was examined by Dirk Bäcker (2018), Professor of Sociology at the University of Witten Herdecke and is described in more detail in Chapter B 2.7 Digitisation and Self-Organisation.

B2.6 Co-Evolution and Self-Organisation

In 1978 Urie Bronfenbrenner founded an ecological socialization research, which, similar to qualitative social research, was interested in natural everyday situations of humans and their subjective meanings. André Epp (2018) interprets this as a critique of the prevailing psychological laboratory experiments of the seventies and the deterministic theories associated with them. He published the ecosystemic development model in which he incorporated both the original social and biological meaning of the term *ecology* (Bronfenbrenner 1976). The first meaning is derived from the Greek word *oikos* (Greek for *household* or *house community*) and refers to the way in which the household is composed, the family is organised and how it

relates to other people. Their importance is based on biological ecosystems. These consist of biotic communities of interrelated organisms share the same habitat. It has to be considered that ecosystems have different sizes and can overlap each other (Epp 2018). However, human ecosystems do not only include biological but also cultural living conditions.

Bronfenbrenner (1981) refers with his model to the fact that development must be regarded as a reciprocal interactionist process between the individual and his social environment. The interactions are nested in each other and the various elements of the system influence each other. The modification of one element can result in the modification of another (Oerter 1995: 88), so that a network of interaction and relationship is formed. Thus, the ecological transition is always a consequence as well as an impulse of development processes, which can be both positive and negative.

Today, the term ecosystem is increasingly used in connection with organisations and economic networks. In 1989, Robert A. Frosch and Nicholas E. Gallopoulos (1989) initially transferred the concept to the field of industrial ecosystems. One year later, Michael Rothschild described the entire (capitalist) economy as a “living ecosystem” (later published in Rothschild 2004). The scientific breakthrough happened in 1993 when James F. Moore published the concept of *business ecosystems* in the Harvard Business Review and refined the content in his book *The Death of Competition* (Moore 1996). Moore speaks of the co-evolution of various organisms of the *business ecosystem*, which are developing over time and which are increasingly oriented towards the guidelines of the leading parties in the *ecosystem*:

“An economic community supported by a foundation of interacting organizations and individuals – the organisms of the business world. The economic community produces goods and services of value to customers, who are themselves members of the ecosystem. The member organisms also include suppliers, lead producers, competitors, and other stakeholders. Over time, they coevolve their capabilities and roles, and tend to align themselves with the directions set by one or more central companies. Those companies holding leadership roles may change over time, but the function of ecosystem leader is valued by the community because it enables members to move toward shared visions, to align their investments, and to find mutually supportive roles.” (Moore 1996)

The ecological transition can also be described as a phase transition of systems in the process of emergence as outlined above. Changes therefore affect not only the individual level, but the ecological system as a whole. Ecology refers to the totality of the potential and received environmental conditions of an individual, as well as the transaction, i.e. the activity and dynamics in the entire system between the individual and his environment (Epp 2018). Consequently, not only the interactions within the immediate habitat are taken into account, but also contexts that initially

appear more distant, such as structural or normative conditions of the social system, come into focus, since people are influenced by them and in turn influence these conditions (Seifert 2011: 114 in Epp 2018). Bronfenbrenner describes these structures as micro-, meso-, exo- and macro-systems, each of which is larger and more comprehensive than the previous one (Oerter 1995: 88).

- The microsystem comprises all factors attributed to the individual within his actions by another individual; i.e. certain external characteristics, abilities, etc. These are personal influencing variables that are located within the individual.
- Epp explains that the mesosystem involves the interaction between the areas of life in which the developing person actively participates, such as a child's relationship between home, school and friends, or for an adult the relationship between family, work and circle of acquaintances (Bronfenbrenner 1981: 41). Accordingly, the mesosystem includes the various life contexts of individual, which also includes organisations.
- Those areas in which the developed person does not participate himself, but in which events take place that influence what happens in his area of life, are called the exo-system (Bronfenbrenner 1981: 42). This includes formal and informal structures, to which the developing individual as an acting person does not belong directly, thus is absent. Instead, these structures influence the individual indirectly. On the other hand, the individual also impacts these structures obliquely. In summary, exo-systems can be described as sources of effects from distant environmental regions. This includes larger institutions of society and how they develop at the concrete local level.
- It is interesting to note that the concept of the macro system does not focus on specific contexts such as the life of the individual, but rather on superordinate institutional patterns, structures and activities. According to Bronfenbrenner Epp (2018) states that the macrosystem refers to the basic formal and substantive similarity within the lower order systems that exist or may exist in the subculture or in the whole culture, including the underlying worldview and ideologies. Examples are the political system, the social, legal system and global supranational organisations and institutions.

Epp (ibid.) further defines the basic principle as a multiple intertwined construction of the different system levels which can be understood as a structure enclosing the next structure. Accordingly, the macro-level does not affect the micro-level directly, but the interaction of the individual levels and the systems contained must be considered. Since changes in the ecosystem development model are basically understood as a conglomerate of interacting and communicating systems and factors, parallels

to symbolic interactionism become apparent. Bronfenbrenner implicitly shares his scientific-theoretical assumptions. By means of the ecosystem development model, the relevance structures and levels of reality can be reconstructed and analysed with reference to the extent people in different attribute significance to social contexts (micro-, meso-, exo- and macro-systems) and their role for their construction of reality (Epp 2018). Since reality is not regarded as predetermined, but continuously constructed by subjects, social systems receive their meaning only through the interpretive powers of the agents.

Dieter Baacke's (1980) socio-ecological approach is also based on these assumptions. Social-ecological approaches examine the interrelations between the social environment and social behaviour of humans (Ehlers 2011). Socialisation is understood as the consequence of active processes of engagement between the symbolic, social and material environment as well as oneself. According to Bronfenbrenner, Dieter Baacke has introduced the socio-ecological approach to the description and explanation of the behaviour of young people into educational youth research in Germany (Baacke 1980; Bronfenbrenner 1974, 1976). In the following years, Dieter Baacke's working group first implemented this approach within the area of youth research (Sander & Vollbrecht 1985), and later empirically as a media socialization approach (Baacke 1988; Baacke, Sander & Vollbrecht 1988; Baacke, Frank & Radde 1991). The project *Medienwelten Jugendlicher* (Baacke, Sander & Vollbrecht 1990a und 1990b), with numerous publications in various authorships (Baacke, Sander & Vollbrecht 1988; Vollbrecht 1988; Vollbrecht 1990; Treumann et al. 2002), proved to be particularly fruitful.

