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Eingereicht am: _____

Titel der Dissertation:

A Knowledge Perspective on Needs to Enhance Organizational Learning

Dissertation zur Erlangung des akademischen Grades

PhD

an der Wirtschaftsuniversität Wien

eingereicht bei

1. Beurteilerin/1. Beurteiler: **ao. Univ.-Prof. Mag. Dr. Alexander Kaiser**

2. Beurteilerin/2. Beurteiler: **ao. Univ.-Prof. DI Dr. Franz-Markus Peschl**

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Fachgebiet: **Informationswirtschaft**

Wien, im **März 2017**

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A Knowledge Perspective on Needs to Enhance Organizational Learning

Florian Kragulj

"With a scientific theory, one knows, even before it is proven, that it is correct, because it is aesthetically satisfying. Here one makes use of criteria that go far beyond what is known as logical deduction. What artists and scientists do is simply to surrender themselves to their curiosity and passion for combinatorial play, and detached from the utilitarian business of everyday life, to pursue this combinatorial play wherever it takes them. This is how models of the world develop."

Wolf Singer [1]

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[1]Paraphrase of Singer (2003, pp. 107-108) put on display at the exhibition stand of the University of Applied Arts Vienna at the 'VIENNAFAIR The New Contemporary' art fair in October 2013.

Acknowledgements

Claudia Kragulj

This dissertation is a major milestone of a scientific journey started on November, 9th 2009, when Ikujiro Nonaka's ideas on knowledge creation caught my attention in the very first lecture on knowledge management I attended. Yet, this journey has not ended, and its destination remains unforeseeable, though, it is envisioned.

The last eight years of this journey were characterized by *stability* and *change*. Gregory Bateson famously illustrates their vital relation by the example of a balancing acrobat:

"The acrobat on the high wire maintains his stability by continual correction of his imbalance." (1979, p. 62) To progress on this wire, the acrobat "must be free to move from one position of instability to another, i.e., [...] position of his arms and the rate of movement of his arms must have great flexibility, which he uses to maintain the stability [...]. If his arms are fixed [...], he must fall." He continuous, "when the acrobat is learning to move his arms in an appropriate way, it is necessary to have a safety net under him, i.e., precisely to give him the freedom to fall off the wire." (1987, p. 503)

First and foremost, I would like to express my deep gratitude to my family, my girlfriend, and my friends for giving me the necessary freedom in all respects to freely move along the high wire, i.e., to do the thing I love. Their trust in me and my skills as well as their endless support, which I can always count on, are not a given.

Special thanks are due to my supervisors Prof. Alexander Kaiser and Prof. Markus Peschl for not only teaching me how to reconcile critical thinking and pragmatism in this balancing feat, but particularly for their sympathetic attitude throughout this journey. By giving me intellectual freedom in my work, engaging me in new ideas, and demanding a high quality of work they contributed substantially to this dissertation. I would also like to thank my committee members Prof. Jan Mendling and Prof. Alfred Taudes for their valuable feedback on the research proposal.

Finally, I need to give thanks to all my colleagues and friends I have been working with for continuously challenging my state of balance by asking the right questions, while providing me with the safety net whenever necessary.

Abstract

Organizational learning causes organizational change. Different descriptive models have been proposed, but little research on variables influencing these processes has been done.

Needs govern our behavior and motivate our acting. It has been shown that their identification and satisfaction effect value-creating and knowledge-intensive activities, such as innovation processes, strategy development, and product design. However, needs are usually implicitly anchored in organizations and people can hardly articulate them. Despite the fact that a focus on needs does not prescribe any concrete strategy, but extends opportunities to act, an initial consideration of needs often lacks. Consequently, their role as an influencing variable for organizational learning has not been investigated yet.

Addressing this gap, this dissertation explores the nature of needs and how they can enhance organizational learning processes. It introduces a novel theory on needs for organizational practice which emphasizes the potential of a focus on needs. It argues why considering needs is beneficial for learning initiatives, such as vision or strategy development, in which various expectations which presumably emerge from shared needs have to be combined. Shared needs within a social system can trigger organizational learning and facilitate the design of new consensual satisfaction strategies (satisfiers).

The theory allows for understanding the motivational forces of organizational learning and exploiting the postulated one-to-many relation between needs and satisfiers. Moreover, it points at influencing variables for the organizational transition from needs to need satisfaction and illustrates that by a knowledge perspective resulting in the concept of 'need-based solution knowledge'. This knowledge enables people to propose viable satisfiers in organizations. We introduce the methodological framework 'Bewextra' that targets at the capacity to identify needs in organizations. It rests upon theories from various scientific fields and utilizes 'learning from an envisioned future' as a core method. This enables to literally envision a desired future scenario in which all needs are intuitively fulfilled, and thereby allows for the creation of knowledge about needs.

The research follows the action research paradigm which proposes a combinational interplay between rational and empirical research processes, in which various (qualitative) research methods are used. Besides theoretical considerations, the dissertation reports about four research projects in which the theories and methods were applied, reflected, and refined. More specifically, it presents how 'Bewextra' was implemented and adjusted and demonstrates that a combination of conventional learning from the past and 'learning from an envisioned future' enhances the outcome of organizational learning in various domains. Moreover, it investigates the differences between organizational strategies, that emerge with reference to needs, and strategies, that are developed without explicitly considering needs.

Kurzfassung

Wenn Organisationen lernen, entwickeln sie sich weiter. Bisher wurden mehrere beschreibende Modelle für organisationale Lernprozesse vorgeschlagen, wobei jene Variablen, die diese Lernprozesse beeinflussen, darin oft vernachlässigt werden.

Die psychologische Forschung geht davon aus, dass Bedürfnisse unser Verhalten motivieren und bestimmen. Die Annahme liegt daher nahe, dass Bedürfnisse auch im Kontext organisationaler Veränderung eine bedeutende Rolle spielen. So kann etwa gezeigt werden, dass sich die Identifikation und Befriedigung von Bedürfnissen positiv auf wertschöpfende und wissensintensive Tätigkeiten - wie etwa Innovationsprozesse, Strategie- und Produktentwicklungen - auswirken. Bedürfnisse sind aber oft nur implizit in der Organisation verankert und Organisationsmitglieder können diese nur schwer benennen bzw. explizit machen. Sie werden häufig unterschätzt, obwohl ihre Identifikation den Handlungsspielraum für die Organisation drastisch erweitern kann.

Das führt auch dazu, dass das Phänomen Bedürfnis und seine Wirkung bisher nur unzureichend in den verwandten Forschungsfeldern des organisationalen Lernens und Wissensmanagements untersucht wurde. Diese Dissertation versucht, diese Forschungslücke zu schließen. Dazu wird eine Bedürfnistheorie für die organisationale Praxis entwickelt. Diese beleuchtet die Wirkung von Bedürfnissen auf organisationale Lernprozesse und ermöglicht es, den Zusammenhang von Bedürfnissen und deren Befriedigungsstrategien als äquifinale Beziehung zu verstehen und konkretisiert diese im Wissenskonzept 'need-based solution knowledge'.

Anhand empirischer Lernprozesse (Visions- und Strategieentwicklung) wird gezeigt, dass ein Fokus auf die geteilten Bedürfnisse von Organisationsmitgliedern verschiedene Sichtweisen einen und das Lernen unterstützen kann. Dabei kann 'need-based solution knowledge' die nachhaltige Entwicklung von bedürfnisbasierten Lösungen anstoßen und leiten. Dazu wird mit 'Bewextra' eine Methodologie vorgeschlagen und getestet, die auf die Identifikation von Bedürfnissen und die Generierung von Bedürfniswissen in Organisationen abzielt. 'Bewextra' verfolgt einen interdisziplinären Ansatz und nutzt 'learning from an envisioned future' als wesentliche Methode, die komplementär zu konventionellen Lernansätzen ist.

Die Dissertation folgt dem Paradigma der Aktionsforschung, welches ein Zusammenspiel aus theoriegeleiteter Reflexion und empirischer Intervention vorschlägt. Es wurden vier empirische Forschungsprojekte durchgeführt, in denen 'Bewextra' und andere Methoden angewandt, evaluiert und adaptiert bzw. erweitert wurden. Dabei konnte u.a. gezeigt werden, dass eine Kombination von erfahrungsbasiertem und zukunftsorientiertem Lernen großen Nutzen für organisationales Lernen in unterschiedlichen Domänen hat. Darüber hinaus wurden Strategien, die basierend auf explizitem Bedürfniswissen erstellt wurden, und solche, die intuitiv entworfen wurden, untersucht und miteinander verglichen.

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1 Introduction

Knowledge is essential for any organization to grow, develop, and innovate, or, as Nonaka et al. (2000, p. 6) put it, the creation of knowledge is the "raison d'etre" of every organization. Since learning is the key to generating new knowledge, the fields of knowledge management and organizational learning are closely related (Chiva and Alegre, 2005; Firestone and McElroy, 2004). When investigating learning on the organizational level, it would be oversimplified to argue that it is the organization that learns (Easterby-Smith et al., 2000). In fact, learning takes place in the heads of individuals who make collective experiences within a shared organizational frame (Argyris and Schön, 1996; Hedberg, 1981; Wang and Ahmed, 2003). Learning is context-dependent and governed by various influences on which little research has been done so far. Arguably, one of them are needs of individuals and/or social systems, which motivate behavior and affect learning. It has been shown that a focus on needs effects value-creating and knowledge-intensive activities, such as innovation processes, strategy development, and product design.

Needs are usually implicitly anchored in organizations and people can hardly articulate them. Identifying and satisfying them can be described as distinct organizational learning processes in which organization members generate new knowledge, which extends opportunities to act. However, this has not been done yet. Addressing this gap, this dissertation explores the nature of needs and investigates how they can enhance organizational learning. It contributes to the fields of organizational learning and knowledge management.

To begin with, I introduce knowledge and needs as the two main phenomena of this research.

1.1 Knowledge

Knowledge is a fascinating phenomenon to study, but hard to grasp. It is inherent to human nature and has been subject to philosophical inquiry ever since, however, it only recently entered economic theories. Although it is evidently bound to humans and their cognitive abilities, there is no consensus on its nature, and, thus, there is no common definition of it. Some argue that knowledge is linked to behavior that continuously changes when our organism adapts to its environment. In so doing, cognition is seen as the key element in these ontogenetic (and phylogenetic) learning processes (Arhem and Liljenström, 1997). Taking this evolutionary view into account, knowledge is not a tangible entity, but rather a human-dependent process which is described as "knowing" (Nonaka and Von Krogh, 2009; Polanyi, 1969; Virtanen, 2013). This may well reflect its nature, or as Maturana and Varela (1987, p. 174) put it conspicuously: "to live is to know." Very broadly argued, knowledge is a condicio sine qua non to produce adequate behavior. It is embedded in adaptive responses,

i.e., effective actions, which is vividly summarized by the maxim "all doing is knowing and all knowing is doing" (Maturana and Varela, 1987, p. 27). This holds for all levels of investigation reaching from simple organisms to large organizations within market(-like) environments.

The importance of knowledge was also decidedly stressed by Peter Drucker (1993, p. 7): "The basic economic resource [...] is no longer capital, nor natural resources [...], nor labor [...] It is and will be knowledge." At least since then, the ability to create, transfer, store, hence, manage knowledge has become evidently crucial for organizations. As a result, knowledge is recognized as an important source for the firm's long-term success in theories of competitive advantage (Drucker, 1993; Nonaka et al., 2000; Porter, 2004; Teece, 1981). Different to the evolutionary account, knowledge is seen as an increasingly important commodity to design and produce products and services ('intellectual asset'). Accordingly, a shift from capital to knowledge intensity has taken place (Spender and Scherer, 2007). In order to gain competitive advantage, firms differ in terms of 'what they know'; this shall protect their market position.

Subsequently, the scientific field of knowledge management emerged in the 1980s (Wiig, 1997) and the knowledge-based theory of the firm (Grant, 1996; Sveiby, 2001) was proposed as an extension of Porter's (2004) competitive advantage theory.

1.2 Needs

Alike knowledge, human needs are closely bound to our being. "[...]Needs specify the conditions under which people can most fully realize their human potentials" (Deci and Ryan, 2000, p. 263). Their identification and satisfaction are crucial for our well-being and flourishing (Sheldon et al., 2001).

Needs govern our actions, though, we are mostly unaware of them (McLeod, 2011; Thomson, 2005). At the same time, marketing and product design scholars among others highlight that successful products are those which effectively meet customer needs (Bayus, 2008). Moreover, various authors acknowledge that an understanding of what people need fosters organizational change and innovation processes, strategy development, product design, among other value-creating activities (e.g. Altschuld and Watkins, 2014; Bayus, 2008; Carlgren, 2013; Ericson et al., 2009; Goffin et al., 2010; Patnaik and Becker, 1999; Ulwick, 2002; Van Der Brouwer and Dorst, 2014). Thus, needs play a crucial role in these organizational learning processes.

The concept of needs has been attracting attention in various fields. Several approaches to tackle the phenomenon have emerged, but still, there is no consensus on its nature and definition (e.g. Deci and Ryan, 2000). It even "may be an illusion to suppose that there might ever be a consensus about the meaning of 'need', even if the context of its use were specific (thus permitting other concepts in other contexts) and even if it were merely provisional (contingent on a manifest improvement for the context in question or a generalization that

embraced this and other contexts)" (Culyer, 1998, p. 77). As a consequence, competing concepts covering different realms including psychology (e.g. Deci and Ryan, 2000; Hull, 1943; Maslow, 1943, 1970; Murray, 1938; Ryan and Deci, 2000, 2001), organization and management science (e.g. Altschuld and Watkins, 2014; Goffin et al., 2010; Jost, 2014; Patnaik, 2004; Patnaik and Becker, 1999; Porter and Kramer, 2011; Rosen et al., 2014; Ulwick, 2002; Von Hippel and Von Krogh, 2016; Watkins and Kavale, 2014), social politics and economics (e.g. Bradshaw, 1972; Burton, 1990; Doyal and Gough, 1991; Drakopoulos and Karayiannis, 2004; Hamilton, 2003; Lutz and Lux, 1979; Max-Neef, 1992; McGregor et al., 2009; Menger, 2004; Noor, 1998; Vodopivec, 1992), medicine and health care (e.g. Asadi-Lari et al., 2003; Lasalvia et al., 2005), and philosophy (e.g. McLeod, 2011, 2015; Reader, 2005; Stampe, 1988; Thomson, 2005) have emerged. The phenomenon lacks a common definition, and its position relative to other concepts (e.g. goals, motives, interests, desires, laws etc.) is described non-uniformly (Culyer, 1998; Watkins and Kavale, 2014).

As I am going to argue, most of these theories on needs provide limited use for practical implementation in organizational learning as they either refer to abstract and most fundamental categories, e.g., food, shelter, water, etc., or their suggestions of what needs are seem to be overlapping with principally different concepts, such as wants or desires. Moreover, needs have only been investigated on micro (individual) and macro (economics) level; a discussion on meso level, i.e., adaptation processes of (small-scale) social systems, such as in organizational learning, is pending.

1.3   Organizational Learning

Irrespectively of the level of analysis (individual versus collective learning), learning starts with experience and follows a cyclical motion of concrete experience (action), observation and reflection, formation of abstract concepts (generalizations), and testing implications of concepts in new situations (Kolb, 2015). Though, organizational learning is more complex than individual learning as it is embedded in a social context and mediates the relationship between experience and learning outcome (Wang and Ahmed, 2003). No unified theory exists (Cohen and Sproul, 1991), but most authors would agree that organizational learning can be seen as an umbrella term for organizational adaptation and knowledge processes. Unlike the "learning organization" perspective (e.g. Senge, 2006), organizational learning theories are descriptive and focus on the process of learning *in* or learning *of* an organization (Rebelo and Duarte Gomes, 2008; Tsang, 1997). Acknowledging the importance of the ability to learn and adapt for enhancing the organization's performance and long-term success, organizational learning can be defined as "a change in the organization that occurs as the organization acquires experience. [...] [it is] a change in the organization's knowledge that occurs as a

function of experience." (Argote and Miron-Spektor, 2011, p. 1124)

However, except for 'outside' needs of customers which act as a given external demand (e.g. considered in TQM Evans and Linsday, 1999; Flood, 1993; Luthans, 1998), the fundamental questions 'why do organization members learn collectively?' and 'what brings the organizational change about?' have not been addressed explicitly yet.

Rebelo and Duarte Gomes (2008, p. 302) claim that future work on organizational learning should "develop cumulative empirical research centered on organizational aspects or variables related to learning in the organizational context instead of persisting in promoting general models of what a learning organization should be like." In the recent, so-called "second stage" (Rebelo and Duarte Gomes, 2008) of research, researchers seek for moderating and mediating variables to better explain learning on organizational level. This dissertation contributes to this ongoing research stream by dealing with the question 'what role do needs play in organizational learning processes?'. This particular concern has not been tackled yet, even though, it could shed light on possible drives that cause us to learn and change organizational reality.

1.4   Knowledge Management

Although the importance of knowledge and knowing has been evident in other disciplines such as philosophy (e.g. Polanyi, 1958, 1962) or psychology (e.g. Bruner, 1995), it lasted until the early 1980s when first efforts to manage organizational knowledge were undertaken (Wiig, 1997). Theories of organizational learning and knowledge management evolved in parallel and often refer to each other in definitions and practice (Wang and Ahmed, 2003). Still, both fields lacks a common understanding of what knowledge is.

Over the last decades paradigms have shifted repeatedly. "Knowledge management was initially defined as the process of applying a systematic approach to the capture, structuring, management, and dissemination of knowledge throughout an organization to work faster, reuse best practices, and reduce costly rework from project to project." (Dalkir, 2005, p. 11) It originally followed a techno-centric paradigm and was closely connected to information management in which the handling of data seemed to be most promising in order to generate knowledge (Wiig, 1997). Accordingly, the conception of knowledge as an intangible resource gave rise to the idea of direct managerial interventions to the organizational knowledge base. As a result, the study of how to *manage* knowledge within organizations has received much attention.

However, the field of knowledge management has been moving on. Subsequent theories stressed the dependence of knowledge on humans, its social complexity, and its embeddedness into context (Nonaka and Takeuchi, 1995). According to this paradigm, knowledge can

neither be easily transferred from one agent to another nor from one context to another. Knowledge processes require interpretation and reflection in order to unfold their potential (Davenport et al., 1998; Sveiby, 1997). This 'social turn' is led and heavily influenced by the work of Ikujiro Nonaka who prominently puts the human in the centre of any knowledge creating process (Nonaka and Takeuchi, 1995). Nonaka references to Polanyi's (1958; 1962) epistemology, and emphasizes the importance of tacit knowledge in organizations. Through the transformation from tacit to explicit knowledge (and vice versa) new knowledge emerges and becomes available to the organization. Since then, it is widely accepted that knowledge creation is mainly a social process (e.g. Chua, 2002). Moreover, Nonaka et al. (2000, p. 6) emphasize that knowledge creation is the "raison d'etre" of any firm, consequently, an emphasis on "knowledge-*based* management" highlights the importance of knowledge for any managerial intervention.