According to Bennewitz the following can be formulated: The social world is understood as a world constructed through interactive action, which is structured with purpose for the individual but also for group collectives. Social reality thus presents itself as the result of socially meaningful interaction processes (Bennewitz 2010: 45). Thus, ecosystem theory offers an explanatory approach that shows how social systems and individuals interact at different levels, from the individual to the global social structure. Dirk Bäcker's media analysis shows how media influence and bring together these different levels and how excess of meaning and information leads to mutually influencing self-organisation processes in the respective subsystems. How these self-organisation processes work is explained by Herrmann Haken's theory within Synergetics.

With the approach of autopoiesis, self-organisation processes can also be explained and conceptualised. The concept of autopoiesis is a subset of the universal ontological concept of emergent self-organisation. In biology, the concept of autopoiesis represents an attempt to define the characteristic organisational feature of living beings or living systems by means of systems theory. The term, coined by

the Chilean neurobiologist Humberto Maturana (1987), was broadened, modified and made fruitful for various other areas of scientific creation in the course of his publications. In the following it will be discussed in the context of self-organisation.

B 2.7 Digitisation and Self-Organisation

In social systems, the emergence of regulations leads to the formation of internal structures, which can be described as phase transitions. This phase transition can be triggered under the condition of energy supply in natural systems and information supply in social systems. Digitisation functions as a medium that represents an information surplus for all social systems (Bäcker 2018). This is revealed by the analysis of social development on the basis of the so-called archaeology of the media epochs by Dirk Bäcker, a sociologist at the University of Witten-Herdecke. He hypothesises that man-machine interface electronic media provide society with an overflow, or as he calls it a “surplus sense” (Bäcker 2018), that previous forms of society are structurally and culturally unprepared for handling. Thus, by providing an excess of sense, information and meaning through electronic media, movements of adaptation and compensation are triggered in social systems whose direction of design and structuring is unpredictable and leads to self-organised processes in the sense of emergence.

The idea of the concept of “surplus sense” follows a suggestion by Niklas Luhmann (1997: 405) to observe different forms of society from the angle of the respective dominant dissemination media of communication and in this sense to distinguish between the tribal, the ancient, the modern and the next society. First a) the language, then b) the writing, then c) the book printing and finally the electronic media are dominant. In the evolution of society every newly emerging dissemination medium carries and develops new possibilities of communication, that connects previously unrelated actors in new ways. According to Bäcker, reaching and understanding new target groups threatens the existing structure and culture, brings them into instability and imbalance and destabilises the existing institutions, conventions and routines, which are adjusted to the modalities of the older (distribution) media. Exactly this instability causes the self-organisation of novelties in social systems and organisations.

Bäcker (2018) further explains that language produces an surplus sense that goes beyond the perception of bodies, gestures, movements and at best some warning and comfort sounds and confronts humanity with the *drama* of the requirement to distinguish between word and thing in order to be able to handle a language

(including its possibility of lying). The tribal society owes its origins to overcoming the reference problem of language (Deacon 1997), including the introduction of morality and mystery to control the question “who may talk to whom about what” and to mark what may not be talked about (Luhmann 1997: 230 according to Bäcker 2018). Bäcker continues by saying that humanity is entering another media epoch at the moment when first writing and then alphabetical writing produce a new surplus sense by *exploding* society’s time horizons. The font enables controllable access to a differentiable past and correctable access to a still open future. For this reason, written societies are historical societies and “hot societies” (Lévi-Strauss 1962) because of their reflexive, i.e. constantly reviewed handling of myths. The terms *hot and cold societies and cultures* go back to the work “Das wilde Denken” (“Wild Thinking”) by the French ethnologist Claude Lévi-Strauss from 1962. In this he distinguishes cultures according to their ideological attitude to cultural change. The *colder* a society is on the scale, the more pronounced its efforts are to preserve its traditional cultural characteristics as unchanged as possible – a culture, on the other hand, is classified as all the *hotter* the greater its drive for far-reaching and rapid modernisation of society is. As linear and open perspectives, the script opens up a past and a future that had previously been circularly closed in the eternal return of the memory of the ancestors. The complexity of society contained in a variable memory and in variable plans is absorbed by stratification, which makes it possible to allocate the orientation to different time horizons to different social strata.

Each of these media epochs is characterised by a surplus sense that threatens the previous order and can only be caught in a new order. Otherwise, society would have to find ways and means of rejecting the respective new dissemination medium of communication. In fact, the attempt at rejection accompanies the introduction of any new medium of dissemination. Since the introduction of writing, there have been plenty of examples of this. The fact that communication *disembodies* not only apply since the introduction and implementation of the new electronic communication media or book printing, but since the introduction of writing and already language, even though the reaction of society to language is not documented for obvious reasons. According to Bäcker (2018), the rejection of the newly emerging media is a topos that is still being repeated today in terms of media and cultural criticism. What is decisive, however, is that the rejection of newly emerging media is in turn a form of observation of their possible consequences and thus a form of discovery of possible benefits – even if this can only be achieved by overcoming rejection and violating the structures of society. The media evolution of society takes place in the medium of the rejection of media innovations.

Each medium is therefore to be evaluated as disruptive at the time of its occurrence. The reduction in transaction costs then demonstrated by economists

always convinces only the one and threatens the other, whose surplus depend on the exploitation of transaction costs. It depends on technical – as well as social – resourceful innovations whether it is possible to anchor the use of a new medium in areas of society that are initially possibly marginal and then increasingly central. This applies and also applied to the modern book printing society, which violates every authority that the written society had laboriously built up into an impressively closed cosmology by dealing with the sources and hierarchies. The fact that one was involved in this devil's work of movable letters and the mass production of texts could only be justified at first by pretending to want to reproduce only the Bible in masses and to *water* the earth with it in a way that God could not have wished for better (Giesecke 1991).

The printing press was regarded as a machine of communication – and this initially meant the dissemination of the Bible and other God-fearing literature. And no one suspected that the religious offer would not be sufficient to ensure enough supplies for the printing presses that had been put into operation with considerable capital expenditure. Humanism, the Enlightenment and the idea of an education for all, including the necessary literacy, came just at the right time to supply the missing content and make it receptive (Bäcker 2018).

Dirk Bäcker impressively analyses the surplus sense produced by digital media. In each case, “surplus sense” means that a medium of communication provides more possibilities for communication than can ever be perceived currently. Every new media epoch must first adjust to this sense of surplus and the adjustment does not mean that the surplus sense disappears, but rather that forms are available, a structure and a culture of society in which it can be taken up and reduced without making it disappear as such. These forms are forms of new social cultures, new social contexts that emerge in the sense of an evolution in order to be able to deal with surplus sense and surplus information.

This occurrence is an emergent process in the best sense of the word, in which self-organisation becomes effective as a principle in the sense of Haken. Through intensive networking via the Internet, information is provided in surplus. This allows systems to network with each other and new systems to emerge. In addition, existing systems change their phase states and enter into self-organisation processes. If we talk here about society and social challenges, Luhmann (1991) always states that sociology understands society as a communication system in terms of system theory. That is, we are talking about global societies. The interdependence of the different levels, the different social subsystems, on both a global and a local level, which are interconnected by new media, are also explained in their interdependence by Bronfenbrenner's ecosystem theory.

Bronfenbrenner (1981b) uses his ecosystem-theoretical model to develop a model that views development as a reciprocal, interactionist process between the individual and his social environment. One development step leads to the other, the interactions are nested in each other and the different elements of the system influence each other. The different system levels are therefore interconnected. The ecosystem-theoretical approach is thus a further explanatory approach that shows how systems can relate to each other and communicate with each other. This communication and relationship are reinforced by digitisation and there is a connection between the systems at the global macro level and the local individual micro level. The use of Twitter to transmit political communication is one example of this: announcements often directly trigger a chain of influences that can be felt first politically, then economically, and then individually. The resulting connection leads to a self-accelerating, self-acting and undirected, unpredictable, highly energetic further development in sub-areas of social systems.

B 2.8 Autopoiesis and Self-Organisation

The autopoiesis according to Maturana (1987) attempts to transfer the cybernetics that emerged after the Second World War to biology. Maturana's intention here is to clarify how man can reach knowledge. According to Maturana, living systems are always autopoietic. The term *autopoiesis* (Ancient Greek *autos*, English *self* and *poiein*, English *create, build*) means as much as *self-doing* or *self-creation*. Accordingly, only systems that generate their system elements themselves, i.e. act self-organised, may be described as autopoietic. All system elements must originate from the existing system elements. In this context one speaks of circularity. No system elements from the environment are transferred into the system.

Autopoiesis is also a key term in Niklas Luhmann's sociological systems theory, who transferred the term *autopoiesis* to the observation of social systems (Luhmann 1984). He refers to the work of Maturana and Varela as well as Milan Zeleny's expanding discussion on the application of the concept to organisations (Zeleny 1981). Social systems consist according to his central hypothesis, exclusively of communication (systems) and operate in autopoiesis. This means that the systems create themselves out of themselves in a constant, non-targeted autocatalytic process. The systems therefore produce and reproduce themselves (ibid.).

Autopoietic systems must be closed to the environment. This means that a structural change can only arise from the system, i.e. systems are self-referential. This does not mean an energetic or informational isolation from the environment.

This is because system disturbances that trigger structural changes can be caused by environmental influences. The system selects the extent and type of contact with the environment by defining the system boundary. This property is called structural coupling and means that there is an environmental coupling between the inner system and the outer system that defines the system scope. Due to this system boundary, the system is not able to perceive changes in the state of the environment. On the other hand, an external observer cannot make any statements about the internal organisation of the autopoietic system. This is referred to as operative unity (*ibid.*). From the outside, only a view can be taken.

Due to the operative unity and self-referentiality of autopoietic systems, a targeted influence on the system is impossible. Since the environment cannot recognise the state of the autopoietic system, the environment cannot judge how the system reacts to an environmental impact, a disturbance. The influence in an organisational system or a team from the outside through information overflow, through digital media, can lead to changes in the system after autopoietic analysis, but these changes are self-referential and self-organised and therefore cannot be determined in the result.

In autopoiesis one speaks of self-organisation, since the autopoietic system can spontaneously adapt its own state to boundary conditions of the structural coupling (*ibid.*). Autopoiesis has established the idea of self-organisation in the field of biology and sociology. A variety of management practices have been inspired by autopoiesis. The reference to emergence arises when one considers that in an autopoietic system, through self-generation and self-reference, a multitude of system elements are organised and, in the process, produce higher or new characteristics in their totality (in the emergent sense). In the theory of autopoiesis it is emphasised that in an autopoietic system there is a system-specific organisation beside the system elements. It is assumed that individual system elements are interchangeable as long as the specific organisation remains intact. This shows that the system behaviour is not due to the behaviour of the individual elements, but that a specific organisation is created alongside the system elements, which is just as decisive for the system behaviour. It can therefore be assumed that autopoietic systems exhibit emergent properties.

B 2.9 Summary and Conclusion

In conclusion, it becomes clear that the interaction of complex systems leads to self-organisation and system change. These system changes are characterized by

the fact that they are not linear to the previous state and do not come about deterministically, i.e. no predictions can be made. Networking through digital media, global interaction and the surplus of information through digitalization lead to faster changes at the level of social organisations, which at all levels of the macro, meso and micro levels once again reinforce and accelerate themselves. The relationship between ecosystem levels thus leads to an acceleration of self-organised change.

Self-organisation is therefore the principle underlying many social developments. It is developing into such a penetrating concept that we have described the development towards self-organisation in society as a whole, but also in the individual areas of society, such as private or public organisations, with the term drift to self-organisation.

In the next section we will look at how self-organisation works in companies and organisations.

The Principles of *Future Skills* Development

B 3

Listening to HR managers of organisations that have largely dealt with the new forms of work and governance, it becomes clear that the concept of networked and agile organisations is currently on the rise. With quite different speeds and characteristics, but with similar results. What are the characteristics that are common to all? Which fundamental effects cause the changes? And what can we learn from this to be better prepared for the future?

It is apparent that all vignettes and episodes reported so far are based on the same development: Organisations have set out to shift the boundary between structure and dynamics further in the direction of dynamics. For many organisations, this is still largely unknown territory. The interviews point out that we are dealing with a future area of development where experiments are carried out and measures are tested.

Regarding the question of what future employees need in order to be able to act successfully in these changing fields of work: Technical knowledge that can be retrieved is no longer sufficient to shape this development, but rather *Future Skills* that are based on aspects of self-confidence, self-competence, self-esteem, autonomy and commitment. To meet the demand for subject- and method-related competences, traditional methodological knowledge, such as business analysis or specialist knowledge in a specific field is less useful, but competences such as flexibility and openness, versatility, ability to change perspectives, interdisciplinarity, innovation competences such as creativity, innovative thinking, willingness to experiment, system competences, systems thinking, knowledge of knowledge structures, networked thinking, analytical competence or digital competences.

When this list of competences is presented to HR managers in *Future Organisations* (for the definition of *Future Organisations* see Chapter A 1.3.1 Step 1: Identification of Future Organisations), they ask for the underlying principles and structures of *Future Skills* in addition of an additive enumeration, and to develop a model of skills under conditions of ever higher self-organisation in the future.