Shortly after the turn of the century, the field shifted into its third phase: Theorists argue that knowledge is not subject to direct managerial intervention or control as it was seen in earlier approaches. Rather, the creation process of knowledge can only be facilitated and enabled (Von Krogh et al., 2000). In this vein, an alternative conceptualization of the organization as an autopoietic system, which is self-referring and dynamic (Maturana and Varela, 1987), is put forward by Sveiby (1997) and Von Krogh and Roos (1995). They argue that social systems are both open and closed: open for data from outside (environment), but closed to knowledge which is private meaning that it is subject to interpretation. As a result, being open for new experiences allows for learning and variation. Knowledge is not a representation of an outside given reality but internally constructed (Sveiby, 1997). Along this line, it is closely linked to learning processes on different epistemological levels and not subject to any 'mechanistic' intervention.

Moreover, as a result of the growing challenges of globalized economy accompanied by the phenomena of decreasing stability and higher uncertainty, the need for new approaches to knowledge management being able to take future demands for new types of knowledge into account has emerged (e.g. Konno et al., 2014; Scharmer, 2001). In this recent perspective, the future is not a probability-based forward projection of the past. Rather, organizations and individuals need the capacity to sense emerging opportunities and adapt accordingly. Approaches are needed that are able to deal with the future and enable individuals as well as organizations to shape the time to come (Nonaka and Toyama, 2007). Accordingly, a vision of the future, i.e., the knowledge vision, has become most prominent in Nonaka's theory (2016; 2011; 2005). A shared vision can be created in an organizational learning process (Kaiser et al., 2013; Kaiser and Fordinal, 2010; Senge, 2006) and should provide answers to the questions 'why do we exist?' and 'how should the future look like?' (Nonaka and Toyama, 2005). These questions are crucial for any organization as they determine its long-term strategy and, thus,

mediate knowledge creation. Since Nonaka and Toyama (2005, p. 424) argue that "the firm's knowledge vision also inspires the intellectual passion of organizational members so that they are encouraged to create knowledge", it seems to be essential that the vision meets the needs of the people who advocate it (Kaiser et al., 2013; Kaiser and Fordinal, 2010).

In this current stage of knowledge management, state-of-the-art approaches deal with anticipating and shaping the future. Scharmer's concept of "learning from the future as it emerges" (Scharmer, 2016; Scharmer and Kaufer, 2013) can be seen as a promising strategy to do so. Moreover, research focuses on identifying and cultivating the enabling factors crucial for knowledge creation (e.g. Peschl and Fundneider, 2012).

However, the discrepancy between knowledge as an manipulable object and knowing as a human-dependent process has not disappeared (Ibert, 2007).

2 Research Design

2.1 Objectives and Research Questions

Although the importance of needs has been acknowledged in different fields including organization and management science (e.g. Jost, 2014; Patnaik, 2004; Porter and Kramer, 2011; Rosen et al., 2014; Von Hippel and Von Krogh, 2016; Watkins and Kavale, 2014) and their effect on activities, such as organizational change, innovation, strategy development, product design (e.g. Altschuld and Watkins, 2014; Bayus, 2008; Carlgren, 2013; Ericson et al., 2009; Goffin et al., 2010; Patnaik and Becker, 1999; Ulwick, 2002; Van Der Brouwer and Dorst, 2014) has been demonstrated, needs have not been particularly introduced as a variable or a semantic knowledge category into the fields of organizational learning and knowledge management. As a consequence, the impact of explicit knowledge about needs on organizational learning processes has not been investigated yet.

This research fills this gap. Therefore, I approach the phenomenon of needs for the purpose of organizational practice by means of a knowledge perspective. In so doing, I synthesize 'knowledge' and 'need' in a transdisciplinary way and introduce a knowledge concept of needs to the fields of organizational learning and knowledge management. At the same time, I investigate the generation as well as the effects of this specific type of knowledge on organizational learning processes. Their synthesis, i.e., need knowledge, rests on explicitness (Nonaka and Takeuchi, 1995) or awareness (Polanyi, 1969) of knowledge. By shifting our focal awareness to any instance of knowledge it transforms into explicit shape and is then more easily shareable (Nonaka and Takeuchi, 1995; Polanyi, 1969; Virtanen, 2013). Similarly, needs unfold their potential and become most effective when we are aware of them (Stampe, 1988). This reinforces our seeking for satisfying strategies (Pincus, 2004).

In sum, the objectives of this dissertation are (I) to develop a theory of needs for organizational learning and establish a supplemental knowledge perspective, (II) to enhance organizational learning processes by proposing, applying, evaluating and advancing methods to identify needs, and (III) to investigate the role of explicit knowledge about needs in organizational learning processes. Accordingly, the overall research question is the following:

How does explicit knowledge about needs contribute to organizational learning processes?

To investigate relevant aspects of this leading question, this dissertation is structured along three main research questions:

- RQ-1: *How can needs be conceptualized in order to serve understanding for organizational learning processes?*

- RQ-2: *How can enhanced organizational learning approaches amplify explicit knowledge about needs?*

- RQ-3: *How does explicit knowledge about needs condense in collectively created strategies for the organization?*

This research shall not only be relevant for the scientific community, but also for the research partners (people concerned). The organizational learning projects covered in this dissertation help to understand the transformations caused by learning and, at the same time on a practical account, empower people and improve organizational performance by enhancing their "capacity to act" (Stehr and Grundmann, 2012; Sveiby, 1997, 2001).

2.2 Research Paradigm

Heinz von Foerster famously rejected objectivity as "the delusion that observations could be made without an observer" (in Von Glasersfeld, 1996, p. 280). Just as what we know depends on the knowing person, all social behavior, including research, is coined by the values of the persons involved. I conducted this research (partly) with my fellow colleagues; we, the researchers, act intentionally and hold (different) value-loaded mental models of how the world is and how it will evolve. Moreover, what differentiates this research from lab experiments is that organizational learning occurs in social settings and does unavoidably alter these situations. This is a necessary condition to investigate the impact caused in real-world environments (Hult and Lennung, 1980). As a consequence, we were not solely observers and analysts acting from 'outside' but part of the organizational learning projects I report about. Rather than neglecting these effects, I reflect on their impact.

The social phenomenon under investigation, i.e., organizational learning, does not comply with the three methodological principles of the natural sciences: reductionism, repeatability and refutation (Checkland and Holwell, 1998). These might hold true for phenomena following physical laws, but the positivistic paradigm reaches its limits when examining social phenomena. This is vividly reflected by the "replication crisis" which seizes the social sciences and questions positivistic approaches (John et al., 2012; Lakens and Evers, 2014; Open Science Collaboration, 2015; Schweinsberg et al., 2016; Simmons et al., 2011). Different to natural phenomena, "things are more volatile in the investigation of human and social phenomena" (Checkland and Holwell, 1998, p. 9). Alike, social systems are not "homogeneous through time" as Keynes already realized in 1938 (in Moggridge, 1976, p. 28). They can neither be reduced to linear causal relations nor are their behavior repeatable. Realities are fluid and continuously created and recreated in social processes. As a consequence, we need to give up positivistic criteria of validity or replicability and use alternative measurements for the qual-

ity of research. Researchers must conduct research in a way that is recoverable by interested outsiders (Checkland and Holwell, 1998).

In order to approach these social realities, Argyris et al. (1982) suggest that research should be a collaborative process between researchers and people concerned. It should be a critical inquiry focused on social practices and, most importantly, subject to deliberate reflective learning. He refers to this as "action science". The action research approach originates from social psychology (Lewin, 1947) and relates to this claim. It generates insights that "challenges the claims of a positivistic view of knowledge which holds that in order to be credible, research must remain objective and value-free." Instead, action research embraces "the notion of knowledge as socially constructed and, recognizing that all research is embedded within a system of values and promotes some model of human interaction [...]" (Brydon-Miller et al., 2003, p. 11). Researchers (inter)act with(in) the social system under investigation, while they also examine how these actions influence the situation. In fact, action research's intention is two-fold: It tries to solve current practical problems and simultaneously expands scientific knowledge (Recker, 2013). Although it is occasionally criticized for its epistemological assumptions (for an overview see Baldwin, 2012), it is now a well-established qualitative research paradigm (Baskerville and Wood-Harper, 1996).

Action research is a combinational interplay between rational and empirical research processes (Greenwood and Levon, 2007). Starting with rational considerations, researchers act in a given set of empirical situations and gather situation specific rather than generalizable knowledge. Subsequently, reflecting on empirical data may confirm or disconfirm initial concepts and allows for generating or refining theories. The approach follows a cyclic path requiring critical reflection of the research outcome and process: (I) diagnosing, (II) action planning, (III) action taking, (IV) evaluating, and (V) specifying learning (Susman and Evered, 1978). Different to consultancy, action research aims at developing theory to underlie practice. In turn, theories are the basis for designing methodologies and researchers' interventions (Eden and Huxham, 1996a). In sum, action research is (I) empirical and interpretative - empirical data needs to be interpreted on an intersubjective basis; (II) experimental and multivariate - it is iteratively experimental and occurs under real-world circumstances; and (III) observational and interventionist - scientists do not only observe, but change the system they act in by their interventions, therefore it is necessarily interventionistic (Baskerville and Wood-Harper, 1996).

Action research best reflects this inquiry on knowledge about needs and its effects on organizational learning. The research is designed and conducted to not only meet the requirements of the scientific community and expand scientific knowledge, but also to alter the real-life situations of the research partners.

The 15 principles of action research summarized by Checkland and Holwell (1998, p. 19)

(modified from Eden and Huxham, 1996b) guides this research:

1. Researcher intends to change the organization.

2. There must be implications beyond the specific situation.

3. Research seeks theory as an explicit concern.

4. Any tools, techniques, or models developed need to be linked to the research design.

5. Emergent theory will emerge from both data and initial theory.

6. Theory building will be incremental and cyclic.

7. Presentation should acknowledge prescription and description.

8. There will be orderliness in approach.

9. Exploration of data and theory building should be explainable to others.

10. Later reporting is part of theory exploration and development.

11. 1 - 10 are necessary but not sufficient for valid action research.

12. It is used where other methods are not appropriate.

13. Triangulation (using multiple methods) is used if possible.

14. History and context are given due weight.

15. Dissemination of findings goes beyond those involved in a study.

The epistemological assumptions have to be in line with the paradigm of action research. Therefore, I need to clarify the notion of knowledge used in this research. Although philosophers have been inquiring the phenomenon of knowledge for centuries, their enterprise has not ended satisfactorily yet (Emery, 1997). Epistemology is characterized by conceptual plurality (for an overview see Martensson, 2000). I employ the proposition of knowledge as the "capacity to act" which was independently proposed by Stehr and Grundmann (2012) (from a sociological perspective) and Sveiby (1997, 2001) (from a strategy management perspective). This is in line with the action research paradigm and consistent with Polanyi's epistemology (prevalently used in knowledge management) as well as the recent assumption that knowledge is a process which can be enabled rather than managed (Von Krogh et al., 2000). Different to information, knowledge can only be observed and evaluated in action. As a process, it is closely bound to the knowing person and depends on the state of awareness (Polanyi, 1958). On this view, knowledge equals the potential to "set something in motion", it is "a model *for*

reality" (Stehr and Grundmann, 2012, p. 32, emphasis added). We shape reality by realizing this potential. It is the result of action as well as the capability (and prerequisite) of taking action, but not the action itself. Different to Maturana and Varela's (1987) notion, it is only the potential and not the actualization of an action (Stehr and Grundmann, 2012). The implementation of this potential (= knowledge) is open meaning that knowledge can manifest itself in objectified as well as embodied forms and is, therefore, also reconcilable with Nonaka and Takeuchi's (1995) theory. However, different to an object, the transmission of knowledge requires intermediary cognitive capacities and skills; the 'receiver' of knowledge has to cognitively process it (Stehr, 1994). In sum, newly created knowledge expands our opportunities as it raises our potential to act; it enables us to implement and to make informed changes to our reality.

2.3 Empirical Projects and Methods

In order to answer the research questions, this dissertation covers four empirical projects that we conducted. They were processed, analyzed and evaluated as case studies (Yin, 2014).

- **Project 1:** Austrian Bakers
  The Austrian Federal Economic Chamber (WKO) offers various services to their compulsory members. In order to develop new and adapt existing services, the WKO wants to understand what its members need. Therefore, the first research project was conducted to gain knowledge about the substantial needs of the WKO members to work successfully and flourish as entrepreneurs. The aim was to generate a catalog of the substantial needs of WKO member companies which are in business for more than 10 years (maturity stage) and employ more than 5 and less than 50 people (small and medium-sized enterprises). For this research the Austrian bakers were chosen by the WKO as one important industry. Based on the catalog of validated needs the WKO developed new services which are now offered to their members (not part of the project). Article D (see page 111) reports about this case in detail.

- **Project 2:** High School in Lower Austria
  This project was conducted with a high school in Lower Austria and had two parts:

  A pilot project with a smaller number of participants (two classes) was conducted to see how the methodological framework 'Bewextra' needs to be adjusted to the characteristics of (this) school(s) and investigate the qualitative differences of the results from 'learning from an envisioned future' versus conventional learning from the past (see subsection 3.2). Article B (see page 79) and Article E (see page 133) report about this in detail.

The main part of the project, which was subsequently conducted, aimed at identifying the needs of teachers, pupils (separated by branches within this school), parents, and the private school provider. Prior to the data acquisition, these stakeholder groups were identified as concerned and crucial to be asked. Different to other projects, the stakeholder groups were represented by themselves and the data acquisition was twofold. The vast majority of participants (teachers, pupils) took part in a data acquisition workshop. Additionally, managers of the private school provider were interviewed separately to gather in-depth data. The interview data was equally combined with the workshop data. Article C (see page 97) and Article D (see page 111) report about this in detail.

It turned out that the project's results are valuable for the quality management initiative of the school. So, the research project gained practical relevance for the school's administration.

- **Project 3:** Students from the specialization field Information Systems and Operations, Vienna University of Economics and Business
  This project was conducted with 25 students from the specialization field Information Systems and Operations at the Vienna University of Economics and Business. The aim was to identify the students' needs regarding their academic environment. The focus of this study was to analyze the effect of different learning approaches in view of the identified needs. Article E (see page 133) reports about this in detail.

  Moreover, the resulting catalog of substantial needs of the students was used as a basis for an experimental inquiry on the effects of explicit need knowledge on collective strategy development. Article F (see page 147) reports about this in detail.

- **Project 4:** Industry sector Crafts and Trades of the Austrian Federal Economic Chamber (WKO)
  This project comprised a strategy developing process with around 50 medium and top-level executives of the industry sector Crafts and Trades of the Austrian Federal Economic Chamber (WKO). The process was framed by four long-term goals predefined by the WKO management. The objective was to collaboratively create a goal-directed strategy for the industry sector with a time scope reaching into the year 2020. Therefore, a widespread catalog of concrete actions to reach the four pre-defined goals was developed. Therein, the approach of 'learning from an envisioned future' (see subsection 3.2) was central. Article E (see page 133) reports about this case in detail.

We mainly used qualitative methods to analyze the data of these projects. The qualitative paradigm is based on interpretivism and constructivism (Denzin, 2010; Schwandt, 2000) and

holds that there are multiple realities and alternative truths based on the subjects' construction of reality which is constantly changing (Berger and Luckmann, 1981).

Blichfeldt (2006) argues that the case study methodology is reconcilable with action research as it complies with the assumptions of action research and allows for investigating social phenomena in-depth. Case studies help "to understand complex social phenomena" because "the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events" such as organizational processes (Yin, 2014, p. 4). In fact, case studies seem to be most suitable when (I) 'how' or 'why' questions are investigated, (II) the researchers have little control over events, and (III) the focus is on a contemporary phenomenon within a real-life context (Yin, 2014).

The cases outlined describe organizational learning processes in which the researchers' intervention lead to a shift of knowledge, i.e., to provide a new instance of experience to the members of the social system. As a result, the researchers are part of this alteration process and do unavoidably change the organization they are engaging with.

However, the research was not limited to the case study methodology. It used a variety of different methods including generative listening (Davis, 1997; Scharmer, 2016; Yackel et al., 2003), aspects of grounded theory (Charmaz, 2014; Glaser and Strauss, 1967) and hermeneutic analysis (Gadamer, 2006), learning from an the future (Kragulj, 2014b; Scharmer, 2016), communicative validation (Kvale, 1995), repertory grid analysis (Baxter et al., 2014; Goffin and Lemke, 2004; Goffin et al., 2010; Hassenzahl and Wessler, 2000), and paradigm relatedness framework analysis (Dean et al., 2006; Nagasundaram and Bostrom, 1994). The methods are explained in more detail in the corresponding scientific articles which constitute the following chapter (see section 3) and are enclosed in the appendix (see page 57).

3 Summarized Results

This dissertation is designed as a cumulative thesis which comprises six peer-reviewed scientific articles which have undergone critical examinations by the scientific community. The reviews were rigorous and ensured the quality of the dissertation. Moreover, publishing the research results via scientific journals and conference proceedings potentially increases their dissemination.

The main research questions (see subsection 2.1) organize the following subsections. In these, the particular research initiatives are described and answers to the research questions are given. The corresponding articles are enclosed in the appendix (see page 57).

3.1 Conceptualization of Need Knowledge

This subsection is dedicated to RQ-1 *'How can needs be conceptualized in order to serve understanding for organizational learning processes?'*. Two journal articles and one article published in conference proceedings answer RQ-1 in detail:

- **Article A** (see page 59): Kragulj, A. (2016). Conceptualising Needs to Enhance Organisational Learning and Enable Knowledge-based Innovation. *Procedia Computer Science, 99*, 225-242. ISSN 1877-0509.

- **Article B** (see page 79): Kragulj, F. (2016). A Knowledge Perspective on Needs as a Foundation for Organisational Learning Processes. In E. Tomé (Ed.), *Proceedings of the International Conference Theory and Applications in the Knowledge Economy* (pp. 196-209). Aveiro, Portugal. ISBN 978-989-20-6806-0.

- **Article C** (see page 97): Kaiser, A., Kragulj, F., & Grisold, T. (2016). Taking a Knowledge Perspective on Needs: Presenting Two Case Studies within an Educational Environment in Austria. *Electronic Journal of Knowledge Management, 14*(3), 115-127. ISSN 1479-4411.

These articles build a novel theory of needs which helps to understand organizational learning, i.e., adaptation processes of social systems. Theory building is done interpretatively and inductively based on findings of a broad range of scientific fields and reinforced by empirical results (Locke, 2007).