This is a central objective of the *Future Skills* Studies. The first thing to be noted in this regard is that *Future Skills* shift the focus away from work as a predetermined, externally structured activity that follows an already pre-structured action plan towards an employment agenda that employees co-design through their own participation. With high identification, great motivation and the possibility of structuring work autonomously. An essential and constituting element of the *Future Skills* named above is the ability of self-management, that refers to the special significance of the subject as creator. For organisations which – by definition – consist of binding structures, this means to experience conflict and tension. The more they find themselves exposed to agile and unpredictable areas of work – like all those organisations that participated in the *Future Skills* Studies – the more they need to mediate, moderate and manage these areas of tension. The challenge consists of using communication and participation processes to establish structures in which the members of the organisation can simultaneously question, negotiate and determine the structures in which they work, without losing overall commitment and coherence, expectability and calculability.

We also call this tension the *structure innovation paradox*. The paradox is that organisations in their innermost part are defined through structures which also constitute the inner commitment and expectability for their members. Paradoxically, the future viability of organisations increasingly depends on questioning exactly these structures and rebuilding appropriate, new and innovative structures. Today's leaders operate within this paradoxical field of tension. They are confronted with the challenge to fostering the capacity to dealing with this area of tension and to practising them themselves. This development finds an expression in more value and less rule orientation, more communication and less structural orientation. It is about building and developing organisational cultures that develop dynamically.

Organisations not only need specific structures, but also a special understanding of how learning and development work within organisations when beginning to orient themselves in this way. Because learning and development becomes a basic constituent of such organisations that determines the ability of the members of the organisation and thus of the organisation as a whole to adapt to future requirements in an appropriate way.

The *NextSkills* Studies show in an impressive way that all participants were able to explicitly identify and elaborate on all four of the following areas:

1. the most important *Future Skills* from their point of view,
2. the necessary leadership competences for managing the described tension, and
3. the organisational learning approaches. And – everyone has
4. specific requirements arising from how higher education must be structured.

The buzzword is: Enabling self-organisation. Hereby we are returning to the keyword that frames this chapter and with which it began. From previous analyses and reports of the participants in the *NextSkills* Studies, nine different principles can be derived which are important for the concept of *Future Skills* and are explained below.

Principle 1: Organisations form part of networked, systemic environment

Organisations, their actors and the environment are interconnected as networked, mutually influencing subsystems. The changes in the global environment, the organisations and the acting subjects are systemically linked to each other so that they form a common ecosystem: Megatrends of demographic change, globalisation and digitisation are leading to more complex, networked environmental contexts, that increase the pressure to develop networked and complex structures within organisations. According to the cybernetic law of Ashby (1974), organisations can deal with complex environmental changes especially if they can enable complex structures for action in their internal structure (see Chapter II.2 *The Future Skills Turn*). The situation is also changing for the acting subjects, because they must remain capable of acting within these structures, i.e. they must face new qualification requirements.

Principle 2: Organisations strive into a state of homeostatic balance

The concept of homeostasis was described by Claude Bernard around 1860. Later Walter Cannon and Karl Ludwig von Bertalanffy revived the term and refined it in 1929 and 1932 (quoted from Flechtner 1972). It describes maintaining an equilibrium state of an open dynamic system through an internal regulating process. Homeostasis can therefore be understood as a special case of self-regulation of systems.

A system that controls another can compensate for more disturbances in the control process, the greater its variety of action: the greater the variety of a system, the more it can reduce the variety of its environment through control (see Ashby's Law 1974). Consequently, the variety of the control system must at least have the same extent as the variety of the malfunctions that occur to execute control. In particular: Whenever it comes to dealing successfully with highly complex and dynamic situations, the acting system must have at least the same complexity and dynamics as the (environmental) system in which action is taken. As market are increasingly networked, there is an increasing need to allow and promote free networking within organisations.

Principle 3: Self-organisation as a prerequisite for the capacity to act

Self-organisation becomes a key category for the ability to act under constantly changing conditions. Organisations can only remain agile and capable of acting if employees are able to develop their own organisational patterns for their respective contexts. Self-organisation in this sense is understood as a competence that has to be learned. At the same time, it forms a central principle as a metaconcept for understanding the emergence, maintenance and development of patterns of order. (see Chapter B 2.1 The “Drift to Self-Organisation”)

Principle 4: Enabling organisational structures

In connection with the importance of self-organisation competence, organisations see themselves confronted with having to design, enable and develop such structures internally. In order to do so, it becomes increasingly central within organisations to move from rigid structures to flexible and framework conditions, i.e. to create an ecology in which solutions for problems *grow*, in which new products emerge within a research and development ecology, as non-deterministically controllable processes (see Chapter B 4 *Future Skills* for Future Organisations: An Analysis).

Principle 5: From (specialist) knowledge to decision-making competence

It is about competence not knowledge! In other words, it is about the capacity to act, which goes beyond mere knowledge or insight. Things have to be decided, implemented, promoted.

Principle 6: Individualisation and personalisation of learning and development

Learning paths become more individualised and personalised: what, when, where and how learning takes place is determined on the basis of individual learning needs resulting from an individual pressure to act.

Principle 7: Dealing with ambiguity and uncertainty as core competence

It is about the capacity to act in basically open situations, i.e. in situations of uncertainty or ambiguity.

Principle 8: Learning formats for Future Skills

The focus is on forms of learning and support that aim at active accompaniment rather than instruction or teaching. The focus is shifting from further education and training in the classical sense, towards a direct support for practice that supports individual employees within their professional context. Learning is no longer promoted by classical instruction, but by new formats, which rather include mentoring, coaching, reflection support, networking or the formation of learning communities. Learning has no educational function in the sense of acquiring pre-determined curricula, but rather the function of continuous further development on the basis of concrete problem situations based on reflections and the formation of new individual action strategies.

Principle 9: Tension between organisational structure and self-organisation

Organisational structures, rules and regulations of the organisations and the principle of self-organisation of actors within organisations are always subject to a creative-constructive tension. This must be taken up productively in human resource development and organisational design.

Future Skills for Future Organisations: An Analysis

B 4

The “Drift to Self-Organisation” described in the previous chapter, which is reflected in all areas of life and expressed in new life, learning and work models, leads to new demands on individuals in society as a whole and in organisations. In this chapter we show examples and approaches from the field of self-management and organisational theory, in which self-organisation forms the basis and *Future Skills* play a special role.

Looking at organisations and analysing the extent to which they are geared for self-organisation, it becomes apparent that between the poles “reliability” and “adaptability” there is often a belief that reliability has to be emphasised and developed more strongly than adaptability. However, the *Future Skills* Studies show that this way of thinking is increasingly being questioned, especially in *future organisations*. On the other hand, more and more empirical findings show the importance of the psychological component of identification with employees’ action for job satisfaction and productivity.