The articles of this subsection focus on complementary aspects:

- Article A (see page 59) answers the subordinate research question RQ-1-1 *'How can needs be conceptualized in order to serve understanding for and enhancing organizational learning processes?'* and thereby specifies insights mainly derived from theoretical findings. After considering the role of needs in organizational learning processes, it presents key findings from a transdisciplinary literature review (motivational psychology, customer-related fields, organization studies, philosophy, social politics, and economics) and evaluates the identified theories in view of their applicability for organizational learning purposes. Based on these insights, it suggests an ontological framework of needs and proposes a notion of needs suitable for the intended purpose: Needs are distinctive from the means of their satisfaction (satisfiers) and defined as "conditional necessities depending on a purpose". An evaluation of the purpose allows for prioritizing needs (first-order and second-order needs) and isolating them from other claims. To grasp the relation between needs and satisfiers, the ontological framework proposes three layers (needs, reasoning, satisfiers) and depicts an equifinal configuration of the phenomena. Finally, it derives three main conclusions from the proposed need concept: (I) Although brought in proposals for action differ, underlying needs within an organization might be the same. Identifying these needs supposedly fosters a consensual morale within an organization. (II) By developing solutions and strategies based on the identified needs, organization members may find alternative possibilities to fulfill their needs and open up for change. It potentially enables to find consensual, innovative and sustainable strategies and solutions. (III) The developed framework allows organizations to understand the motivational forces of behavior and exploit the potential inherent to the one-to-many relation between needs and satisfiers.

- Article B (see page 79) answers the subordinate research question RQ-1-2 *'Given a dichotomy of needs and means of their satisfaction (satisfiers), how can knowledge crucial for the transition from needs to satisfiers be conceptualized in order to drive organizational learning?'*. The ontology proposed in Article A (see page 59) has three main implications which are further investigated in this complementary article: (I) We have to be able to identify the needs to target at. (II) We have to know what means of need satisfaction exist and how they come about. (III) We have to be able to judge the specific potential of need satisfaction among the satisfier candidates. To address these, this article introduces a knowledge perspective on needs and the transformation process from needs towards need satisfaction. This results in the concept of 'need-based solution knowledge' consisting of three distinct capacities to act (capacity to identify needs, capacity to judge needs and satisfiers, capacity to design satisfiers) which are critical for need-driven organizational learning. I discuss these capacities on an ontological as

well as an epistemological dimension and argue why these capacities should be made explicit in groups. Moreover, I reflect on a case example from Project 2 (see section 2.3) and point at possible leverage points to support organizational learning processes.

- Article C (see page 97) answers the two subordinate research questions RQ-1-3-1 *'Is an enhanced organizational learning process including learning from past and future experiences applicable to assess the hidden needs in larger social settings; and what types of knowledge are involved in this learning process?'* and RQ-1-3-2 *'How is our approach applicable to assess the hidden needs in larger social settings and what challenges arise for the management of emerging knowledge?'*. Following the hidden needs theory (Goffin et al., 2010) which holds that the identification of hidden needs may provide organizations with competitive advantage, we explain why making needs explicit is crucial for organizational learning processes and extend the epistemological argument presented in Article B (see page 79). For this purpose, we present empirical data from Project 2 and Project 3 (see section 2.3). We briefly outline our methodological framework for identifying needs called 'Bewextra', and explain how it was adjusted and applied to these projects (the methodology was first presented in Kaiser et al., 2014; Kragulj, 2014a, and Article D [see page 111] explains it in detail). We conclude that an initial identification of all relevant stakeholder groups is necessary for applying 'Bewextra' in larger social systems (n $\approx$ 200). Further, the workshop space must be designed as an enabling space encouraging to think freely and outside the box (Peschl and Fundneider, 2012) and a trustful relationship between the facilitator and the participants is necessary for a successful learning intervention.

3.2 Need Knowledge and Learning

This subsection is dedicated to RQ-2 *'How can enhanced organizational learning approaches amplify explicit knowledge about needs?'*. Three journal articles answer RQ-2 in detail:

- **Article C** (see page 97): Kaiser, A., Kragulj, F., & Grisold, T. (2016). Taking a Knowledge Perspective on Needs: Presenting Two Case Studies within an Educational Environment in Austria. *Electronic Journal of Knowledge Management, 14*(3), 115-127. ISSN 1479-4411.

- **Article D** (see page 111): Kaiser, A. and Kragulj, F. (2016). Bewextra: Creating and Inferring Explicit Knowledge of Needs in Organizations. *Journal of Futures Studies, 20*(4), 79-98. ISSN 1027-6084.

- **Article E** (see page 133): Kaiser, A., Kragulj, F., Grisold, T., & Walser, R. (2016). Learning From an Envisioned Future - An Empirical Account. *Electronic Journal of Knowledge Management 14* (1), 18-30. ISSN 1479-4411.

- Article C (see page 97; already mentioned in subsection 3.1) does also contribute RQ-2 *'How can enhanced organizational learning approaches amplify explicit knowledge about needs?'*. We analyze the consequences of the alternative learning approach called 'learning from an envisioned future' (also Kragulj, 2014b) which we used in the research projects. Based on empirical data from Project 3 (see section 2.3), we compared learning from past and learning from future experiences. It turned out that a combination of learning from past and future experiences increases the overall number of identified hidden needs.

- Article D (see page 111) answers the subordinate research question RQ-2-1 *'How to infer abductively - in a methodological replicable and consistent way - human needs from observable satisfiers in a non-instantaneous setting using qualitative research methods?'*. In this article, we present our advanced methodological framework 'Bewextra'. Based on theories from several disciplines, including visioning and philosophy of needs, as well as empirical data from Project 1 and Project 2 (see section 2.3), we propose three consecutive phases to generate explicit knowledge about needs in organizations. In 'Bewextra-Collect' (phase 1), organization members generate and interact with their ideal future scenarios. The 'learning from an envisioned future' approach enables them to imagine ideal future scenarios in which all their needs are intuitively fulfilled (Atance and O'Neill, 2001). Therein, we encourage people not to think of possible restraints that result from current or past limitations to foster the creation of knowledge that is less affected by past experiences. As we demonstrate, the generated reports 'from the future' do not represent needs directly, but they embody patterns that point towards the persons' hidden needs. In 'Bewextra-Analytic' (phase 2), researchers follow a hermeneutic approach to analyze the reports (Gadamer, 2006). They use generative listening (Davis, 1997; Senge et al., 2005; Yackel et al., 2003) as a method to abductively generate hypotheses about the underlying needs people may try to articulate by their ideal future scenarios. Abductive reasoning (Peirce, 1974) allows for bridging the 'ontological gap' between satisfiers and needs, and results in sound need hypotheses. Complying with the principles of grounded theory (Charmaz, 2014; Glaser and Strauss, 1967), this interpretative analysis is methodologically transparent and completely documented. In 'Bewextra-Validate' (phase 3), the hypotheses are feed back to the people

concerned. We ask them to validate the need hypotheses in terms of correctness and completeness. Utilizing information technology (e.g. online questionnaires) allows for increasing the sample of respondents in order to broadly evaluate the data and gain robust insights.

- Article E (see page 133) answers the subordinate research question RQ-2-2 *'How does the use of Learning from Interacting with an Envisioned Future as an additional learning mode support the quality and quantity of innovative ideas?'*. Complementary to Article D (see page 111), this article reinforces the theoretical background of 'learning from an envisioned future' and proposes an enhanced theory of learning which entails this learning source. Therein, tacit need knowledge is crucial, as it is embedded in the scenarios participants imagine and engage with (visions). Moreover, we empirically investigate what impact interacting with and learning from a vision has for meso level interventions. Therefore, data from Project 2 and Project 4 (see section 2.3) are analyzed by means of the paradigm relatedness framework (Nagasundaram and Bostrom, 1994). We conclude that 'learning from an envisioned future', i.e., learning from a vision in which needs are intuitively satisfied, enables the creation of creative and innovative solutions. Moreover, the combination of learning from the past with 'learning from an envisioned future' leads to a higher number of innovative ideas, both in terms of quality and quantity.

3.3   Need Knowledge and Strategies

This subsection is dedicated to RQ-3 *'How does explicit knowledge about needs condense in collectively created strategies for the organization?'*. This article published in conference proceedings answers RQ-3 in detail:

- **Article F** (see page 147): Kragulj, F. and Fahrenbach, F. (2016). Investigating the Impact of Need Knowledge on Strategy Development in Organizations. In S. Moffett and B. Galbraith (Eds.), *Proceedings of the ECKM-2016 (17th European Conference on Knowledge Management)* (pp. 485-493). Reading, UK: Academic Conferences and Publishing International Limited. ISSN: 2048-8961. ISBN 978-1-911218-02-9.

In Article F (see page 147), we report about an experimental inquiry to understand the differences between strategies, which are generated with reference to needs, and strategies, which are developed without explicitly considering needs. As part of Project 3 (see section 2.3), we

asked two groups of students to develop strategies for a better learning and teaching environment at their university. While one group developed their strategies with explicit reference to previously identified needs, the other group did the same task intuitively. We used the repertory grid analysis (Hemmecke, 2012) to evaluate these strategies and investigate how explicit need knowledge affects the outcome. Based on the results, we draw two conclusions: (I) There is a clear overlap between identified needs and the perception of the developed strategies. This is in line with the assumption that needs govern our behavior (strategy development), even when we are not explicitly aware of them. (II) There is no solid difference between strategies with explicit reference to needs and strategies intuitively generated. We cannot conclude that need knowledge has a distinct effect on the outcome of a strategy development process. Conclusively, we hypothesize on reasons for the results. One possible reason could be that participants in this experiential setting were free to come up with whatever ideas that came to their minds. They did not have to find a consensual strategy in a 'real-world' environment characterized by scarce resources, competing interests, bounded rationality, and other restrictions.

3.4   Coherence of Results

Each empirical project outlined in subsection 2.3 independently followed an action research cycle of diagnosing, action planning, action taking, evaluating, and specifying learning (Susman and Evered, 1978). Though, the research articles constituting subsections 3.1, 3.2, and 3.3 report about these projects and focus on different aspects to answer the research questions. Their results feed the overall action research cycle of this dissertation. Figure 1 depicts this cycle and illustrates the *main* contribution(s) of each article to the framing cycle.
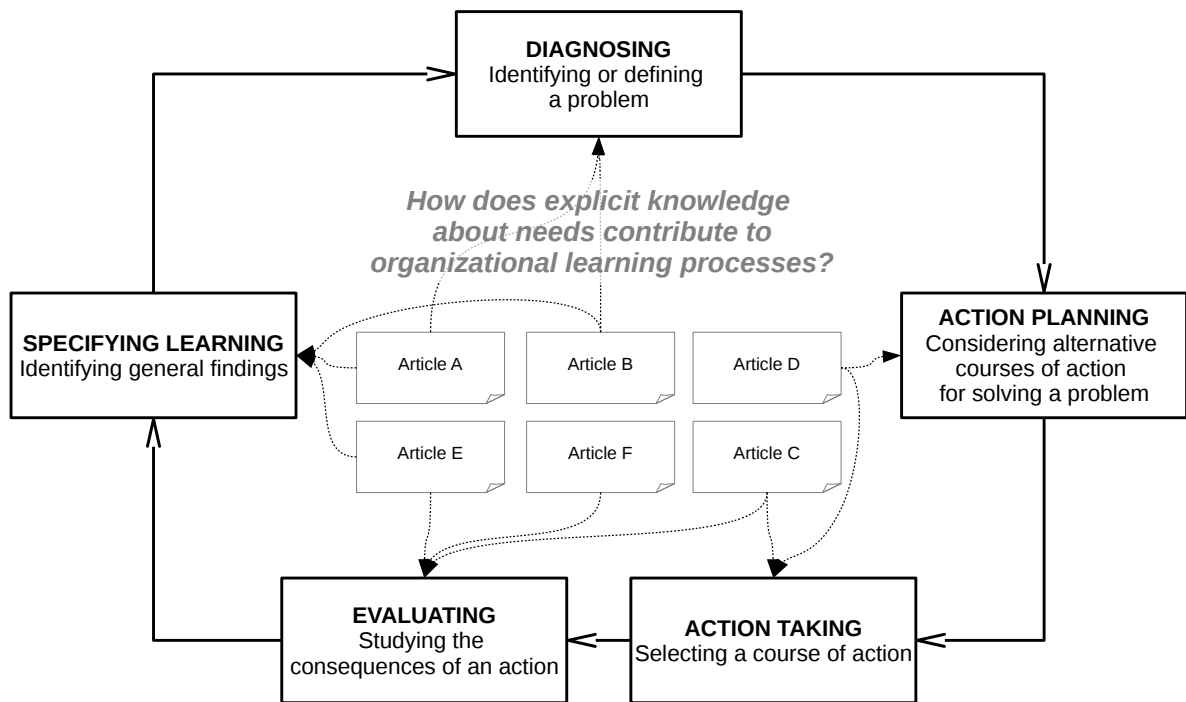
Figure 1: The articles' *main* contributions to the overall action research cycle (adapted from Susman and Evered, 1978, p. 588)

The diagram shows a cyclical action research process with the following boxes connected by arrows:

DIAGNOSING — Identifying or defining a problem

ACTION PLANNING — Considering alternative courses of action for solving a problem

ACTION TAKING — Selecting a course of action

EVALUATING — Studying the consequences of an action

SPECIFYING LEARNING — Identifying general findings

Central question: *How does explicit knowledge about needs contribute to organizational learning processes?*

Article notes: Article A, Article B, Article D, Article E, Article F, Article C

4 Key Findings and Conclusion

The increasing interest in organizational learning as well as the demand for research on mediating variables in these processes (Rebelo and Duarte Gomes, 2008) justify this inquiry on the impact of need knowledge on organizational learning. By means of an action research approach, this dissertation contributes several insights to the fields of organizational learning and knowledge management. A summary of key findings regarding the dissertation's objectives is presented in table 1.

Table 1: Summarized key findings

Article	Key Findings
Article A	▷ The proposed theory of needs allows for (I) understanding the motivational forces of organizational learning, and (II) exploiting the potential inherent to the one-to-many relation between needs and satisfiers.
	▷ Although concrete proposals and ideas of stakeholders differ significantly, the underlying needs might be the same, and identifying them supposedly fosters a consensual morale within the organization.
	▷ There is no 'right' satisfier to a given need, but many ways ro reach need satisfaction. Thus, considering shared needs first may facilitate the design of consensual satisfiers. By developing these, stakeholders may recognize new possibilities to fulfill their needs and open up for change.
Article B	▷ The proposed concept of 'need-based solution knowledge' encompasses essential capacities to act for need-driven organizational learning.
	▷ Nonaka and Takeuchi's (1995) argument reinforces that these capacities are most powerful when they are made explicit.
	▷ Enhancing and using these capacities enable people to propose viable need satisfying strategies in organizations which are potentially able to not only meet their own needs but also the needs of other stakeholders.

Table 1: Summarized key findings

Article	Key Findings
Article C	▷ Combining conventional past-oriented learning and 'learning from an envisioned future' increases the overall number of identified needs.
	▷ Providing an enabling space (Peschl and Fundneider, 2012) is crucial for the participants' willingness to engage in 'learning from an envisioned future'. Especially a trustful relationship between the facilitator and the participants is critical for detaching from current restrictions and thinking outside the box.
	▷ The proposed methodological framework 'Bewextra' proves to be efficiently applicable in larger social systems ($n \approx 200$).
Article D	▷ In organizational practice, people are not used to communicate on the level of needs. Consequently, an initial consideration of needs (not proposals for solutions) often lacks.
	▷ A focus on needs and knowledge about needs drastically extends opportunities to act, as it does not prescribe any concrete strategy at first.
	▷ By means of 'Bewextra' organizations can identify (shared) needs among their stakeholders without great effort. In the two case studies, the identified needs were assessed as valid by a great majority of the system members.
Article E	▷ 'Learning from an envisioned future' facilitates the creation of highly creative ideas.
	▷ Combining conventional past-oriented learning and 'learning from an envisioned future' increases the overall number of innovative ideas, both in terms of quality and quantity.
	▷ The effects of 'learning from an envisioned future' hold for diverse domains and different intended learning outcomes.

Table 1: Summarized key findings

Article	Key Findings
Article F	▷ Research reinforces that needs influence our acting, even when we are not explicitly aware of them.
	▷ Under experimental conditions, there is no solid difference between strategies with explicit reference to needs and strategies without such reference.
	▷ The repertory grid methodology can be effectively advanced by integrating semantic clustering to combine data from several interviewees into one data set that can be evaluated by a large population (via an online questionnaire).

The findings of this dissertation reveal that needs are a crucial variable in organizational learning and can drive organizational change. The research contributes to the scientific community and provides practitioners with tested methodologies to enhance organizational learning processes. As outlined in detail, this dissertation results in three main contributions to the scientific fields of organizational learning and knowledge management:

1. It emphasizes the role of needs in organizational learning and thereby contributes to the ongoing discussion on influencing variables for such processes (Rebelo and Duarte Gomes, 2008). It provides a theory of needs appropriate for organizational learning processes, such as vision or strategy development. Based on this theory, it introduces the concept of 'need-based solution knowledge' by which leverage points for the transformation from needs to satisfiers are highlighted.

2. Based on these, the dissertation presents an advancement of a methodological framework to identify needs which proved to be efficient and effective in small to medium-sized organizations.

3. It introduces 'learning from an envisioned future' as an additional learning source and embeds it into a state-of-the-art learning theory. Moreover, it empirically shows the benefits of this learning approach in various domains.

In addition to all that, this research, that I together with my colleagues conducted, has directly touched around 400 people and hopefully shifted their organizations in a valuable way.

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Appendices

Article A:

Conceptualising Needs to Enhance Organisational Learning and Enable Knowledge-Based Innovation

Kragulj, A. (2016). Conceptualising Needs to Enhance Organisational Learning and Enable Knowledge-based Innovation. *Procedia Computer Science, 99*, 225-242. ISSN 1877-0509.

Conceptualising Needs to Enhance Organisational Learning and Enable Knowledge-Based Innovation

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Abstract

Organisational learning causes organisational change; it utilises and results in (new) knowledge. Needs are crucial in these processes, since they govern behaviour and cause us to act. Consequently, it seems to be worthwhile to consider what needs are and how they can be exploited in organisational learning processes enabling innovation. In this conceptual paper, I theorise on the concept of need and argue why considering needs is beneficial in learning and innovation processes, such as vision or strategy development, in which various expectations which presumably emerge from shared needs have to be combined. Based on a transdisciplinary literature review, I emphasise the principle of equifinality and propose a one-to-many relation between needs and their means of satisfaction. In order to take advantage of this relation, we have to understand what needs are and how they are linked to other phenomena. Therefore, I introduce an ontology, which aims at clarifying the concept of need for organisational practice and points at influencing variables in the transition from needs to need satisfaction.

1. Introduction

What if you know, what your needs are? Needs govern our actions, though we are mostly unaware of them[1]. At the same time, marketing and product design scholars among others highlight that successful products are those which effectively meet customer needs.[2] Additionally, it has been acknowledged that an understanding of what people need fosters organisational change and innovation processes, strategy development, product design, among other value-creating activities (e.g.[3,2,4,5,6,7,8]). Thus, needs play a crucial role in organisational learning and development processes.

However, the question pertains: What are needs and how can we assess them? The concept of need has been attracting attention in various fields, the most important being psychology, philosophy and economics (e.g.[9,10,11,12,13,14]).

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However, most of the theories on needs provide limited use for practical implementation as they either refer to abstract and most fundamental needs, i.e. food, shelter, water, etc., or their suggestions of what needs are seem to be overlapping with principally different concepts, such as wants or desires.

To close an important research gap and propose an usable definition of needs, this article addresses the following research question: *How can needs be conceptualised in order to serve understanding for and enhancing organisational learning processes?*

The paper is structured as follows: First, I will argue how the consideration of needs could contribute to organisational learning processes. Second, I will present key findings from a transdisciplinary literature review, which was guided by the three basic notions of 'need' identified by Gasper[15],[16],[17]. I will review theories from motivational psychology, customer-related fields, organisational study, philosophy, social politics as well as economics and discuss why they have limited use for the field of organisational learning. Third, in order to clarify the concept, I will present an ontology of needs. Finally, I will argue what this implies for and how it potentially contributes to organisational learning and knowledge processes.

2. Why to Focus on Needs in Organisational Learning?

Although no unified theory exists, most authors would agree that organisational learning can be seen as an umbrella term for organisational adaptation and knowledge processes. Unlike the "learning organization" perspective (e.g.[18]), organisational learning theories are descriptive and focus on the process of learning *in* or learning *of* an organisation.[19] Acknowledging the importance of the ability to learn and adapt for enhancing the organisation's performance and long-term success, organisational learning can be defined as "a change in the organization that occurs as the organization acquires experience. [...] [it is] a change in the organization's knowledge that occurs as a function of experience."[20] Irrespectively of the level of analysis (individual versus collective learning), learning starts with experience and follows a cyclical motion of concrete experience (action), observation and reflection, formation of abstract concepts and generalisations, and testing implications of concepts in new situations.[21] New experiences act as triggers for learning processes in which these experiences are transformed into new knowledge.

Rebelo and Duarte Gomes[19] claim that future work on organisational learning should "develop cumulative empirical research centred on organizational aspects or variables related to learning in the organizational context instead of persisting in promoting general models of what a learning organization should be like." In the latest, so-called "second stage"[19] of research on organisational learning, researchers tend to search for moderating and mediating variables to better explain learning on organisational level. Contributing to this ongoing research progress, this paper raises the fundamental question 'what role do needs play in organisational learning processes?'. This has not been tackled yet, even though it could shed light on possible drives that cause us to learn and change organisational reality.

It has been argued that addressing needs is an effective approach to guide organisational change[22], increase employees' well-being[23] and support decision making.[24] Particularly, it has been shown that the consideration of needs is important for innovation processes and fosters their results.[25,26,4,7,2,8]

Focusing on the outcome of organisational learning, we could hypothesise that a consideration of needs is beneficial in at least two aspects. First, organisational learning embracing the identification and implementation of needs may generally lead to better results. When organisations engage in such processes they reveal and get acquainted with what is necessary for meeting an end, i.e. reaching a goal or fulfilling a purpose. This is a prerequisite (though, not a prescription) for taking effective actions and, thus, meeting an end. For instance, organisations are well advised to learn about what their customers need and take actions, e.g. innovate, accordingly.[27] Second, a specific potentiality lies in the basic distinction between needs and the means of satisfaction (satisfiers) which can be found throughout the literature (e.g.[28,11,7,29,30,31,32,33]). A need can be satisfied in different ways. However, the potentiality this one-to-many relation implies has received little attention (except e.g.[7]). Identifying and developing knowledge related to needs helps to reveal the motivational forces of behaviour and, most essentially, enables organisations to incorporate this knowledge into organisational learning processes, such as innovation, strategy or vision development processes. This allows for developing alternative need satisfying strategies, which could enhance conventional decision making, which starts and remains on the satisfier level only. In order to illustrate this potentiality, I highlight the principle of equifinality proposed in system theory.[34]

The concept of *equifinality* is rooted in the early biological work of Driesch on living organisms and was proposed as a principle in Von Bertalanffy[34]'s general system theory. It holds that in open systems, such as humans or organisations, the same final state (satisfaction of needs) may be reached from different initial conditions and by different means (satisfiers).[35] An equifinality configuration enables us to substitute one means by another. This yields the opportunity to choose among alternative means (satisfiers) if need satisfaction by a given means is not feasible.[36] Furthermore, Kruglanski et al.[37] argue that when the number of satisfiers available increases, one's dependence on a particular satisfier decreases, as there are appropriate alternatives to meet a given need at disposal. This can have a weakening effect on the commitment to a specific satisfier, which implies that if a group of people is supplied with a set of alternative satisfiers (either developed jointly or brought in by others), the individual's commitment to a particular one may decrease. Applying these arguments to the organisational learning context implies that there is no 'right' satisfier to a given need, but many ways that lead to need satisfaction. Possibly, there are many satisfiers, which are related to a given need. Thus, knowing the needs comprises the potential to find alternative ways of their satisfaction. This enables us, for instance, to escape organisational situations that are characterised by conflicts on the satisfier level or even stand-offs.

3. Literature Review

The concept of need is a fuzzy one and discussed in different fields. Consequently, the phenomenon lacks a common definition and, hence, its positioning relative to other concepts (e.g. wants, desires) is described non-uniformly.[38] However, there are several attempts to classify human needs on different levels and in various realms (for an overview see[39]). Derived from Taylor[40]'s early contribution revealing the very different basic linguistic features and expressions of the term 'need', I use Gasper[15]'s work as a reference framework for a literature review.

3.1. Notions of Need

Taylor[40] identifies four meanings of the term 'need' in ordinary language: Needs are (I) descriptive and explanatory for behaviour, (II) instrumental to reach a goal, thus, requisites for meeting a given end, (III) instrumental requirements by a prescriptive rule or law, and (IV) normative as justifying and prioritising requisites.

Derived from these, Gasper[15],[16],[17] argues that "the concept of need arises in three importantly different modes." (c.f.[13]):

1. Discussed in explanatory theories, needs are powerful underlying motives or drives. Needs become effective through wants or desires and drive behaviour.
2. Instrumental (or conditional) needs are requisites (or mere claims) for reaching a goal.
3. In normative theories, needs are strong normative claims as their constitutive objective is a normative priority. They are justified and prioritised necessities. Arguably, the third notion of needs is a subset of the second notion which covers any objective (goal).

Accordingly, this tripartition of meaning - explanatory, instrumental and normative - guides my transdisciplinary literature review on needs. In the next subsections, I point to selected theories adopting these different notions and refer to motivational psychology and heterodox economics (section 3.2), customer-related fields (design, innovation, consumer research) and needs assessment (section 3.3) as well as philosophy, social politics and normative economics (section 3.4).

3.2. Needs As Explanatory Drives for Behaviour

3.2.1. Psychology

Psychological need theories employ the first notion of needs.[16] Although several theories have been proposed (e.g.[41,10,9,42,43,44,45,46,47,48,49,50]), there is little consensus on how to define needs.[12,9] Basically, psychological theories consider needs as drives for action. Drive results from a disequilibrium, which causes compensating behaviour, i.e. satisfying needs. Needs either point to physiological or psychological shortcomings which have to be met (e.g.[41,51,52])

or to lacking qualities of experience that all humans thrive for (e.g.[9,53]). There were previous approaches to define needs (e.g.[46,54,47,55,56]), but it was not until the first proposal of Maslow[41]'s theory on human motivation for an evident awareness for human needs raising in economic theories.[57] Maslow argues that humans are motivated by goals they pursue rather than by animal-like instincts and proposes a set of needs, which are organised hierarchically by their level of prepotency and probability of appearance. Although this permits for some dynamics in the hierarchy (the individual's context has an effect on the satisfactory behaviour), the set of needs remains stable across individuals and contexts. This leads Chung[58] to the conclusion that "the simple concept of hierarchy does not do justice to the very involved, complex, and dynamic nature of human needs."

To sum up, psychological theories - some of the most prominent being Maslow[41]'s theory on human motivation, Alderfer[42]'s need hierarchy, or Deci[59],Deci and Ryan[60,9,61]'s Self-Determination Theory - propose final sets of basic psychological and/or physiological human needs and argue that their fulfilment is likely to enhance the person's health and well-being.[62,41,10,42,9] Needs are universal and apply to all individuals in any culture at any given point in time. However, this claim was weakened[61] and could only be partially confirmed empirically[63]. The claim for universality reaches its "limits when [it] faces with the remarkable variety of cultures and the reality of people as culturally moulded, thinking decision-makers"[16].

3.2.2. Heterodox Economics

The paradigm shift from a supply-based explanation of value and prices to a demand-based explanation requires an economic theory on demand to explain the individual's behaviour. This led heterodox economic theories to adopt concepts like wants, needs, and preferences as explanatory variables for consumer behaviour[64] which resulted in a progressive 'psychologisation' of the concept of utility in these theories (for an overview see[65]).

In hierarchical choice theories (for an overview see[66]), hierarchically organised preferences represent a reasonable system of consumer choice.[64,67] In contrast to neoclassical economics, which views all needs as equally important, demand depends on needs which are not equal; some needs are predominant and have to be met earlier than others.[68,69] Menger argues accordingly: "Thus if economizing men must choose between a satisfaction of a need on which the maintenance of their lives depends and another on which merely a greater or less degree of well-being is dependent, they will usually prefer the former."[33]

Accounting for this, the humanistic approach to economics by Lutz and Lux[69] is a direct response to Maslow. It criticises neoclassical theories and proposes an alternative theory based on Maslow[41]'s motivation theory.[68] Similarly, Post Keynesian consumer theory holds that consumers do not act rationally, but are influenced by their needs.[70]

Forming the basis for the Austrian school of economics, Menger argues that human beings are needful by their nature. The purpose of economic activity is the satisfaction of human needs. Consequently, economic activity takes place at the intersection between needs and the availability of goods potentially able to satisfy them.[33] Putting forward a demand-based approach, the value of goods is not determined by their production costs, but defined by the importance of the individual's need(s) these goods are able to satisfy; importance is defined as the current level of need satisfaction and reflected by the diminishing marginal utility function.[71,33]

Menger classifies needs into two the categories. Food, clothing, and shelter are considered as basic needs, whereas transport and entertainment are secondary needs. Additionally, he proposes four necessary conditions of something being a good: "1. A human need. 2. Such properties as render the thing capable of being brought into a causal connection with the satisfaction of this need. 3. Human knowledge of this causal connection. 4. Command of the thing sufficient to direct it to the satisfaction of the need."[33]

Menger's focus on subjective needs and preferences was a paradigm shift and reinforces the law of diminishing marginal utility.[72] Although human needs once occupied a significant position in consumer economics and contributed to the paradigm shift towards demand-based theories, newer approaches focus on rationality, cognitive abilities, and (general) preferences; these seem to be sufficient to explain economic behaviour.[71]

3.3. Needs As Instrumental Claims

The notion of needs as instrumental requisites for meeting a given goal (e.g. customer satisfaction[73]) comprises customer-related and market-related fields, such as innovation and product design[26,5,74,75], consumer research[76,2,77] and marketing (for summaries see[78,74,2,79]). Scholars in these fields agree upon the importance of the 'voice of the customer'[80], i.e. the customer needs, as an essential input for corporate processes[24]. To uncover and address the (often

unexpressed) customer needs is a crucial ingredient for a successful and innovative product.[81,82,83,4,2,27] Several approaches to incorporate the 'voice of the customer' into product development and innovation have been proposed (e.g. empathic design[84], user-centered design[74,85,86,87], outcome-driven innovation[8], problem solving[88]; for an overview see[89]).

Commonly, needs are distinguished from solutions.[2,26,90,7] While needs are stable over time, solutions are subject to short-term changes (e.g. technological advancements). As a consequence, a focus on needs could serve as a guideline and avoids a too early insistence on a concrete solution.[91,92,7] In this vein, the "needfinding" approach by Patnaik and Becker[7],Faste[83] describes a specific method to uncover customers' needs and has been used in different (large-scale) projects (e.g.[93,94,91,95]). Based on a distinction between needs and solutions, they call for an emphasis on needs rather than on concrete solution in innovation processes because of several reasons. First, "needs last longer than any specific solution"[7]. Needs are stable over time, whereas concrete solutions addressing needs are dependent on the temporal context. Second, needs guide actions and provide a roadmap for further product development towards the satisfaction of the needs. In this sense, the articulation of needs profoundly affects these development processes. And third, a focus on needs "keeps all possible solutions open for consideration and avoids prematurely limiting possibilities."[7] This impressively reflects the potentiality explicit needs have compared to instances of solutions (satisfiers) to these needs.[91]

Similarly, Von Hippel and Von Krogh[88] build upon this dichotomy and claim that needs and solutions are often discovered simultaneously in informal problem solving tasks. The discovery of a solution triggers an assessment of potential needs which might be satisfied by the particular solution. As a result, "viable need-solution pairs" emerge, which reflect a one-to-one relation between a solution and an associated need.

However, this and other approaches lack a precise definition of needs clearly distinguishing them from customer wants, requirements and related concepts[74,96,22] (for an overview see[89]). As a consequence, organisations have difficulties in understanding what their customers need.[73,74] This reinforces a necessity to find a clear line between needs and non-need claims to account for their different normative significance.

In organisational practice, the so called needs assessment (or discrepancy assessment) approach likewise adopts an instrumental notion of needs.[97,92,98,99] Needs assessment is an organisational process to identify and prioritise needs. Its outcome informs need-based decisions, the allocation of resources, and the implementation of actions.[92] For this, Altschuld[92] defines needs as "a noun and stand[ing] for the measured discrepancy or gap between two conditions - the 'what should be' or desired status of an entity and the 'what is' or its current status." This definition refers to a gap which has to be necessarily 'filled' in order to reach the desired state of affairs. Since the gap (need) is defined by a fixed desired state and a given (not satisfying) state (both on a concrete realisation level, i.e. referring to satisfiers), this approach does not allow for finding alternative solutions; there is only one solution (desired state) to target at.

3.4. Needs As Normative and Existentially Important Necessities

3.4.1. Philosophy

The third notion of needs identified by Gasper[15],[16] addresses needs as normative necessities. Normative need claims are based on an evaluation of the objectives (ends) underlying a need (Pu). A need is normative, as opposed to being merely instrumental, when the (normative) claim *'A has a need for N in order to Pu'* implies that N is necessary for A, A cannot do without N and not having N seriously threatens A.[100] A need is essentially instrumental (conditional) and involves necessity for an end (Pu): the need for N does only exist iff Pu exists, irrespectively of what Pu is, and Pu inevitable requires N.[101]

However, meeting these two conditions does not entail that the need qualifies as an existential need. Philosophy is dealing with the question what counts as an existential need. This is an enhancement to the prior need notion, since it allows for setting priorities based on the moral importance of a need. "The moral importance of meeting or of not meeting a need must therefore be wholly derivative from the importance of the end [i.e. Pu, n/a] which gives rise to it."[101] To draw an existential conclusion whether A's need for N is predominant and should be prioritised over other needs and claims, we have to evaluate Pu's relation to A.[101,102,103] Based on the question 'what for?', namely Pu, we can distinguish between contingent and non-contingent ends (Pu). The former ones refer to Pu which could be, whereas the latter ones refer to Pu which must be.[104]

If the purpose (Pu) underlying a need is subject to our disposition, needs are merely conditional/instrumental with respect to a mutable Pu. Frankfurt[101] refers to needs derived from such contingent ends as "volitional needs",

Reader and Brock[104] call them "contingent needs". Since we can choose on *Pu*, i.e. the agent wants its needs, these instrumental needs are morally[101] not more important than other claims (e.g. wants). In contrast, existential needs depend on a purpose which is unavoidably and uncontrollable for the agent. Frankfurt[101] refers to these needs as "non-volitional needs", Reader and Brock[104] call them "non-contingent needs". We can conclude that the need statement is existential or morally important[101], as opposed to purely instrumental, when it implies not only that *N* is necessary for *Pu*, but also that *Pu* is unavoidably and uncontrollable for *A* and not having *N* threatens *A* in a serious way. Thus, to meet *Pu* is non-contingent for *A* and therefore the need is existential.[100]

If *Pu* refers to existential fundamentals in life and *N* is a necessity for it, *Pu* is a non-contingent purpose, and thus, non-contingent needs are derived. Then, these needs appear existential since *Pu* is unavoidably[32,28,105] and are called differently in literature: "basic needs"[106], "fundamental needs"[13],"morally important needs"[32], "categorical or absolute needs"[14], "course-of-life needs"[107], or "constitutive needs"[108]. Psychologists commonly regard these needs as fundamental human. However, what counts as fundamental, i.e. existential, is unclear. While Thomson[13] suggests basic needs which aim at survival or minimal subsistence of the needful entity, others offer alternatives for non-contingent *Pu*s (non-contingent ends) (for overviews see[16,104]), including existence or life[104], agency[32,31], health and autonomy[106], flourishing[109] or the avoidance of harm[14,13,101] as well as autopoietic conditions of living systems[110,111]. All these are possibly the most fundamental ends to the agent (*Pu*) and are therefore of existential nature.

However, they limit the existential needs to a very few 'basic' needs. In the same vein, Schuppert[102] concludes that "basic need-claims are extremely limited in scope, as they merely specify the most elementary requirements for the prolonged existence and minimal agency of a human being."

To sum up, in philosophy needs are necessities relative (instrumental or conditional) to an end. Their status of being an existential need, in contrast to a need or a want, has to be evaluated in terms of the consequences of non-satisfaction, thus, the relevance of the end. Therefore, scholars propose several candidate ends of needs to define what existentially important needs are. As a consequence, lines between wants or desires, needs and existential needs have been established.

3.4.2. Social Politics and Normative Economics

Philosophical approaches to needs are typically linked to discourses in politics[105] and economics[30] which deal with the fair allocation of scarce resources and (ecologically) sustainable development[112,28,11,113,114]. Human need theories give rise to normative concepts, such as quality of life or happiness.[115]

In the realm of social politics, normative needs are described as objective and entail historical, social and political aspects. Theories adopting this notion of needs claim to extend the explanatory repertoire of economic behaviour beyond the paradigm of the 'economic man'.[116,117] Additionally, they aim to structure, rationalise and humanise policy prioritisation and serve as an alternative evaluation framework for economic development.[15,118]

Several alternative theories on normative needs have emerged, which organise final lists of (basic) needs differently: For instance, Hamilton[119,118,103] defines three kinds of needs: (I) vital needs, (II) agency needs, and (III) particular social needs. Alternatively, Bradshaw[120] identifies four distinct need categories: (I) normative needs, (II) comparative needs, (III) expressed needs, and (IV) felt needs. Doyal and Gough[31] propose only two basic human needs: the need for health and the need for autonomy. These are met through the satisfaction of a set of universal intermediate needs. Although the two basic needs are absolute, the theory accounts for local contexts by recognising that in different social and geographic environments the intermediate needs can be satisfied in different ways (e.g. the need for shelter is differently satisfied according to climatic conditions).