The German management consultancy Gallup Deutschland, a research-based consultancy and specialist for the interface between economics and psychology, records its annual findings in the so-called “Engagement Index”. For 2016, the study shows that German employees are satisfied with their lives and value their economic situation positive, they hardly fear for their jobs and show a positive attitude toward work (Nink 2014). Seventy-seven (77) percent would continue to work even if they would not depend on money (Nink 2014), seven percentage points higher than in 2010. Nevertheless, the majority of employees are hardly emotionally attached to their employer. This has a direct impact on key competitive factors such as absenteeism, productivity, profitability, quality and customer loyalty. Employees who do not feel emotionally involved with their employer show less initiative, motivation and conscientiousness, and they are less likely to address undesirable developments. According to the current “Engagement Index”, every third employee hid at least once in the last 12 months serious concerns from his or her supervisor. Without

emotional commitment almost every second employee has been silent. These topics, such as emotional involvement, the feeling of unjustified hierarchies, leading to insufficiently educated decisions in complex problem situations, are currently intensively discussed by organisations and companies of all sizes.

The NextSkills Studies also show that the topic of emotional commitment of employees to their organisation is one of the most important management topics, that determines the motivation of employees to get involved. Within the data of the interviews two development areas play an important role: value management and new leadership concepts. Value management refers to the appreciation of diversity and different talents, skills and competences, as well as interests, in order to create “shared cognition”³⁴ in teams and to increase team performance. In addition, the focus is on identification, motivation, culture fit and the transfer of the core values of the organisation. These play the role of a “social glue”, that the mere organisational affiliation could no longer adequately ensure, since the commitment and temporal duration of the organisational affiliation is consistently challenged and in normal biographies ever-faster negotiated episodically. Management concepts for *future organisations* are primarily concerned with communication, feedback, hierarchy reduction and decentralized, individual assumption of responsibility. The *Future Skills* Study shows that instruments such as coaching, mentoring, the initiation of peer communication networks and the moderation of self-supporting structures in organisations are becoming increasingly important. Executives are confronted with new challenges that have not been so much in the foreground so far. New qualification requirements are emerging. Mindful leadership, systemic consulting and coaching approaches, non-violent communication and communicative moderation as well as peer consulting are becoming more important than hierarchical delegation and assignment-control approaches. Two case studies illustrate these instruments and organisational forms.

Inspiring Practice: Daimler

The extent to which the topic of hierarchy and alternative approaches is currently occupying well-known large companies is reflected, for example, by the contribution of Daimler-Benz CEO Zetsche. A start-up culture should bring a new spirit into the company in order to promote grassroots democracy. The Leadership 2020 program is about a new leadership culture. The impetus come from 150 employees from 24 nations, from all areas and ranks, from clerks to foremen from up to managers. In eight teams, ideas and visions of future leadership at Daimler are developed.

34 The concept of shared cognition refers to the concept of situated learning and peer learning (Brown, Collins & Duguid 1989; Lave & Wenger 1991).

Hierarchy structure, meeting culture, performance evaluation are all questioned and there is only one guideline – that there is no guideline.

Good Practice: Spotify (Open Access for Music)³⁵

An example of self-organisation in organisations is the music streaming service Spotify. At Spotify, agile corporate structures are the order of the day. From Spotify's perspective, in 70 percent of all cases good employees take the same decisions as their supervisors. In 20 percent s/he makes better decisions because s/he knows better. Only 10 percent s/he is off the mark. These management principles were shaped by Daniel Ek. He is the founder and CEO of Spotify.

Spotify Story in a nutshell: Daniel Ek's stepfather, an electrical engineer, introduced the boy to the world of computers at an early age. Already as a primary school student he wrote his first programs on a Commodore C64, founded his first company at the age of 14 and created a company websites cooler than the commercial web agencies in the Swedish capital. The company grew. At 19, Ek sold the web service provider. Ramge (2015) reports that he began studying computer science, but quickly dropped out and finally became head of the software company uTorrent, whose programs were used to illegally exchange music and film files worldwide. During this time, he came up with the idea for Spotify. He found investors and 12 million euros of venture capital; no other music streaming platform grew as fast as Spotify. Ramge (2015) analyses that this also has a lot to do with Ek's special leadership model, through which good programmers come to Spotify and stay there. Only they are able to create the comfort for which Internet listeners are willing to pay for in the age of free culture. Ek knew that if you want to attract the best of this guild, you have to provide them with leeway. He himself was one of them. Giving more leeway was no problem for him. He is rarely in one place for long periods of time, which is comprehensible in a global company with two headquarters and five development sites.

Ramge (ibid.) explains that there are 60 so-called agile coaches at Spotify. Moderators support the teams without internal hierarchies in making the right decisions and organising themselves that each team is productive and each team member happy. At Spotify 1200, technical developers in Stockholm, Gothenburg, New York, Boston and San Francisco can do well without any supervisor. At Spotify, the number of employees doubles every 12 months. The challenge is to preserve the culture with a lot of freedom of choice and team spirit in small units, without the product and the business falling apart. Talking to Spotifyers, shows that blurriness is part of the system (Ramge 2015).

35 Presentation of the case study from Brandeins magazine based on Ramge (2015).

B 4.1 Self-Organisation as a Management Principle

Spotify is organised according to agile, holacratic principles, which have been illustrated in Figure 22. The topic of leadership relates thereby to the programming method SCRUM³⁶ and their approach to improve of software programs: A goal is defined without any planning but a cautious approach, step by step. On a trial and error basis ideas are tested. If it works, it is followed up; if it does not catch on, it is dropped. Another important principle is the *no blame culture*, this means working without accusation.