More radically, Max-Neef et al.[28],Max-Neef[11] claim to reconsider the concept of poverty which must not be exclusively defined in monetary terms; rather, having some needs not satisfied reveals poverty. Hence, community development should not only be used to raise monetary wealth, but should focus on the human being holistically. The "human scale development" model has been "used as a framework to analyse human behaviour and improve people's quality of life in developing countries."[121]According to Max-Neef et al.[28],Max-Neef[11], fundamental human needs are finite, few and classifiable. They are stable across different cultures and historical periods. The finite number of needs (subsistence, protection, affection, understanding, participation, idleness, creation, identity, freedom) has to be satisfied on four dimensions (being, having, doing, interacting). At their intersection satisfiers emerge which are, unlike fundamental needs, culturally determined and, thus, might be different in various cultural contexts and historical periods. They are "particular means by which different societies and cultures aim to realize their needs."[122]

4. Findings from the Literature Review: Issues and Shortcomings for Organisational Learning

After having reviewed relevant fields dealing with the concept of need in relation to the three notions of needs identified, I now evaluate these insights in view of the intended adoption for organisational learning. How could needs be used to enhance organisational learning processes and what could be shortcomings?

The results of the literature review reinforce Taylor[40]'s conclusion that there is no consensus on the notion of 'needs' (also[38]), even in a particular field different understandings have emerged. Basically, we can outline this heterogeneity by the following dimensions (an extension of[22]):

- Needs versus satisfiers
- Needs versus wants and desires
- 'Need' as a noun versus a verb
- Absolute versus conditional/instrumental needs
- Contextual versus universal, i.e. dynamic versus stable, needs
- Needful entities: Humans versus non-humans

In the psychological tradition and particular economic theories, needs are explanatory for human behaviour. In general, psychological theories treat needs as absolute and finite motivational forces. Needs are stable over time and contexts. So, if we are about to introduce the concept of need into the field of organisational learning, straightly adopting psychological theories is likely to fail. This is due to several reasons: First, they do not account for other needful agents than humans. Thus, conceptualising needs of organisations would contradict their basic assumption. Second, motivation theories are universal, they do not account for contextual differences and other dynamical factors, such as time. Kesebir et al.[123] argue that a theory of needs should "allow for individual and cultural variations in specific pathways and contents. Human reality is full of individual and cultural variations, and a theory of human needs should capture this complexity." (also[124,125]) Third, the abstraction level of need categories is high, needs are described too broadly and are therefore of little use for guiding concrete actions. They can only account for very general and abstract behaviour patterns. Nevertheless, they could be used to cluster and, as one possible way, to prioritise contextual needs (c.f.[24]). However, the psychological understanding of needs as being able to set something in motion seems appealing and shall be adopted in this paper.

Customer-related fields (as well as needs assessment) adopt needs as instrumental claims or necessities and highlight their importance for the development of new products and services. They further adopt a dichotomy between needs (of the customer) and satisfiers (offered by the company). However, these fields lack a sound distinction between what their customers necessarily need and what they want, i.e. desires versus wants. Thus, due to a lack of a clear distinction, a prioritisation based on the importance of customer claims is hardly possible. Nevertheless, if we want to establish a theory for organisational learning which focuses on needs rather than on existentially less important demands and enables to set priorities and guides actions, we have to enable people to crystallise necessities from what they are demanding.

Needs assessment (or discrepancy assessment)[92,99,98,97] is the only prominent approach to need-based decision making in the organisational context. This approach follows a straight measurement of 'what is' and 'what should be', which is in line with traditional managerial practice. However, this approach relies on the assumption that there is agreement on 'what should be' in an organisation. Consequently, it does not employ the concept of need as an inclusive starting point for the principle of equifinality (combined with a certain type of knowledge) to become effective, i.e. realising alternative strategies. However, this is the key argument I opt for in this paper.

Philosophers offer a structurally clear definition of needs which helps to discriminate them from other claims. This has been applied in political and economic theories by shifting the focus on normative attributions of needs. The philosophical argument is also in line with customer-related fields, but extends their understanding of needs. It shows why decision making should be based on assessing existentially important needs rather than wants or (less important) needs. However, in order to adopt these approaches for organisational learning practice, an ontology of needs and satisfiers has to be developed which defines their relation and stresses the potentiality underlying their relation.

5. Putting It All Together: Clarifying the Concept of Need for Organisational Learning

Based on these considerations, I synthesise the findings, adapt them to the field of organisational learning and develop an ontology of needs and satisfiers which shall serve understanding for organisational learning processes. Although this ontological framework is theoretical in nature, its genesis is significantly based on empirical experiences. In the past five years, we conducted several organisational learning processes with organisations operating in different domains, including companies, schools, the chamber of commerce and communities. The projects had different scopes, including change processes, community development, strategy or vision development.[126,127,128,129,130]

In order to be applicable in a variety of practices, a conceptualisation of needs to enhance organisational learning processes should synthesise the different perspectives and remain general in nature. Accounting for the importance of needs, the phenomenon has to be precisely defined in order to address the essentials in organisational life and to allow for sustainable innovation to occur. In line with the psychological discourse, needs are considered as triggers for action and learning. They count as motivating factors towards change in organisational settings. However, they are not limited to a few; rather, needs may emerge as a contingency of the context or from a constructive act of the needful agent itself.[101] Consequently, needs are structurally understood as proposed by philosophy; they are necessarily linked to an end. This end might be as specifically defined as a goal or as broadly defined as, for example, avoidance of harm, flourishing or personal growth. Needs are morally justified by their ends and as such distinct from wants or wished. This allows an organisation to take an essential focus on what people (should) do and why they (should) do it.

A focus on needs allows an organisation to fundamentally reflect on its learning behaviour. Additionally, combined with the principle of equifinality, it allows for activating the potentiality of needs and to find alternative ways of satisfying them.

The formalisation of these ideas will be the aim of the reminder of this paper.

The principle of equifinality is the core of my argument why organisations should focus on needs first. It holds that in an open system a given end state can be reached in different ways. So, a distinction between needs and means of need satisfaction, i.e. satisfiers, seems to be promising. A given need can be met by different satisfiers. Being aware of this relation and the need(s) potentially reveals a way out of conflicting situations and serves as a starting point for collectively finding alternative solutions and strategies, i.e. satisfiers. In order to take advantage of the principle of equifinality, we have to ontologically distinguish between needs and satisfiers and need to have a clear understanding of what they are and how they relate to each other. I assume that "a satisfier can contribute to fulfilling several needs; a need/lack can often be met by many alternative satisfiers; and not all proposed satisfiers are effective."[15] (c.f.[94,96,4])

A need is not an end in itself. It is an "indispensable condition"[131] that depends on what has been called goal, logos, meaning, intention, "further end"[131], "private utility and social valuation"[115], "vocation"[132], motive, paradigm or causa finalis and to which I refer as purpose as a umbrella term. The purpose has the potency to cause (a) need(s), in turn, needs are conditional. This purpose may be inherent to the nature of the needful agent (e.g. existence, eudaimonia, wisdom, meaning[123]) or result from a deliberate act (e.g. profit-oriented paradigm), which reflects the differentiation of "true needs" versus "artificial needs" in moral philosophy.[101] In most cases the purpose is taken for granted (e.g. 'living a fulfilled life', 'making profits'). Though, having and following a purpose does not necessarily entail being aware of it.

Furthermore, we have to distinguish needs from other claims, such as wants or wishes. In daily life, when we are using the noun or verb 'need' in contrast to 'want' we attribute existential importance to the former.[131] However, this does not release us from the liability to effectively discriminate needs from mere wants or wants disguised as needs.

Let us consider the statement *'Al has a need for nutrition, i.e. he needs something to eat'*. It is to a daily understanding not only that Al wants to have something to eat, but he must have it. Thereby, we attribute categorical power to this claim. In contrast, let us also consider the statement *'Al has a need for luxury, i.e. he needs a sports car'*. We feel a difference between these two statements, although they are worded alike. However, without making any reference to a purpose, we cannot evaluate whether these statements point to necessities regarding a corresponding purpose. As a result, these statements formally fail to be needs and remain pure claims. However, this view is primarily theoretical, because we can usually either assume or do even know the purpose underlying these sentences. In view of this purpose, we can judge whether these statements are necessary for accomplishing the purpose or not. Importantly, the purpose might be unavoidably for the agent (e.g. innate to human nature) or might be subject to its disposition (e.g. a goal).

Consequently, I distinguish between two types of purposes:

- In the first case, the purpose is non-contingent and unavoidably. The agent can neither avoid nor control this purpose. This refers to very basic or existential ends (purposes) of needs, such as existence or life[104], autopoiesis[111,110,133], agency[32,31], health and autonomy[106], flourishing[109] or the avoidance of harm[14,13,101]. Needs related to these purposes are most basic and existential for an agent. Thus, they enjoy priority over others. I refer to these purposes as *first-order purposes* and to the resulting needs as *first-order needs*, accordingly.
- In the second case, the purpose is to be set by the agent; the agent desires this end (purpose) and could do otherwise. Resulting needs are necessities for these contingent ends, indeed, but they are not unavoidably as their purpose is neither. As a consequence, I refer to these ends as *second-order purposes* and to the resulting needs as *second-order needs*, accordingly. Second-order needs follow the same structure; they only differ in terms of their underlying purposes which are mutable.

Consequently, following an existential argument, first-order needs have priority over second-order needs in case of contraction. However, to account for both types of needs, the ontology facilitates the consideration of a variety of needs of different qualities; they may depend on a sheer goal (second-order purpose) or an existential end (first-order purpose).

Let us get back to Al and evaluate whether the two statements qualify as first-order needs. In so doing, I adopt Frankfurt[101]'s moral judgment approach and equal the purpose to avoidance of harm. Avoidance of harm is most fundamental for humans and unalterable, therefore it is a first-order purpose. In order to approximate this difference between the two statements, I focus on the consequences of not meeting the claim. Nutrition is a necessity for avoiding harm, in turn, not being nourished causes serious harm. The first statement qualifies as a first-order need, since it is a necessity to avoid harm and the avoidance of harm is existential for Al. Having a sports car is not a necessity for avoiding harm, in turn, not having such a car does normally not cause serious harm (although it may cause disappointment). Therefore, it does not qualify as a first-order need, although it might be a second-order need, if the second-order purpose is defined as, for instance, 'becoming a race driver'.

While the non-satisfaction of second-order needs may only trigger a sensation of disappointment, the non-satisfaction of first-order needs has a serious and unavoidable impact on the needful agent. Therefore, a distinction between first-order and second-order needs may serve as a distinguishing feature between prioritised and subordinated needs. For organisational learning, we are well advised to follow this argument and define needs accordingly. First-order needs are to be prioritised over second-order needs or even wants as the non-satisfaction of the former endangers the organisation seriously. Thus, it is reasonable to address first-order needs first, since they are existential, i.e. musts. In contrast, non-need claims (wants or wishes) either do not contribute to a purpose or are not necessary for the purpose (they are nice to have). As such, they do not endanger the agent since their non-satisfaction has no serious effect on the organisation and/or its members. Or as Frankfurt[101] puts it: Satisfying needs "aims at avoiding harm, while [satisfying wants, n/a] aims only at providing unneeded benefits."

It is not the purpose of this paper to enter the discussion on taxonomies of 'basic' or 'fundamental' needs or even to presume to judge which of the well tested theories (e.g. [134,51,135,136]) is right. This is under ongoing discussion in psychology (e.g. [12]). Considering the contradictory theories of human needs identified in literature, I remain sceptical on the claim of exclusivity and completeness of these theories and attribute this to the positivistic nature of psychology and agree with Jost[23] who concludes that "any classification of needs will be arbitrary to some degree" (same argument by [16]). In a similar vein, cultural scientists argue that a final and universal list of human needs is "potentially oppressive because such an account could be used as ground for criticizing the practices of other cultures"[107]. Rather, I take up a relativistic perspective[16] and account for the singularities of the various needful entities. Consequently, this paper eclipses the idea of absolute and universal needs and attributes these theories, if at all, structuring functions on a practical level. By accounting for second-order needs, I adopt Frankfurt[101]'s idea of "volitional needs" which holds that there are also needs which exist "because there is something else that a person wants, then to that extent the need depend upon the person's will." Consequently, I consider both necessities as needs. Irrespectively of their genesis, needs push the agent towards satisfaction by their nature. In the same vein, James[137] argues that "any desire [or need, n/a] is imperative to the extent of its amount; it makes itself valid by the fact that it exists at all". They unfold potentiality towards their satisfaction by the fact of their existence and "create tense energy to engage in behavior ca-

pable of reducing the built-up tension"[138]. In any case, needs are necessities for a given purpose and imply discontent when unmet. As a consequence, I avoid a discussion on "natural" versus "artificial" needs[101] which seems to be of little use for the paper's purpose.

To sum up, I define a need as an agent's conditional necessity depending on a purpose. Needs can be divided into two categories: First-order needs are normatively prioritised and categorical since they depend on a first-order purpose which is a non-volitional and unavoidable purpose inherent to the agent, i.e. existential end (e.g. existence, avoidance of harm). Second-order needs depend on a volitional and mutable second-order purpose and are therefore of inferior importance. Needs are not themselves the means of satisfaction. These means to which I refer as satisfiers are ontologically different and independent of the needful agent (however, they may themselves be needful agents).[106,32,31,28,11,7,24] Two ontological spheres to which I refer as the object and agent sphere reflect this dichotomy. While satisfiers are rooted in the object sphere, needs originate from the agent sphere. In order to link these two spheres, a (conscious) process of transition is necessary which is neither a satisfier nor a need. I refer to this process as reasoning. Through reasoning needs gain motivational power towards their satisfaction. Further, while reasoning we combine the two spheres by (conscious) judgement about the object's potentiality of need satisfaction. In fact, reasoning it the process by which a potential satisfier becomes an effective satisfier. In contrast to psychological theories, this definition of need does not exclude organisations or other entities from having needs (therefore I refer to the 'agent's need', highlighting a variety of needful entities; c.f.[40]).

In short, wants fail to be needs because they are not conditionally linked to a purpose; needs are necessities towards a purpose. Non-volitional and immutable purposes are first-order purposes; they result in first-order needs. All other purposes which are voluntary and alterable are second-order purposes; they result in second-order needs. First-order needs are essential for the agent and therefore enjoy priority over other needs. In order to illustrate this, some examples are given in table 1.

Table 1. Examples of non-need claims, first-order needs, and second-order needs.

Statement - *'A has a need for N in order to P'*	Evaluation	Classification
'We have a need for financial solidity!'	Unclear whether the statement refers to a necessity, because *P* is not given.	Claim (wish or want)
'We have a need for financial solidity in order to become the most enjoyable employer.'	*P* is given, but *N* is (assumedly) not necessary for *P*.	Claim
'We have a need for financial solidity in order to become market leader.'	*P* is given; *N* is (assumedly) necessary for *P*; *P* is mutable and avoidable.	Second-order purpose Second-order need
'We have a need for financial solidity in order to survive (economically as an organisation).'	*P* is given; *N* is necessary for *P*; *P* is non-volitional and unavoidable.	First-order purpose First-order need

Formally defined, the ontology comprises eleven components which are illustrated in figure 1 and explained in more detail.

There are five main elements on three layers:

- Satisfier $\boxed{S}$:
  A satisfier (S) refers to a category of means sharing the same essence (E) to potentially satisfy a need (N). A satisfier may be (a description of) an artefact (e.g. product, service) or a behaviour (e.g. action, strategy). Since satisfiers are grounded in the object sphere, their description is limited to characteristics of the object sphere without making direct reference to the agent sphere, i.e. needs. Objects in this sphere exist independently of the needful agent and its needs. The most straight forward definition of a satisfier is given by Marx[139] (Marx terms it "commodity"): It is "an object outside of us, a thing that by its properties satisfies human needs of some sort or another." Categories of satisfiers (S) contain the essence (E) which subordinated instances of these categories ($S_{cont.}$) share.
  Example: Means of transportation
- Contextual satisfier $\boxed{S_{cont.}}$:
  A contextual satisfier ($S_{cont.}$) is an instance of a satisfier category (S). It is more concretely described and accounts for its specific context (Co) (e.g. technological possibilities; c.f. Bayus[2]'s argument on feasibility and

market dynamics). Contextual satisfiers share the same essence (E) with other instances of the same category of satisfiers (S). It is helpful to make an 'ontological step' from $S_{cont.}$ to S in order to understand the essence of the particular satisfier ($S_{cont.}$) and, thereby, to find alternatives within the same satisfier category (S).
Examples: Nuclear submarine, TGV train, propeller aircraft, foiling keelboat, red mini van car offering space for eight passengers, black 500-hp sports car, unicycle

- Reasoning $\boxed{R}$: [1]

Reasoning (R) refers to a (conscious) process that links the two spheres. In particular, it is the process of evaluating satisfiers (S or $S_{cont.}$) in regard to the agent's needs (N or $N_{cont.}$), i.e. the transition from one sphere to another. This is similar to what Norman[143] describes as the phenomenological approach of affordances which "result from the *mental interpretation* of things, based on our past knowledge and experience applied to our perception of the things about us." He argues that affordances are not mere opportunities for action, but perceived possibilities in an object world which point to potentials for utilisation. This idea was adopted by many industrial designers.[144] This process depends on agency (A), is motivated by a need (N or $N_{cont.}$) and controlled by the agent's preferences (Pr) and the contexts (Ca and Co). This includes McLeod[1]'s notion of desires and his argument that a need manifests itself in a desire which we are aware of. By means of this conscious desire, a need gains causal power towards its satisfaction. Thus, desires are mental states and motivational forces for action.[141] While reasoning, individuals assess their preferences and choose among potential satisfiers.[115] Personal preferences as well as contextual circumstances control this interplay of object and agent sphere and manifest in the agent's rationale. Actual preferences are rooted in the agent sphere, but are, at the same time, influenced by the information an agent has about the object sphere (range of potential satisfiers). Thus, reasoning encompasses the evaluation whether a potential satisfier qualifies as an effective satisfier, i.e. matching of needs with the possibilities offered by artefacts of the object sphere (e.g. technology). When a satisfier is effectively satisfying a need, we may have a feeling of "joy"[50].
Example: Given that an agent has a need for mobility, it mainly depends on the current contexts and its preferences whether it chooses the mini van car over the nuclear submarine.

- Need $\boxed{N}$:

Needs (N) refer to general categories of conditional necessities depending on a purpose (Pu). Needs are conditional[101] or instrumental[40] (and normative) because they refer to a purpose (a given end, Pu). Needs can be divided into two categories: *First-order needs* are normatively prioritised and categorical since they depend on a *first-order purpose* which is a non-volitional and unavoidably purpose (Pu) given by the agent's nature (e.g. existence, avoidance of harm). They are categorical, because there is no way to avoid serious consequences when they are not meet.[101] *Second-order needs* depend on a volitional and mutable *second-order purpose* (Pu) and are therefore of inferior existential importance. Different to what I call contextual needs ($N_{cont.}$), these need categories (N) are quite general and stable across contexts (c.f. psychological theories). Needs are grounded in the agent sphere, thus dependent on the needful agent. In order to take advantage of the potentiality of alternative need satisfaction (equifinality), needs should not make any reference to their (possible) satisfiers; otherwise the satisfaction is limited to the object in focus. This is usually inevitable in the use of 'need' as a noun: For example, *'Al needs a car'* limits the range of potential satisfiers to one, namely the car. This persuades that there solely exists one satisfaction strategy and cuts options.[22] In contrast, the statement *'Al has a need for mobility'*, in which 'need' is used as a noun, empowers the principle of equifinality. Thus, by carefully formulating a need statement, i.e. using 'need' as a noun, we potentially allow for alternative need satisfaction. Needs (N) are described on a level of abstraction which allows for finding commonality among many agents (e.g. basic human needs) and leaves latitude for contextual differences.
Example: Need for mobility

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[1] We previously used the term 'desire' to refer to the agent's mental and motivational state by which it bridges the two spheres.[140,128] However, only few authors[141,1,13] use the term in the same sense and competing theories apply the term inconsistently and incomparably. For example, Frankfurt[101] refers to the conscious motivation for a need, while Wiggins and Dermen[14],Wiggins[142] use desire as a synonym for want, i.e. a non-needful claim. As a consequence, a person might have a desire for something without needing it. From now on, I use the term 'reasoning' to emphasise the process-like nature of this element.

- Contextual need $\boxed{N_{cont.}}$:
  A contextual need ($N_{cont.}$) is a need instance of a need category (N). Contextual needs ($N_{cont.}$) are dynamical; that means they take into account the agent's context (Ca), i.e. the state of the system/agent including time. As a result, contextual needs are less abstract by nature and are presumably not valid for other domains (systems), under different circumstances or at other times (Ca). They can be reduced to more broader and, thus, more abstract needs (need categories) (N); thereby its informative context disappears. Contextual needs are described on an abstraction level that enables an agent to directly take actions to satisfy them. They are formulated concretely enough to guide the organisational learning process and decision making.
  Example: Need for travelling with my family across Europe

The following variables affect the main elements:

- Agency $\boxed{A}$:
  Agency refers to the capacity to perform intentional actions. This capacity in inherent to humans; non-human agents (e.g. organisations) can become effective through their representatives' actions.
- Essence $\boxed{E}$:
  I roughly adopt an Aristotelian view and define essence (E) as the basic nature of a thing and refer to the attributes that make a thing what it most fundamentally is. Without these it loses its identity. By means of the essence, it is possible to abstract contextual satisfiers ($S_{cont.}$) to a category of satisfiers (S).
  Example: Owning a car, taking the TGV train or renting a keelboat are distinct instances of means of transportation; they sharing the same essence.
- Context $\boxed{Ca}$ and $\boxed{Co}$:
  Context refers to enabling or restricting circumstances of either the object sphere (Co) or the agent sphere (Ca), such as social and technological conditions. The context variable accounts for the continually changing state of the agent (and the system it is in) (Ca) or the object sphere (Co) (e.g. technology) and reflects the current state of affairs at a given point in time. The context is necessary to deeply understand a need[26] and a satisfier likewise.
- Preferences $\boxed{Pr}$:
  Preferences (Pr) refer to the agent's attitudes towards satisfiers and needs. They reflect the individual's personality crucially influencing unconscious and conscious processes, such as reasoning (R), i.e. developing a rationale for choice.[145]
- Purpose $\boxed{Pu}$:
  Purpose refers to the end on which a need conditionally depends. It refers to what has been called goal, logos, meaning, intention, "further end"[131], "private utility and social valuation"[115], "vocation"[132], motive, paradigm or causa finalis. The purpose has the causal power to establish a need. In most cases, this is taken for granted and manifests itself in assumptions, such as 'living a fulfilled life' or 'making profits'. Following a purpose does not necessarily entail being aware of it.
  Against the instrumental argument that Pu is always required for formulating a need, one could claim that the purpose of existence is the most fundamental one and, therefore, a statement like *'A has a need for N'* (and N being absolutely required for A's existence) does not require any further justification like *'... in order to Pu'* (Pu referring to existence). However, existence is a first-order purpose and the single most important condition for having a need (being a needful entity); if A does not exist, there would be no one who could have a need for S. I agree with Frankfurt[101] who argues that "all necessities [i.e. needs n/a] are [...] conditional: nothing is needed except in virtue of being an indispensable condition for the attainment of a certain end." This end (Pu, existence) is unavoidably, the resulting needs are first-order needs ("non-volitional needs"[101]).

By defining needs this way, I account for the three major approaches to needs which guided my literature research[15,16,17]: As motivational psychology suggests, needs gain motivational power towards their satisfaction through reasoning. As philosophy suggests, needs are different from satisfiers and distinct from wants. Based on an existential threshold, first-order needs are distinct from existentially non-important second-order needs. Though, this distinction is not intended to restrict considerations to 'basic' needs only (e.g. 'basic need claims' in political discourse). Rather,
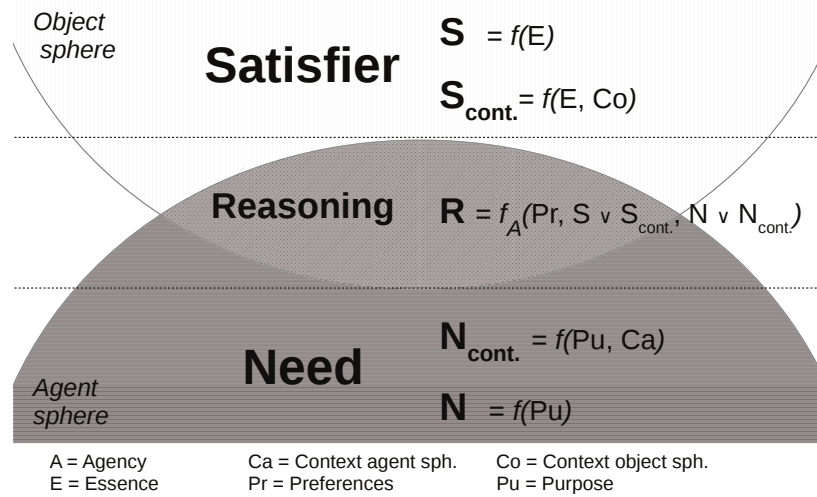
Fig. 1. Ontology of needs and satisfiers

it should also allow for considering second-order needs based on 'higher' purposes (second-order purpose), which we find in organisational practice. Nevertheless, the boundary to non-need claims (wants, desires) remains unimpaired.

From an empirical point of view, the ontology could be illustrated along a continuum of the visibility of its main elements. In daily life, satisfiers are the most visible and tangible phenomenon and people are easily aware of them. Arguably, this could be the reason why people reflexively answer in terms of satisfiers when asked about their needs. Since it is not our daily routine to do so (except for situations like psychotherapy), it is more effortful to access the needs which underlie satisfiers. In addition, the principle of equifinality is inherent to this ontology. In order to depict this, the relation between (contextual) needs (N or $N_{cont.}$) and (contextual) satisfiers (S or $S_{cont.}$) is a one-to-many relation and is established by reasoning (R). [2] Both features are illustrated in figure 2.
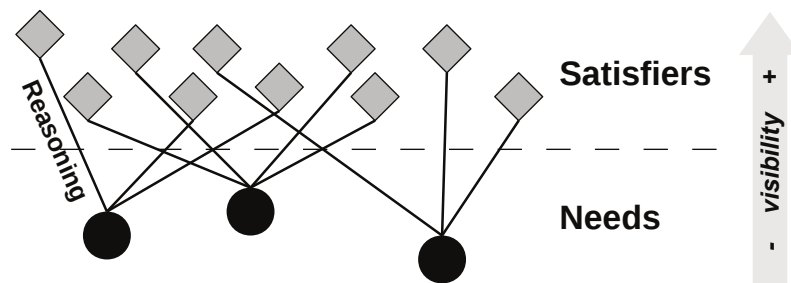

Fig. 2. The principle of equifinality applied to the ontology

Based on this conceptualisation, the following two questions may appear: (I) Can an organisation have needs? (II) If yes, can it act independently towards need satisfaction?

There are theoretically no objections to attribute needs to non-human entities, such as groups of people, organisations or societies (e.g. [39]). The organisation follows a purpose or goal (Pu) for which it has been established. The organisation's purpose (Pu) is (directly or indirectly) set by some agent different to the organisation and, more crucially, the linkage between agent and object sphere (R) requires agency (A). As a result, in order to 'move' towards need satisfaction (R), an organisation requires individuals having agency; this is ensured by its members. However, we

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[2] Admittedly, a given satisfier may serve the satisfaction of different needs and the relation should read as n:m. However, being aware of this, figure 2 shows the simplified illustration to highlight the principle of equifinality and its importance for my argument.

have to be aware that organisation members are needful and purposeful agents themselves. If the members' individual purposes (Pu) and (contextual) needs (N or $N_{cont.}$) diverge significantly, both agents may be seriously impaired (first-order purposes) or are at least frustrated (second-order purposes). Therefore, the answer to question (I) is yes, whereas to question (II) no, since the organisation depends on their representatives' agency and should have its organisation needs harmonised with those of its members.

6. Implications and Conclusion

The aim of this paper is to clarify the concept of need for organisational learning. I hypothesise that an explicit consideration of needs provides several advantages for organisational learning processes. First, although concrete proposals and ideas brought in may differ significantly, the underlying needs might be the same. Identifying these needs supposedly fosters a consensual morale within an organisation. Second, by developing new solutions and strategies based on the identified needs, organisation members may find alternative possibilities to fulfil their needs and open up for change. It potentially enables to find consensual, innovative and sustainable strategies and solutions.

By means of an ontological framework, I synthesise the three major notions of needs identified in literature - motivational force, instrumental necessity, normative necessity - in a way that allows organisations (I) to understand the motivational forces of certain behaviours and proposals and (II) exploit the potentiality inherent to the one-to-many relation between needs and satisfiers. I argue that this conceptual ontology has at least three implications. First, we have to be able to identify the needs to target at. Second, we have to know what means of need satisfaction exist and how they come about. And third, we have to be able to judge the specific potential of need satisfaction among the satisfier candidates. A proposal on how to address these implications from a knowledge perspective is described elsewhere.[146]

This conceptual paper lays the foundations for further empirical research which shall investigate, for instance, the effects a precedent identification of needs has on the organisational learning outcome. Further, it should yield an understanding of how we judge and decide on satisfiers, i.e. how we reconcile our needs with satisfiers and external restrictions (e.g. phenomenologically unboxing 'reasoning'). In addition, the impact of considering needs in group settings on collective decision making is highly relevant for this research. To explore this, research may focus on organisational settings which are characterised by conflicting interests, bounded rationality or even stand-offs (e.g. schools or communities). Do (shared) needs matter in theses settings?

If organisational learning towards needs is found to have a positive impact on the outcome (organisational performance), this conceptualisation could be used as a guiding framework for diverse organisational learning processes. The concept of need could then constitute an inclusive starting point for organisational change processes, which exploit the principle of equifinality, i.e. developing and realising alternative strategies. By a clear understanding of the concept of need and by implementing the principle of equifinality, existing methods to uncover needs (e.g.[128,140,7]) as well as need-based innovation (e.g.[147,148]) could be advanced and new methods to foster need-based organisational learning should be developed.

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Article B:

A Knowledge Perspective on Needs as a Foundation for Organisational Learning Processes

Kragulj, F. (2016). A Knowledge Perspective on Needs as a Foundation for Organisational Learning Processes. In E. Tomé (Ed.), *Proceedings of the International Conference Theory and Applications in the Knowledge Economy* (pp. 196-209). Aveiro, Portugal. ISBN 978-989-20-6806-0.

Eduardo Tomé (Editor)

Proceedings of the International Conference

Theory and Applications in the Knowledge Economy

TAKE 2016 – Aveiro, Portugal, 6 to 8 July 2016

Papers have been double-blind peer reviewed before final submission to the conference. Initially, paper abstracts were read and selected by the conference panel for submission as possible papers for the conference.

Many thanks to the reviewers who helped ensure the quality of the full papers.

A Knowledge Perspective on Needs as a Foundation for Organisational Learning Processes

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Abstract: Needs are crucial in organisational learning processes, but yet not formally conceptualised as a distinct type of knowledge. In this conceptual paper, I establish a knowledge perspective on needs and the transformation process from needs towards need satisfaction.

Based on an ontology clarifying the concept of need and its means of satisfaction, I introduce *need-based solution knowledge* consisting of three distinct capacities to act. I argue why these capacities should be made explicit in group settings and point at possible leverage points for organisational practice.

Keywords: organisational learning, needs, equifinality, capacity to act, epistemology

1 Introduction

Organisational learning can be seen as an unifying umbrella term for organisational adaptation which occurs as a function of new experiences (Argote & Miron-Spektor, 2011). A relevant variable in these adaptation processes are needs which govern behaviour and cause us to act. As psychology suggests, needs are motivational forces that set us in motion. Furthermore, several authors argue that being aware of needs has a considerable impact on (organisational) innovation (Bayus, 2008; Brouwer & Dorst, 2014; Ericson & Stahlbrost, 2006; Holt, 1976; Patnaik & Becker, 1999; Von Hippel & Von Krogh, 2016) and supports decision making (Patnaik, 2004).

However, being aware of our needs does not prescribe how to meet them. Needs are not the means of their satisfaction (satisfiers). Consequently, several theorists and practitioners draw a clear distinction between needs and satisfiers which reflects the potentiality of alternative need satisfaction (Braybrooke, 1998; Brock, 1998, 2005; Doyal & Gough, 1991; Max-Neef, Elizalde, Hopenhayn, & Sears, 1989; Max-Neef, 1992; Patnaik & Becker, 1999). In short, a given need can be satisfied in different ways. This dichotomy implies a one-to-many relation, which potentially extends the range of possible solutions.

Developing knowledge about needs, i.e. awareness of needs, and capacities to address them and judge a satisfier's potentiality appears to be crucial for organisational learning processes, such as innovation, strategy or vision development.

Although the importance of needs has been acknowledged by different fields including organisational studies, e.g. recently in organisational politics (Rosen, Ferris, Brown, Chen, & Yan, 2014), they have not been particularly introduced to the field of

organisational learning and knowledge-based management. Except our previous work (Kaiser, Fordinal, & Kragulj, 2014; Kaiser & Kragulj, in press; Kragulj, 2014), there is no theoretical approach synthesising the concepts of knowledge and need in the respective literature.

To address this gap, this conceptual paper aims at establishing a knowledge perspective on the relation between needs and satisfiers and defines a type of knowledge crucial for the transition from needs to satisfiers. This specific type of knowledge should yield the potential to exploit the one-to-many relation between needs and satisfiers and could facilitate the development of (alternative) need satisfying strategies.

Consequently, the research question is: *Given a dichotomy of needs and means of their satisfaction (satisfiers), how can knowledge crucial for the transition from needs to satisfiers be conceptualised in order to drive organisational learning?*

The remainder of this paper is structured as follows: First, I will introduce my conceptualisation of needs for the purpose of organisational learning. Second, I will establish a knowledge perspective to illuminate the transition from needs to need satisfaction and reflect on what knowledge is crucial for this process. Third, based on a case example, I will reveal leverage points to support these processes and hint at directions for further research.

2 The concept of need

The concept of need is discussed in different fields. Consequently, the phenomenon lacks a common definition. However, there are several attempts to classify human needs on different levels and in various fields (for an overview see McGregor, Camfield, & Woodcock, 2009).

The notion of needs arises in three importantly different modes (Gasper, 2005). Psychological theories discuss needs as powerful underlying motives or drives for action. Differently, needs as instrumental requisites for meeting a given goal (e.g. customer satisfaction; Goffin & Lemke, 2004) comprise customer-related and market-related fields, such as innovation and product design (Ericson, Bertoni, & Larsson, 2009; Ericson & Stahlbrost, 2006; Gkouskos, Normark, & Lundgren, 2014; Hyysalo, 2003), consumer research (Bayus, 2008; Kano, Seraku, Takahashi, & Tsuji, 1984; Pincus, 2004) and marketing (for summaries see Bayus, 2008; Hyysalo, 2003; Roberts, Dant, & Lim, 1990; Wagner & Hansen, 2004). Uncovering and addressing (often unexpressed) needs appears crucial when we want to create innovative and successful products (Bayus, 2008; Brouwer & Dorst, 2014; Faste, 1987; Goffin, Lemke, & Koners, 2010; Preece, Rogers, & Sharp, 2002; Von Hippel & Von Krogh, 2016; Von Hippel, 2001). And lastly, in normative theories proposed by philosophy or social politics and economics, needs are strong normative claims related to an objective of normative priority. Needs are justified and prioritised necessities. These fundamental human needs are finite, few and stable among different cultures and historical periods (Max-Neef et al., 1989; Max-Neef, 1992). Arguably, the third notion of needs is a subset of the second notion, which covers any objective (goal).

2.1 The role of needs in organisational learning

In organisational learning, adaptation happens as a function of new experiences. They get transformed into knowledge which subsequently informs organisational change (Argote, 2011). Although, it has been argued that addressing needs is an effective approach to guide organisational change (Watkins & Kavale, 2014), increase employees' well-being (Jost, 2014), support decision making (Patnaik, 2004) and foster innovation (Bayus, 2008; Brouwer & Dorst, 2014; Ericson & Stahlbrost, 2006; Holt, 1976; Patnaik & Becker, 1999; Ulwick, 2002), needs have not been considered explicitly in the context of organisational learning processes (except Kaiser, Feldhusen, & Fordinal, 2013; Kaiser, Fordinal, & Kragulj, 2014; Kaiser, Kragulj, Grisold, & Walser, 2016; Kaiser & Kragulj, in press).

It is reasonable to start such processes with a consideration of salient needs. Apart from revealing the motivation for our actions, a specific potentiality is inherent to the distinction between needs and the means of satisfaction (satisfiers). This dichotomy can be found throughout the literature (e.g. Braybrooke, 1998; Brock, 1998, 2005; Doyal & Gough, 1991; Max-Neef et al., 1989; Max-Neef, 1992; Patnaik & Becker, 1999). A need can be satisfied in different ways. This is reflected by the principle of equifinality which is derived from system theory (Von Bertalanffy, 1968) and holds that the same final state (satisfaction of needs) may be reached from different initial conditions and by different means (satisfiers). Different satisfiers can meet a given need (Kruglanski, Chernikova, Babush, Dugas, & Schumpe, 2015). An equifinality configuration enables us to substitute one satisfier by another. This allows for choosing among alternative satisfiers, if need satisfaction by a given means is not feasible (Kruglanski et al., 2002). This could enhance conventional decision making which starts and remains on the satisfier level only.

The principle of equifinality is the core of my argument why organisations should focus on needs first. Being aware of needs and exploiting this relation potentially reveals a way out of conflicting situations and serves as a starting point for collectively developing (alternative) solutions and strategies, i.e. satisfiers. Kruglanski, Pierro, & Sheveland (2011) argue that when the number of satisfiers available increases, one's dependence on a particular satisfier decreases, as there are appropriate alternatives to meet a given need at disposal. This can have a weakening effect on the commitment to a specific satisfier which implies that if a group of people is supplied with a set of alternative satisfiers (either developed jointly or brought in by others), the individual's commitment for a particular one may decrease.