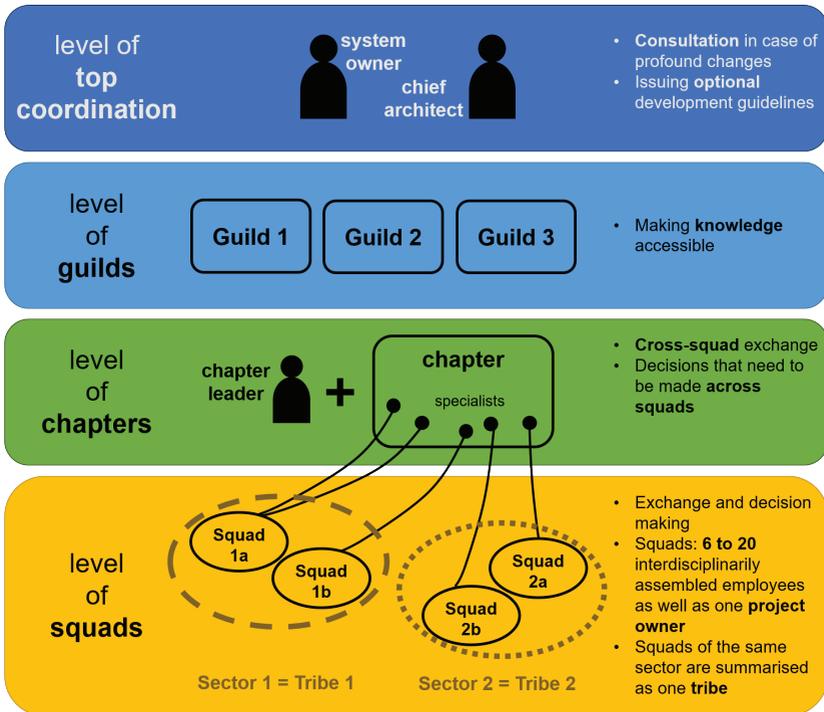


Fig. 22 Agile, holacratic structures in self-managed organisations

³⁶ Scrum is a process model for project and product management, especially for agile software development. It was originally developed for software engineering but is independent of it.

Teams are not called teams, but squads. One of these units comprises between six and 20 employees (see Figure 22: Agile, holacratic structures in self-managed organisations). It is always an interdisciplinary team composed of classic developers, experts for user experience and tests as well as designers. There is no leader but a so-called product owner who sets the topics and organises the many joint conferences and the sometimes very emotional sessions on Friday afternoons, on which the week is reviewed.

An agile coach ensures compliance with the rules. Each member can bring about decisions by convincing her/his colleagues of her/his idea. Squads working in the same field belong to the same “Tribe”. One tribe should contain no more than 150 members, that it does not become too confusing (see Figure 22).

Ramge (2015) describes that the members of a tribe meet regularly to exchange information and make decisions that affect everyone. The specialists also discuss topics on which consensus must be reached for technical reasons. These specialists also belong to a cross squad chapter with one “Chapter Leader”. But s/he is only given authority in formal matters such as holiday applications, apart from that s/he only has an advisory function. The level above the tribes is occupied by “guilds”. Their task is to provide access to knowledge throughout the company. The highest co-ordination is assigned to two persons: a so-called *system owner* and a *chief architect*. Major changes in the system require their consent. But there are no fixed rules. Sometimes the top coordinators set development targets, sometimes self-confident squads impose their ideas. Or the founder or the chief designer breaks all rules or put his foot down (Ramge 2015).

Inspiring Practice: Deutsche Telekom

In Deutsche Telekom’s AI Blog (Bäumler 2017), Michael Kaselow, agile coach at Deutsche Telekom, reports on his experience with Holacracy within the company: “We have adapted the Spotify model for ourselves. The challenge is that the structure has not grown organically as in the case with Spotify. Rather, it has been set up and we as agile coaches have to make sure that it works out. Since there is little information about this type of organisation, we foster an atmosphere of learning by doing and adapt everything to our requirements. When working on new topics or products, we have to redesign squads or tribes or even chapters.” In the eLIZA project there are currently about 15 squads divided in four tribes.³⁷ There are also

37 eLIZA is the name of an innovation project of Deutsche Telekom with the task to develop an Artificial Intelligence (AI). The name eLIZA was taken over from a computer program developed by Joseph Weizenbaum in 1966. It should show the possibilities of communication between a human being and a computer via natural language.

so-called chapters, which are recruited from the people who work in the squads and tribes and who have the same profession. These are, for example, developers, user experience experts, designers or testers. They exchange ideas beyond the borders of the squad and develop common methods.

Kaselov says: “Not every development squad has to set up its own test environment. Many things can be shared or built up together – the chapters are responsible for that.” The so-called Campus, an event at which the individual squads present milestones and occasionally external experts speak on specific topics, provide for regular exchange opportunities. In addition to internal training, the focus is on informal exchange – recognising it is only together that the various team units, i.e. squads, tribes and chapters, can meet the challenges (ibid.).

Management concepts based on self-organisation are fundamental fields of experimentation for organisations. The *NextSkills* Studies show that self-organisation as a management principle is already widespread, without introducing more progressive types of organisation such as Holacracy.

It should be noted that these are often introduced organically in start-ups and small companies, while there is little or no knowledge about success factors for the transformation of larger and traditional organisations. Sociocracy, democracy and Holacracy are currently on everyone’s lips. According to Frederic Laloux, these three concepts can be seen as the next form of corporate evolution, as presented in his book *Reinventing Organizations: A Guide to the Design of Meaningful Forms of Collaboration* (2015). According to this, Holacracy seems to be the perfect answer to an increasingly fast-moving and complex world of work. It enables companies to react flexibly to external (or internal) changes and at the same time increases the innovative strength of the organisation. The employees are more independent, enjoy personal freedom and a high degree of personal responsibility. In the long term, they become happier, highly motivated, healthier and more productive. Freedom and self-responsibility – these are important keywords for current employer branding concepts.

However, it is not clear whether and, if so, which future organisational type will prevail – especially in large, traditionally structured organisations. The advantages and disadvantages of the three models are explained below.

B 4.1.1 Sociocracy in Organisations

Sociocracy assumes that all parties involved are equal when it comes to governance of decisions within the company. A decision has been taken if there is no serious counter-argument. The method requires self-motivation and a cooperative attitude

in cooperation as well as self-responsibility. According to the management principle Y (McGregor 1960), it also aims to ensure that employees feel comfortable and therefore strive for self-realization within the company. On the other hand, according to Management theory X (ibid.), humans have a fundamental reluctance to work, thus a manager is needed to force them to work. In comparison to management theory X, management theory Y states that work has a high value among employees and represents an important source of self-satisfaction.

B 4.1.2 Holacracy – Agility and Responsibility

The concept of Robertson (2015) is currently quite popular within the new work scene. It regulates the management of organisations through transparency that enables everyone to participate at all levels and in all processes. It focuses on the purpose of the organisation and not on profit. Robertson impressively shows how managers in a Holacracy do not assume the position and status of a manager, but their role and responsibility. At the heart of Holacracy is a steering committee that controls all activities and problems. Anyone who wants to get involved in the company is allowed to take part in it and plays a certain role there. Various other roles have been set up around the executive committee, e.g. *Business Developer* or *Consultant*. These roles can consist of one or more persons and change constantly. When an external request, i.e. from a customer, comes up the respective committee reacts to it and decides autonomously and independently. For example, a customer wants to place a new order and the person involved in the request changes from the Consultant role to the Sales role. When required, the respective person can be supported by the management circle, i.e. in searching for a suitable employee. As soon as this situation has been clarified, the person takes on the role of IT Consultant again. However, a new circle has now formed, which consists of two persons, person X and the new consultant and is unambiguously assigned to the respective customer. Consequently, we have different committees in the company that deal with a certain topic. The entire organisation is also to be understood as a committee. Beyond these committees there are many different roles. As an employee, I can be located in several committees and constantly contribute to the purpose of the organisation. Thus, the company is managed dynamically and primarily oriented to the purpose of the organisation. Roles replace status and hierarchy. In addition, above rigid organigrams there is a vivid structure.