2.2 An ontology of needs and satisfiers

For organisational learning, I propose an ontological framework and define a *need as an agent's conditional necessity depending on a purpose*. This purpose reflects an end, which may be inherent to the nature of the needful agent (e.g. existence, eudaimonia, wisdom, meaning, etc.; c.f. Kesebir, Graham, & Oishi, 2010) or result from a deliberate act (e.g. profit-oriented paradigm). Needs are not themselves the means of their satisfaction. These means, to which I refer to as satisfiers, are ontologically different and independent of the needful agent (however, they may themselves be needful agents) (Braybrooke, 1987; Brock, 1998; Doyal & Gough, 1991; Max-Neef et al., 1989; Max-Neef, 1992; Patnaik & Becker, 1999; Patnaik, 2004). Two ontological

spheres to which I refer as the object and agent sphere reflect this dichotomy. While satisfiers are rooted in the object sphere, needs originate from the agent sphere. In order to link these two spheres, a (conscious) process of transition is necessary, which is neither a satisfier nor a need. I refer to this process as reasoning. Through reasoning needs gain motivational power towards their satisfaction. Further, while reasoning we combine the two spheres by (conscious) judgement about the object's potentiality of need satisfaction. In fact, reasoning is the process through which a potential satisfier becomes an effective satisfier. In contrast to psychological theories, this definition of need does not exclude organisations or other entities from having needs (therefore, I am referring to the 'agent's need', highlighting a variety of needful entities; c.f. Taylor, 1959).

Formally defined, the ontology comprises eleven components, which are explained in more detail in Kragulj (2016). For the purpose of this paper, the ontology is simplified. Figure 1 depicts the three main elements on two spheres.
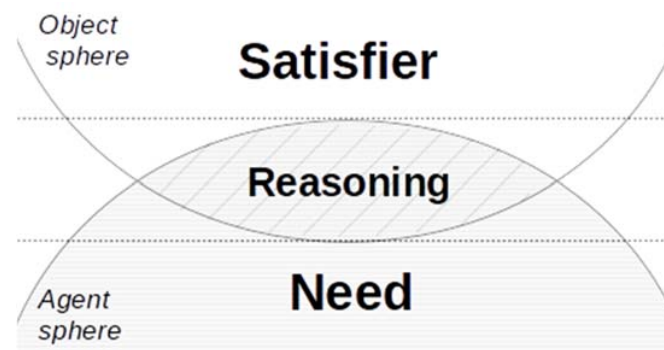

Figure 1 Ontology of needs and satisfiers

The three main elements are defined as follows:

- A *satisfier* refers to (a category of) means that are potentially able to satisfy a need. A satisfier may be (a description of) an artefact (e.g. product, service) or a behaviour (e.g. action, strategy). Since satisfiers are grounded in the object sphere, their description is limited to characteristics of this sphere without making direct reference to the agent sphere, i.e. needs. Objects in this sphere exist independently of the needful agent and its needs. For instance, product specifications are a description of a satisfier.
Example: Means of transportation (e.g. Nuclear submarine, TGV train, propeller aircraft, foiling keelboat, red mini van car offering space for eight passengers, black 500-hp sports car, unicycle)

- *Reasoning* refers to a (conscious) process that links the two spheres. In particular, it is the process of evaluating satisfiers in regard to the agent's needs, i.e. the transition from one sphere to another by consideration. This is similar to what Norman (2002, p. 219) describes as the phenomenological approach of affordances. He defines affordances as the "result from the mental interpretation of things, based on our past knowledge and experience applied to our perception of the things about us". He argues that affordances are not mere opportunities for action, but perceived possibilities in an object world,

which point at potentials for utilisation. Through reasoning a need gains causal power towards its satisfaction. Individuals assess their preferences and choose among potential satisfiers. Personal preferences as well as contextual circumstances control this interplay of object and agent sphere and manifest in the agent's rationale. Reasoning encompasses the evaluation whether a potential satisfier qualifies as an effective satisfier, i.e. matching of needs with the possibilities offered by artefacts of the object sphere (e.g. technology).
Example: Given that an agent has a need for mobility, it mainly depends on the current context and its preferences whether it chooses the mini van car over the nuclear submarine.

- A *need* refers to a conditional necessity depending on a purpose. Needs are either non-volitional and unavoidably or volitional and avoidably. While the first refer to course-of-life needs (i.e. existential needs), the latter refer to needs derived from a voluntary and alterable goal (purpose). Needs are grounded in the agent sphere, thus dependent on the needful agent. In order to take advantage of the potentiality of alternative need satisfaction, needs should not make any reference to their (possible) satisfiers; otherwise, the satisfaction is limited to the object in focus. By carefully formulating a need statement, i.e. using 'need' as a noun, we potentially allow for alternative need satisfaction.
  Example: Need for mobility

Different to psychological theories, this conceptualisation of needs does not limit needful agents to humans. Other entities, such as organisations can have needs, but require representatives to take actions towards need satisfaction.

3 A knowledge perspective: need-based solution knowledge

The implication of this ontology is at least threefold. First, we have to be able to identify the needs to target at. Second, we have to know what means of need satisfaction exist and how they come about. Third, we have to be able to judge the specific potential of need satisfaction among the satisfier candidates.

In order to address these implications, I establish a knowledge perspective, which utilises two well-known approaches to the phenomenon of knowledge.

3.1 Theoretical foundation

I employ the notion of knowledge as a capacity to act (Nonaka & Von Krogh, 2009; Stehr & Grundmann, 2012; K. E. Sveiby, 1997; K. Sveiby, 2001). This has several consequences. First, due to its focus on potentiality to "set something in motion", knowledge is "a model *for* reality" (Stehr, 2012, p. 32, emphasis added). We shape reality by realising this potentiality. It is the result of action as well as the capability of (and prerequisite for) taking action, but not the action itself (Stehr, 2012). Newly created knowledge expands our opportunities as it raises our potentiality to act and change (organisational) reality. Usually, these capacities are unarticulated and only observable in the effects they cause.

The concept of tacit knowledge is a corner stone in Nonaka's theory of knowledge-based management (Nonaka, I., Toyama, R., Konno, 2000; Nonaka & Takeuchi, 1995;

Nonaka & Von Krogh, 2009). It is related to Polanyi's (1958) epistemological assumption that any instance of knowledge has a tacit dimension. Polanyi refers to two states of awareness: focal and subsidiary awareness. We can either process consciously (focal awareness) or unconsciously (subsidiary awareness). Grant (2007, p. 175) summarises Polanyi's position on the nexus between explicit and tacit knowledge: "To him [Polanyi, a/n], there is not an either/or between tacit and explicit knowledge. It is not something amenable to conversion. But it can be transferred and made more explicit in certain circumstances. Indeed, to him, ALL knowledge has a tacit component." Through shifting our focal awareness to an instance of knowledge, it gets transformed and becomes easily shareable (Polanyi, 1969; Virtanen, 2013).

In order to enhance organisational learning processes, we have to consciously access these capacities (knowledge) and transform them; they have to transcend the personal level and become effective on a group level, i.e. explicit knowledge.

Based on these considerations, I formally define *need-based solution knowledge* as crucial knowledge for the transition from needs to satisfiers, which yields the potential to make use of the principle of equifinality. Adopting Nonaka's usage of terminology (Nonaka & Takeuchi, 1995), I discuss the ontological as well as the epistemological dimension of this type of knowledge in the following subsections.

3.2 Ontological dimension

Need-based solution knowledge is formalised as a capacity to act consisting of three ontological components (see figure 2):
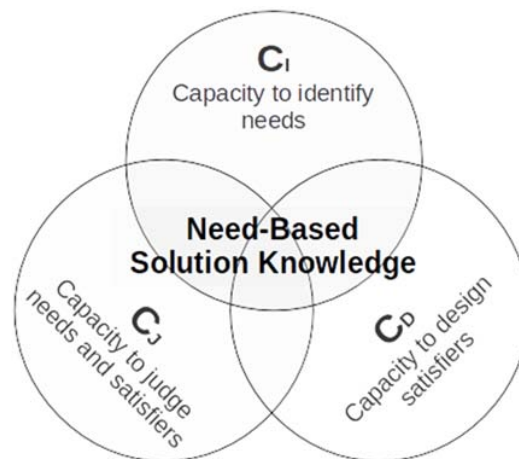

Figure 2 Need-based solution knowledge

- *Capacity to identify needs (C_I):*
  The capacity to identify needs relates to knowledge about the agent's needs, which can be identified in organisational learning processes. Mostly people are hardly aware of their needs (Doyal & Gough, 1991; Goffin et al., 2010; Mele, 2009), "as a consequence, the satisfaction of needs might not be pursued due to lack of knowledge, not lack of urgency." (Korolev, 2015, p. 27)
  By knowing their needs, agents meet a requirement to transform them into demands and need satisfying strategies. It involves knowledge about what is

needed (need) and, ultimately, about for what something is needed (purpose). Some methods (with different scopes) have been proposed (e.g. Bewextra method proposed by Kaiser et al. (2014), Kaiser & Kragulj (in press) and Kragulj (2014); Patnaik & Becker, 1999; Ulwick, 2002) to identify (hidden) needs. They foster the acquisition of C_I through a shift of awareness on needs.

- *Capacity to judge needs and satisfiers (C_J):*
  The capacity to judge needs and satisfiers refers to the necessary knowledge to judge the potentiality of satisfiers being able to meet the agent's needs. This is based on subjective reasoning of the object sphere in respect to the agent sphere and influenced by personal preferences, which constitutively involves cognition, skills and mental capacities (Hamilton, 2009). It refers to the transition process from the agent sphere to the object sphere (and vice versa). Satisfiers are evaluated in terms of their corresponding needs and are finally accepted or rejected (non-satisfiers).

- *Capacity to design satisfiers (C_D):*
  The capacity to design satisfiers refers to the necessary knowledge to develop satisfiers, which are basically able to satisfy needs (Verganti, 2008). This encompasses the necessary social skills and/or technological know-how. By using the term 'design', I highlight the process by which we devise "courses of action aimed at changing existing situations into preferred ones" (Simon, 1996, p. 130). This component is complementary to C_J, since it refers to the capacity to transform a need into a satisfier. This is usually attributed to designers and/or domain experts, who have expertise on the object sphere (e.g. technology, legal regulations).

In order to illustrate why all three components are essential for constituting need-based solution knowledge, I give three examples partly derived from our practical work with organisations describing situations in which at least one capacity was missing:

- *C_I + C_J; C_D missing:*
  An agent is aware of its needs (C_I) and has the ability to judge 'good', i.e. need satisfying, solutions (C_J). However, the agent is not sufficiently informed about the object sphere (e.g. solutions offered, technological capabilities). Consequently, it has has not enough expertise to find new, alternative ways to satisfy its needs. Only little or even no alteration will take place and the agent may run into the so-called "functional fixedness" behaviour, which describes the tendency to leave everything the same (Ulwick, 2002, p. 93). Thus, without integrating knowledge about the object sphere (C_D), adaptation is likely to fail. "People can't ask for what they don't know is technically possible." (Leonard & Rayport, 1997, p. 111) In such situations, external consultancy (e.g. expertise on technology) is necessary to meet the identified needs.

- *C_I + C_D; C_J missing:*
  The agent is informed about its needs (or at least thinks so); additionally, it has the capabilities to design artefacts and solutions intended to satisfy needs. However, the agent has - for whatever reason - no capacity to make judgements about how well the artefacts meet the needs, such as in the following example: An union offered services to their members. The union had detailed information

about the industry and presumably knew what their homogeneous members needed (C_I). They were experienced in designing and offering diverse services to their members (C_D). Nevertheless, these services were rarely demanded by the members and it seemed that their offerings where off the mark. In an organisational learning process we facilitated (Kaiser & Kragulj, in press; Kragulj, 2014), it turned out that the union lacked the capacity to judge whether their services meet the needs of their members (as a result of a poor understanding of their members' needs). This might be due to the fact that they did no in-depth analysis of why their members decided to not demand the services (C_J) or that they had not checked whether the presumed needs were in line with their members' assessment.

- *C_D + C_J; C_I missing:*
  In principle, the agent could judge 'good', i.e. need satisfying, solutions from a set of given alternatives. In fact, it cannot because it does not know the salient needs. This was true for a vision development process we conducted with a community: Citizens were encouraged to contribute their concrete realisation ideas for a city worth living in (C_D). Mutually exclusive ideas were presented and citizens (by the help of political parties) argued and fought for their respective idea (C_J).
  The people involved had no knowledge (awareness) about the citizens' needs (C_I). Consequently, an agreement on their common needs and the drive this would imply were missing. There was no way out of this stand-off, since the potentiality of equifinality could not emerge. It remained a binary (yes or no) decision whether an idea was realised or not.

3.3 Epistemological dimension

We may reach need satisfaction without reflecting on its emergence. We decide intuitively on need satisfying strategies, i.e. knowledge is tacit, but effective. This "intuitive approach" might reach its limitations in group environments which are characterised by conflicting interests, bounded rationality or even stand-offs. In these situations, organisational learning processes should reinforce and take advantage of the three capacities mentioned by explicitly addressing them. Therefore, need-based solution knowledge has to be articulated, i.e. made explicit, in order to be shareable among a group of people.

However, explicit and tacit knowledge should not be seen as mutually exclusive, but rather as a continuum. Organisational learning processes fostering and exploiting need-based solution knowledge can be seen as a continuous knowledge conversion of tacit and explicit knowledge (Nonaka & Takeuchi, 1995). Consequently, this conversion could serve mutual understanding and inform collective action towards need satisfaction. In order to take advantage of the motivational power of explicit needs (Stampe, 1988) and the principle of equifinality, organisations should first identify (common) needs (C_I) and subsequently develop satisfiers capable of consensus (C_D + C_J).

In figure 3, I illustrate the ontological and epistemological dimension of need-based solution knowledge.

Figure 3 The ontological and epistemological dimension of need-based solution knowledge

4 Discussion and implications for practice – an example

Developing and exploiting these three capacities yields at least two advantages for organisational learning processes. First, although concrete proposals and ideas brought in may differ significantly, the underlying needs might be the same. Supposedly, identifying these needs fosters a consensual morale within an organisation. Second, by developing alternative solutions strategies (satisfiers), organisation members may perceive alternative means to fulfil their needs and open up for innovative possibilities and different satisfiers.

The principle of equifinality serves as a model for how the relation between needs and satisfiers can be understood. Organisational learning and change processes which preliminarily focus on common needs prepare the ground for alternative need satisfying strategies. In order to inform need-based decision processes, appropriate group methods should be developed to strengthen these three capacities involved. From figure 3 we can see potential leverage points for further research as well as practical work in organisations. Organisational practice demands approaches capable of shifting the capacities along the continuum towards the explicit extreme. This ensure that the knowledge becomes most effective on a group level.

So far, we have been developing the so-called Bewextra method (Kaiser et al., 2014; Kaiser & Kragulj, in press; Kragulj, 2014) which enables organisations to get acquainted with their needs. It reinforces the capacity to identify needs and its results constitute a potential point of departure for change processes.

However, we are progressing. I want to give an example on how these capacities could be addressed, made explicit and exploited for organisational change. Therefore, I briefly report from a pilot study we conducted with 12 pupils and 2 teachers from an Austrian high school. This preceding study was part of a large-scale research project we carried out with this school (> 170 participants). The research question of the pilot study was "What are existential needs of pupils, teachers and parents in this school?". Further details on the procedure and the results can be found in Kaiser, Kragulj, Grisold, & Walser (2015) and Kaiser, Kragulj, & Grisold (in press). Based on the results, i.e. 11 validated needs, we conducted an implementation workshop, in which we invited pupils to discuss the results and collectively develop concrete and feasible ideas for meeting these needs (satisfiers).

The workshop lasted for 1.5 hours and ran as follows: After a short introduction, we presented the results, which were previously validated by the participants (online survey). In order to get the participants acquainted with the validated needs, we introduced them in detail and facilitated a discussion. Subsequently, in a marketplace-like setting (charts presenting the 11 needs were located in the room), participants were encouraged to discuss the needs at the respective charts and, finally, to indicate the relative importance by awarding coloured labels (up to three) to the needs they favoured most. The resulting rating was presented to the audience and informed the subsequent work in groups. Participants formed three groups working on the following three questions using the world café (knowledge café) method (Holman, Devane, & Cady, 2007) for around 20 minutes: (I) What can I contribute (concrete actions) to meet the three most important needs? (II) How do I usually become aware of my needs? (III) What insights did I personally gain from this project?

From the resulting presentation it became clear that participants were able to propose viable need satisfying strategies which are potentially able to not only meet their own needs but also the needs of other stakeholder groups. All proposals were feasible and concretely enough formulated to consider further elaboration. After discussing the proposals and receiving feedback, some were rejected, while others were emphasised. The results of (I) are shown in figure 4.
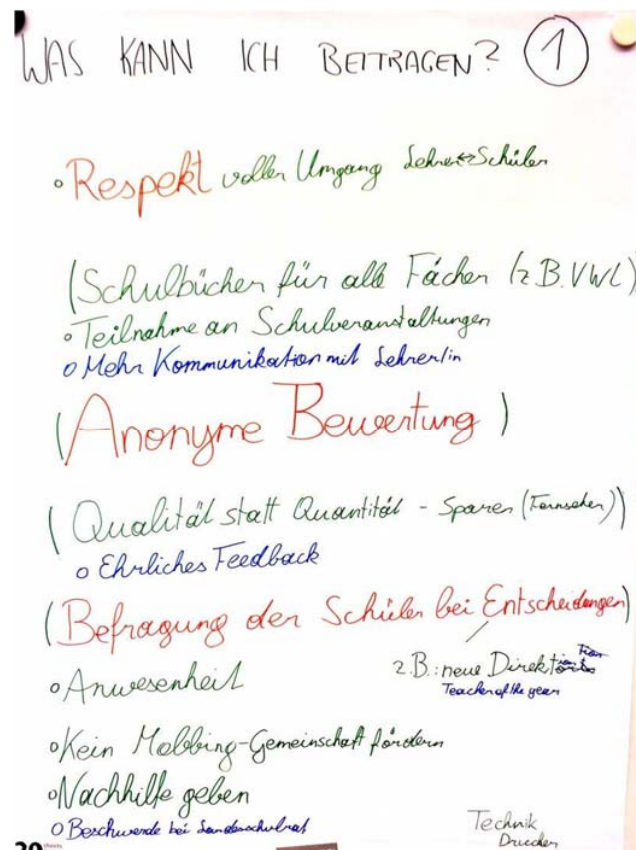

Figure 4 Example from pilot study: "What can I contribute (concrete actions) to meet the three most important needs?"

Although, this is only anecdotal evidence from one case example, we assume that such workshops are able to foster the discussion among stakeholders and, most importantly, we could observe that the participants were able to find inclusive, probably consensual, proposals for need-based solutions.

5 Conclusion

The aim of this paper was to establish a knowledge perspective on needs and on the transition from needs to satisfiers. These considerations yield an understanding of why we should focus on needs and what knowledge is crucial for linking needs and their respective satisfiers enabling organisations to develop need-based solutions.

Therefore, I introduced *need-based solution knowledge.* I clarified the nature of this type of knowledge and discussed its ontological and epistemological dimension. The conceptualisation of need-based solution knowledge as three specific capacities to act allows for identifying leverage points for organisational learning processes.