In an analogy to biology, Holacracy consists of different circles, so-called holons, which enclose other things. A holon contains several molecules (roles) and a molecule contains several atoms (ibid.). Although the atoms and molecules in a

holon do not change, they can develop new properties through recombination. In nature this has been successful for millions of years. Agility and Holacracy have much in common.

B 4.1.3 The Democratic Organisation

The approach of democracy in companies first of all represents the following questions “Who leads me?”, “Who represents me?” and “How am I involved in the company?” Within this approach it is experimented with time as a factor in leadership. The second topic is self-determination: “Where do I work, when and with whom?” (Sattelberger 2015). Thus, it is about greater say for the employees as well as equity of opportunity. According to the authors of the book “Demokratische Unternehmen”, Sattelberger et al. (2015), the focus is on responding to the desire of the employees for participation in the strategic development of their company by allowing them deciding on their own work situation. It therefore prioritises group decisions. According to the author, the aim is not the achievement of a majority decision, but to change the position of the group members that their voices unite to form the critical mass of one option. Many companies are considering how such a democracy could look like. One abandoned thesis within various references is that digital technologies facilitate co-determination.

Will the future look as follows? Employees elect managers, vote on new products, decide on working hours and customers. Currently, this topic is still highly controversial and offers great scope for further research. However, it is evident that many employees have little interest in external control. Digital technologies have simplified coordination processes. The CEO of Microsoft Germany said: “We used to look for employees who do what they are told, now we look for employees who do what we do not tell” (ibid.).

B 4.2 State of the Art of Self-Management and Agile Management Practice

In their contribution to Holacracy in the *Harvard Business Review*, Bernstein et al. (2016) stretch an orientation framework in which they show a tension between stability and reliability on the one hand and adaptability on the other. They argue that holacratic forms of organisation are no panacea and that their implementation

should depend on how the general conditions in companies or sub-organisations develop:

- If the requirements for stability and reliability are high, large long-term investments are needed. For example, if a machine park needs overall control via long-term strategic planning, then holacratic forms of organisation are not necessarily effective.
- Does the company/suborganisation operate in an unsafe environment with changing requirements? Is the product service portfolio broad and diversified? Are few guidelines sufficient for an overall control? Then holacratic forms of organisation might be appropriate. But even in this case, some unanswered questions remain: How is overall coordination of the individual subunits/circles ensured? Who assumes the external overall responsibility? Which remuneration models are suitable for such a changed organisation and the new mechanisms of task allocation?

Overall, the agility barometer of a study by Haufe and Promerit (Anderson et al. 2017) shows that agility has not yet established as a dominant management principle in German companies. 90 percent of employees and 70 percent of managers state that they never use agile methods. Virtually no changes can be detected compared to the survey results from the previous year. *Scrum swarming* or Holacracy are unknown to 80 percent of employees. It looks somewhat better in terms of Design Thinking (57%) and fluid structures (61%). We have already learned about the characteristics of holocratically organised organisations from the Spotify case study.

What else is characteristic of Self-Managed Organisations (SMOs)? Self-Managed Organisations work by Self-Managed Teams: the responsibilities for the work are divided between the members of the teams. The members share the responsibility regarding the attainment, the use of resources and the ownership of information and knowledge related to the tasks. Variations in self-management can be recognised in organisations and companies that have dared to take the leap into agility and self-organisation. These include companies such as *Morning Star*, a manufacturer of tomato products, *Valve*, a developer of video games and gaming platforms, *W. L. Gore*, a highly diversified manufacturer, and the aforementioned *Zappos*. The variations of the different degrees and forms of self-organisation are an expression of the specific management and organisational contexts. The best-known and best specified system for Self-Managed Organisations and Self-Managed Teams is the Holacracy system already described (see Chapter B 4.1.2 Holacracy – Agility and Responsibility). Self-Managed Models (SOM), typically have three characteristics:

1. Teams are the structure: in Holacracy they are called “circles”. Podularity” refers to “pods”, *Valve* to “cabals” and in many other companies simply to teams. But whatever they are called, teams are the basic components of the overall organisation – not individuals, not departments or divisions. The roles are developed and defined collectively in the teams and assigned to the individual work tasks. As in traditional forms of organisation, Self-Managed Organisations also have different teams for different projects, functions (e.g. finance, technical development, sales or different segments (customers, products, services)). At *Zappos*, the 150 departmental units were converted into about 500 circles according to this model. The resulting modularity is much more flexible than hierarchically structured organisations. According to current organisational needs ad hoc teams can be built or removed.
2. Teams develop and lead themselves: Although Self-Managed Organisations avoid traditional hierarchy structures, teams are still embedded in larger structures that they can co-determine. Holacratic organisations adopt a constitution, an organisational charter, that usually represents a “living document” in which rules on how circles are built, developed, changed and dissolved are recorded. Thus, circles do not only manage themselves, but there are overall rules how they are “designed” and managed. However, the constitutions and charters do not determine how employees have to fulfil their tasks. They merely provide a framework for how circles emerge, are formed and work together, how they identify and assign roles, their boundaries and how they can interact with each other. At *Morning Star*, employees write so-called CLOUS (colleague letters of understanding) in teams. These define the responsibilities, activities and objectives to be pursued in the teams, as well as criteria and measurement procedures for evaluating performance measurement. Hence, CLOUs are agreements between the Circles.
3. Leadership is highly contextualized: In Self-Managed Organisations, leadership is allocated among different roles, not individuals. Actors usually perform many multiplayer roles in different teams. When work contexts change, management responsibilities also change. Technology plays an important role in providing transparent information. Amongst others, Software tools such as *GlassFrog* or *holaSpirit* are used to communicate and compare the goals and responsibilities, but also the progress and decisions of the respective circles. Due to the grouped nature of the actors’ collaboration, an equal level of information is indispensable in Self-Managed Organisations. At *Morning Star*, for example, the Clous are stored on an internal server that employees can transparently retrieve information about responsibilities. If someone does not succeed in a role, it is assigned to someone else. Of course, assigning roles is work in itself. In a Holacracy there is also a role

related to this task, the so-called “lead link”, responsible for connecting circles with each other. In more flexible, loose forms of self-management, such as the concept of podularity, roles are assigned flexibly by the internal organisation. For example, at *Zappos*, there are twice as many lead link roles than managers were previously employed. The crucial distinction is that management responsibility now is part of the respective role and no longer of the individual actor. Thus authority, power and leadership responsibility continue to exist, but are highly contextualized.

Overall, it is apparent that for large organisations and companies forms of self-organisation provide the opportunity to partly or completely introduce agile structures. The concepts to be used for this purpose are new, not yet fully tested and their effects still unknown. However, each of the approaches offers the possibility of questioning existing traditional structures, breaking them up and satisfying the abilities, needs and requirements of both employees and customers. In the field of tension between stability and reliability on the one hand and flexibility and mobility on the other, it is now a matter of detecting the right mix. Concepts such as Holacracy, podularity, Sociocracy and democratic organisation are important to form the gravitational centres of new, modern, self-organised corporate and organisational structures. The various approaches though very different aim at the same purpose: the try enhance the adaptability and flexibility of the individual abilities of members of the organisation with the roles, structures and responsibilities in the organisation as well as with the objectives of the organisation, and to point out potentials where flexible change is possible and vital. Thus, a high degree of flexibility, adaptability, competence and self-reflection is required from the individual actors. It is obvious that *Future Skills* are an indispensable prerequisite for self-organised companies. Furthermore, the advantage of structuring organisations as flexible entities is that leadership roles can change contextually over time. This almost playful approach fulfills the requirements of competence on the one hand and the abilities of the employees on the other. It is important to stay focused and transparent, and to concentrate on the common purpose within the different circles, pods and various action formats. Furthermore, Self-Managed Organisations are challenged by the topics recruiting and remuneration. When members determine their own personal role portfolios, it is difficult to define clear benchmarks or market salary rates. The development of roles also complicates the recruitment of new employees. From October to December 2015 approximately 1,500 employees at *Zappos* performed 17,624 rolls. This corresponds to around eleven roles per employee and 195 different roles per day. Thus, a completely new approach is required to manage, explain,

and monitor the diversity, multitude and variety of these roles, and beyond that to recruit, introduce or “onboard” new employees.

Traditionally, leaders are said to steer organisations and parts of organisations in the right direction guided by their vision. On the other hand, it is repeatedly shown that the attempt to change organisations with a top-down concept do not succeed. Rosabeth Moss Kanter reports in her well-known article “Transforming Giants” in *Harvard Business Review* on the question “What enables a big business to be agile?” (2008) that the success of change processes in companies highly depends on the so-called “Guidance System” or the navigation systems of large organisations. While employees initially acted mainly according to rules and decisions, they are now encouraged to play a holistic role and to contribute to the development of a shared understanding and vision. Action, identification with the work, and alignment with the living environment, partners and the extended family is of utmost importance. Authority and leadership are maintained, and activities coordinated in these new “Guidance Systems”. Above all, it is about shared values and standards and coherent organisational cultures. According to Kanter (2008), this change to new guidance systems has been discussed and prepared for a long time and is now taking place with astonishing speed. An expression of this new organisational philosophy can be found in the entire area of Self-Managed Organisations. Having a look at such highly developed organisational forms as *Valve*, the self-organisation becomes obvious for many company histories. For example, by the decision to expand the corporate market to the hardware sector by producing PC games. At *Valve*, over 400 employees focus all their time on projects that they believe are important for their customers. They collaborate in self-organised cabals and reorganise every single project by rearranging chairs and desks, sometimes several times a day. (Of course, it is also possible to maintain customer focus. Steve Jobs once famously commented that even the market does not always know what it wants.)

Ethan Bernstein, John Bunch, Nico Connor and Michael Lee (2016) state in their overview article in the *Harvard Business Review*, that most killer arguments for or against self-managed organisations or Holacracy and other new forms of organisation usually ignore a very important point: Most organisations, especially large ones, should implement these new organisational structures and working techniques rather partly than in their entirety. They note:

“[W]e’d be surprised more than 20 percent of the Global 1000 looked ‘teal’ in 2030, to use Frederic Laloux’s term for ‘whole’, evolutionary, self-managing organizations. But we’d also be surprised if more than twenty percent didn’t significantly draw on some of the techniques within their corporate frameworks.” (Bernstein, Bunch, Connor & Lee 2016).

In large and small organisations, both private and public, numerous experiments with agility and self-organisation are already performed. *Procter & Gamble* have implemented a very complex matrix structure in order to integrate their different products and brands geographically. In addition to this, there is a very large, extensive “Open Innovation Program” in which external teams develop tailor-made solutions for *Procter & Gamble*. *Google* and *3M* are similar examples: For a long time, employees were encouraged to spend a certain percentage of their working time on their own projects (self-directed work). To determine how self-management and self-organisation should be introduced in companies and other organisations and to what extent it is reasonable serve the following three questions:

1. How much stability is needed? Which parts of the organisation need stability?
2. Where adjustments are required and necessary?
3. Which organisational forms provide the right balance?

Therefore, it is reasonable to apply self-management principles to entire organisations when the ideal level of adaptability is particularly high. This is the case, when the organisation operates in a rapidly changing environment where the benefits of rapid flexible adaptation exceed the costs of its adjustment effort, the consequences of possible misconduct and misadaptation would not have disastrous consequences, and there would be no need for explicit control. This is the reason why startups rank among the “early adopters” in this field. As *Valve* discovered, industries such as software development or game development are also prototypical for this category. Unlike, in industries characterised by a high degree of reliability – such as the financial sector or defence and military organisations – hierarchical structures remain, although in some niches self-management would provide fruitful approaches for promising reorganisation.

B 4.3 Conclusion on Self-Organisation as a Basic Principle

We have shown that self-organisation is a fundamental principle of modern organisational ecosystems. This affects both the organisational structures (see agile organisational and management concepts) and the individual actors as well. Furthermore, it has an impact on the required set of skills and also larger global structural contexts, which in turn interact. Self-organisation can be traced back to processes in the physical-scientific field in which energy input to a system leads to non-deterministic phase transitions. If this is applied to modern societies, according

to Dirk Becker's (2018) analysis of the media society, an excess of information has the same effect on social systems, i.e. it leads to non-deterministic phase transitions, namely self-organisation processes. In an environment where self-organisation processes on markets, in political systems and organisations prevail and are enabled, they become prerequisites in combination with the ability to act self-organised and self-responsible. Self-organisation thus becomes a basic structural principle for the development of *Future Skills*.