Further research should empirically evaluate the conceptual framework. If confirmed, it could be used as a guiding framework for diverse organisational learning processes. Furthermore, methods to foster these three crucial capacities should be developed.

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Article C:

Taking a Knowledge Perspective on Needs: Presenting Two Case Studies Within an Educational Environment in Austria

Taking a Knowledge Perspective on Needs: Presenting Two Case Studies Within an Educational Environment in Austria

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Abstract: Needs that are shared by members of an organization can trigger an organizational learning process. To a large extent, needs are implicitly anchored in organizations and people can hardly articulate them. In this article, we present Bewextra, a method that allows for identifying hidden needs in organizations. Thereby, we trigger a knowledge conversion process, which is similar to Nonaka's SECI-spiral. In two case studies, we present how our Bewextra-process is applied to projects in educational contexts in Austria. In a first case study, we show that a combination of learning from past and future experiences extend the scope of the overall outcome. Since learning from future experiences requires a distinct environment (enabling spaces), we present a second case study. Here, we conducted a Bewextra-process with a large number of participants (n > 170), focusing on learning from future experiences.

Keywords: organizational learning, need knowledge, learning from an envisioned future, enabling spaces

1. Introduction

The identification of needs seems relevant for the realm of organizational learning and knowledge-based management. It has been acknowledged that understanding what people need may facilitate the development of suitable measures with respect to strategy development, product design, amongst others (Altschuld & Watkins, 2014; Bayus, 2008; Brouwer & Dorst, 2014; Ericson, Müller, Larsson, & Stark, 2009; Goffin, Lemke, & Koners, 2010; Patnaik & Becker, 1999).

What are needs and how can we assess them? The topic of needs has been attracting attention in various fields, the most important being psychology, philosophy and economics (e.g. Deci & Ryan, 2000; Maslow, 1970; Max-Neef, 1992; Sheldon, Elliot, Kim, & Kasser, 2001; Thomson, 2005; Wiggins & Dermen, 1987). Many theories about needs, however, are unsuitable for practical implementation as they either refer to fundamental and *course-of-life needs*, i.e. food, shelter, water, etc., or their suggestions of what needs are seem to be too abstract to find concrete realizations, e.g. Maslow's need of "self-realization" (Chung, 1969; Noddings, 2005).

Goffin et al. (2010) introduced a theory of needs into the fields of marketing and product development. They proposed that many needs are *hidden*. We cannot consciously access them since they are beyond our awareness. They point out that hidden needs may have the greatest potential to develop new products or enter new markets. At the same time, they emphasize that the assessment of hidden needs presents a challenge as they are implicitly anchored in individuals or organizations.

We have been developing a concrete method to assess needs, which are implicitly anchored in organizations. Our method *Bewextra* covers several steps. While we will provide an in-depth description of Bewextra in the following section, we want to emphasize that a crucial element of this method is the utilization of an enhanced learning approach. Whilst all learning is conventionally based on experiences from the past being extrapolated into the future, we propose an additional learning source; *Learning From an Envisioned Future* entails the envisioning of and interacting with an ideal future scenario to derive concrete steps, which can be taken in the present to achieve the desired goal(s). While we repeatedly showed that our approach of Learning From an Envisioned Future extends the output of learning outcomes with respect to quantity and quality (Kaiser, Kragulj, Grisold, & Walser, 2015a, 2015b), we want to investigate the impact of an enhanced learning approach on the generation of hidden needs. Furthermore, since we have been applying our method only to relatively small groups with a maximum number of twenty participants, we want to see if it could be applied to larger settings with a larger number of participants. This seems relevant for the practical implementation of our method since organizational learning processes often involve larger groups of people.

Therefore, this article addresses two research questions.

RQ1: *Is an enhanced organizational learning process including learning from past and future experiences applicable to assess the hidden needs in larger social settings? What types of knowledge are involved in this learning process?*

RQ2: *How is our approach applicable to assess the hidden needs in larger social settings and what challenges arise for the management of emerging knowledge?*

In order to address these questions we present two case studies. According to Yin (1994, p. 63), "the distinctive need for case studies arises out of the desire to understand complex social phenomena" because "the case study method allows investigators to retain the holistic and meaningful characteristics of real-life events," such as organizational processes.

Both case studies were done with educational institutions in Austria. It has been repeatedly acknowledged that the consideration of needs seems relevant in the realm of education; understanding needs may facilitate the development of appropriate measures with respect to curriculum design, transmission of teaching content, organization of space, etc. (Noddings, 2005; Tyler, 1949). However, it seems particularly challenging since there are different stakeholders involved, e.g. lawmakers, principals, teachers, students and parents. They hold respective viewpoints on the system, have different expectations and demands and thus, they may have different hidden needs.

The first case study was done with students at the Vienna University of Economics and Business. To answer the first research question, we compared the resulting needs of two groups of students who have either learnt from past or future experiences.

In a second case study, which we conducted with pupils in a high school in Austria, we aimed at answering the second research question. Here, we invited more than 170 pupils to participate in a workshop all at once. Subsequently, we analysed and validated the large bulk of data.

The paper will be structured as follows. First, we will present the theoretical background of our method to assess hidden needs. We will elaborate on our enhanced learning approach including both learning from past and future experiences. Second, we will present the case studies. We will describe the procedure as well as the analysis and the results. Third, we will provide a conclusion and give recommendations for further research.

2. Theoretical background

2.1 Hidden needs

The satisfaction of needs is vital for any entity to survive and flourish. This holds true for simple organisms as well as complex social systems, such as organizations (Sheldon et al., 2001). From an economical point of view, this bears two consequences. Firstly, in order to sustain, an organization must satisfy the needs of its members, e.g. employees. Second, in order to grow in terms of profit, any organization must be capable of meeting the needs of their customers (Porter & Kramer, 2011). Integrating "the voice of the customer" (Griffin & Hauser, 1993) into new products is almost universally recognized by scholars and managers as being crucial for new-product success. It can either be done by responding to already well-known needs or by learning about needs that have been unconsidered and thus, unpleased.

According to Goffin et al. (2010), there are three different kinds of needs. They distinguish between known needs, unmet needs and hidden needs. The first ones are commonly known within an industry and are already addressed by products and solutions. The second ones are needs that are known on the market but have not been serviced yet. Hidden needs have not been articulated by customers nor are they known by the industry. Goffin et al. (2010) argue that individuals are not consciously aware of their hidden needs. Their identification may yield the potential for an organization to enter new markets with innovative products and services; thus, learning about hidden needs of their customers may provide organizations with competitive advantage. However, identifying hidden needs appears to be challenging since the individuals themselves cannot articulate them.

Goffin et al. (2010) argue that common approaches are insufficient for the identification of hidden needs since one cannot articulate what she is not consciously aware of. As a result, surveys and many other common market research

tools fail in identifying customers' hidden, as they are hidden (Goffin et al., 2010). Consequentially, there is a need for alternative methods to reveal hidden needs.

In this paper, we use Goffin's idea of hidden needs and discuss how we could identify them; little to no theoretical or practical work has been done to identify hidden needs in the context of organizational learning and organizational learning in education, respectively.

2.2   Learning from an envisioned future

Conventional experiential learning theory defines learning as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 41). Knowledge results from the combination of grasping and transforming experience. Accordingly, learning is understood as an action-reflection process based on reflecting experiences from the past. Learning from the past is well known and well developed. It underlies all our major learning methodologies, best practices and approaches to organizational learning. There are several learning theories which all are based on the paradigm of learning from past experiences; the most influential theories may have been formulated by Argyris and Schön (1978, 1996), Bateson (1972), Kolb and Boyatzis (2000) and Kolb (1984).

Breaking with the conception of learning as strictly and solely connected with our past experiences and questioning the belief that the future is a mere forward projection of the past, several authors (Greenleaf, 1977; Jaworski, 1998; Scharmer, 2000; Senge, Scharmer, Jaworski, & Flowers, 2005) are proposing an alternative source of learning: learning from the future. The idea is to shift attention to the individual's inner world and to sense the very moment by "connecting with the source of one's best future possibility and of bringing this possibility into the now" (Scharmer & Kaeufer, 2010, p. 28f). Thus, it is about learning "from a reality that is not yet embodied in manifest experience" (Scharmer, 2000).

We extended Scharmer's idea and introduced "Learning From an Envisioned Future" (Kaiser, Fordinal, & Kragulj, 2014; Kragulj, 2014a, 2014b), which is a method that fosters the imagination of an ideal future scenario, i.e. the imagination of a situation in which all desires, wishes and dreams have become true, and to experience how this looks and feels like (Atance & O'Neill, 2001). Thereby, people are able to overcome possible restraints that result from current limitations and previous experiences (Seligman, Railton, Baumeister, & Sripada, 2013). Our approach makes use of our capability of imagination (i.e. to have experiences in the absence of visual-sensory input) and, thus, it enhances the creation of knowledge that is less affected by past experiences. Our experience shows that the outcome of this learning approach covers categories that are more substantial since their generation is not influenced by every day limitations, problem-oriented aspects and thoughts about implementation. A more detailed description and discussion of our approach of Learning From an Envisioned Future along with a proposal for an enhanced theory of learning can be found in Kaiser et al. (2016) and Kaiser (2016).

We label the articulated dreams, wishes and desires that result from this learning mode as *satisfiers*. We emphasize that they do not stand for the respective needs of organizations but they embody patterns that point towards their hidden needs. In the following, we will discuss how these patterns can generate needs.

2.3   Bewextra

Over the past years we have developed a method for creating and inferring explicit knowledge about needs in organizations. Applying our method called "Bewextra", we have conducted several projects with organizations in different fields and with different sizes. Bewextra can be seen as an organizational learning approach, which consists of three steps.

The first step (Bewextra-Collect) covers the data acquisition where we utilize our approach of Learning From an Envisioned Future in a group setting. The output of this step is a great number of possible satisfiers, articulated by the members of an organization in a process of responding to questions from facilitators.

The second step (Bewextra-Analytic) entails the generation of hypotheses about the substantial needs of the organization. The generation of these hypotheses is enabled by a hermeneutic method, which is based on the technique of generative listening.

The third step (Bewextra-Validation) covers the validation of the formulated hypotheses by communicative validation and quantitative analysis. Figure 1 summarizes the three steps of the Bewextra framework.
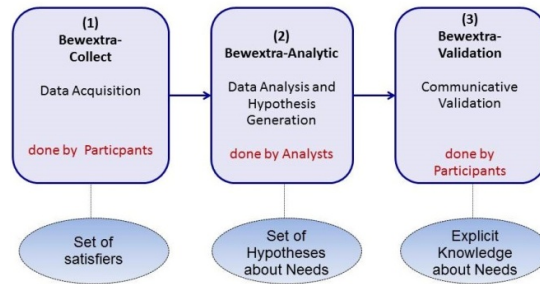
Figure 1: Bewextra framework

Bewextra has been described in detail in Kaiser and Kragulj (forthcoming), Kaiser et al. (2014a) and Kragulj (2014a). In the following, we will give a brief description of the three steps of Bewextra along with the main aspects of our method.

2.3.1 Bewextra-Collect

A crucial element of the first step is the creation of an enabling space where we facilitate participants to make explicit a great number of wishes, dreams, visions, goals and ideas. We refer to the overall outcome as satisfiers. As described in the previous section, we use our approach of Learning From an Envisioned Future to support the participants in reporting their wishes for a fulfilled life. When participants engage in a learning cycle that allows for learning from an ideal future scenario future, we can generate sustainable satisfiers more effectively as compared to the reflection of past experiences (Kaiser, Kragulj, & Grisold, 2016). Our learning approach may foster the detachment from today's circumstances, including restrictions, boundaries and impossibilities (Kaiser, Kragulj, Grisold, et al., 2016). Situated in enabling surroundings, people should be able to shift their thinking to come up with visionary and creative results transcending the boundaries of the current situation as well as of the environment.

2.3.2 Bewextra-Analytic

For the data analysis and the generation of hypotheses about needs we follow a hermeneutic approach (Davis, 1997) and apply the idea of generative listening (Senge, Scharmer, Sol, Jaworski, & Sue, 2004; Yackel, Stephan, Rasmussen, & Underwood, 2003). Thereby, we reveal these patterns and create knowledge about underlying needs. Generative listening is a dialogue setting where knowledge is generated that transcends the information carried by spoken or written words (Kaiser & Kragulj, 2015; Scharmer, 2008). The idea is that while listening to what someone is saying, we dwell in a state where we are open for whatever knowledge wants to emerge; we suspend our assumptions, prejudices and unquestioned assumptions to connect with a "deeper source of knowing" (Scharmer, 2008, p. 58). By listening to the articulated satisfiers we try to understand what the speaker wants to express; we aim to grasp the essence of not what is being said but what is being meant. For a detailed description of generative listening in an interview setting see Peet et al (2010).

Using the approach of generative listening we code the articulated ideas, wishes and answers of step-1. To facilitate the coding and illustrate hierarchies among the satisfiers, we use ATLAS.ti. The unit of the analysis (defined as a quotation in ATLAS.ti) is each participant. The unit of coding (a code in ATLAS.ti) is the needs that are included (implicit as well as explicit) in their ideas and wishes. Finally, we utilize a haptic approach and place the codes on the floor. We then organize and cluster them so that patterns are found and the main categories of the hypotheses about possible hidden needs emerge.

In short, Bewextra-Analytic enables the emergence of hidden needs of the participants and results in a set of hypotheses about needs.

2.3.3 Bewextra-Validation

In the final step, the set of hypotheses generated during Bewextra-Analytic has to be validated. The hypotheses can be validated in terms of both quality and quantity.

For the validation, we use an online questionnaire containing the hypotheses generated in step-2. This questionnaire is sent to all participants. On a Likert-scale from 1 to 4, where 4 means that the hypothesis does not fit at all and 1

means that the hypothesis fits perfectly, participants are invited to assess each hypothesised need. Additionally, participants can leave comments if relevant needs are missing in the proposed hypotheses. The simultaneous use of qualitative and quantitative validation allows us to accept or reject the generated hypotheses about needs in order to finally create a catalogue containing explicit knowledge about substantial needs.

3. Knowledge perspective

In the following section, we provide a knowledge perspective on the generation of needs. We follow Nonaka, who defines knowledge creation as a continuous, self-transcending process through which one transcends the boundary of the old self into a new self by acquiring a new context, a new view of the world and new knowledge. In short, it is a journey "from being to becoming" (Nonaka, Toyama & Nagata 2000, p. 8). The ability to constantly generate new knowledge and to transfer, use and apply existing knowledge is a crucial factor for individuals and organizations if they want to be capable to meet the future. We learn to create new knowledge. The Bewextra method as an organizational learning approach is based on a knowledge orientation as well as knowledge creation.

A holistic definition of knowledge – neither on an individual nor on a collective level – has not yet been found and a variety of epistemological and ontological assumptions lead to conceptual plurality and debate. We follow the definition of knowledge as capacity to act (Sveiby, 2001) and a radical constructivist definition of knowledge in which knowledge is seen as something which the organism builds up to organize the amorphous flow of experience by establishing repeatable experiences and relatively reliable relations between them (Glasersfeld, 1984).

The Bewextra method can be seen as a knowledge creating process by itself, as it generates knowledge to act in the here and now based on substantial needs as well as towards the ideal future described in the first step. Furthermore, it can be described as a knowledge creating and knowledge transforming process which has in its center four different fields of knowledge:

a) *Explicit need knowledge*

With this field of knowledge we focus on explicit knowledge about substantial needs. Need knowledge can be created and externalized when answering the questions "what do I need for a fulfilling life and a fulfilling future?" and "why do I desire the imagined future?" Needs are the most fundamental basis in a hierarchy of needs, desires and their corresponding satisfiers. In general, there are many actions, which can be taken in order to satisfy a specific need. Knowledge about needs is highly valuable in the sense that it enables us to find a variety of different solution strategies. Explicit need knowledge helps to escape binary decisions on actions (i.e. yes or no-decisions) and allows for developing alternative strategies.

b) *Implicit need knowledge*

McLeod emphasizes that "needs are not themselves experienced" (McLeod, 2011, p. 215). They are not to be confused with the desires they generate. Therefore, knowledge about needs cannot be accessed directly (McLeod, 2011). However, implicit need knowledge is an already existing and important as well as invisible fundament and part of the decisions we make in our life. Furthermore, implicit need knowledge is related to the idea of hidden needs, as both cannot be articulated.

c) *Explicit satisfier knowledge*

This field of knowledge can be described as explicit knowledge about dreams, wishes and ideas. They can be summarized as satisfiers. Satisfier are articulated and externalized when answering the question "what do I really want?". Thereby, participants visualize concrete states and satisfiers. It is important for moving persons and even whole social systems into the positive emotional attractor (Boyatzis, Smith, & Beveridge, 2012) and therefore, to bundle energy for moving forward as well as specifying a picture of the vision. Explicit satisfier knowledge serves as an essential starting point for inferring explicit knowledge about needs (Kaiser, Feldhusen, & Fordinal, 2013).

d) *Implicit satisfier knowledge*

Implicit satisfier knowledge is related to knowledge of artefact functions. This type of knowledge is indispensable for our everyday lives. Typical examples are a consumer knowing that a telephone is for calling people, a maintenance person knowing which component of a broken hi-fi set needs to be replaced, or a designer knowing that the inner ribbing of a car is meant to strengthen the construction and to insulate it from electrical signals as well (Houkes,

2006). Therefore the implicit satisfier knowledge is an essential enabler to create explicit satisfier knowledge and formulate concrete dreams, wishes and ideas.

All these fields of knowledge are strongly interrelated. Their interaction drives the Bewextra-process in a similar way as the SECI knowledge spiral drives the creation of new knowledge (Nonaka, Toyama, & Nagata, 2000). Implicit satisfier knowledge is necessary for generating explicit satisfier knowledge and at the same time, explicit satisfier knowledge already contains implicit need knowledge. In Bewextra-Collect, both types of knowledge are involved when participants learn from an envisioned future, which results in a set of explicit satisfiers. In Bewextra-Analytic, analysts transform these satisfiers (explicit satisfier knowledge) into explicit need knowledge by applying generative listening (abductive reasoning). Figure 2 summarizes these knowledge conversion processes.
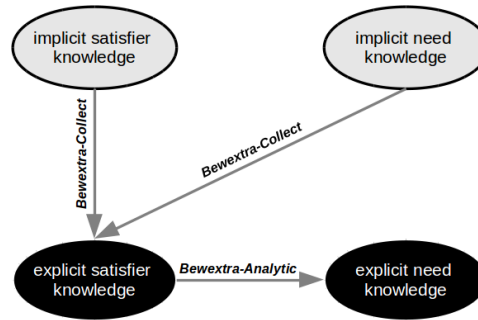

Figure 2: Knowledge conversion processes

4. Case studies

In the following section, we will show the implementation of our Bewextra-process to two case studies we did in an educational context in Austria.

In the first case study, we will present a case study we did with students at the Vienna University of Economics and Business. Here, we investigated the difference between learning from past and future experiences and how they affect the need creation process.

In the second case study, we will present our findings from applying the Bewextra-process to a large number of participants (n > 170).

4.1 Case study 1: Vienna University of Economics and Business

4.1.1 Scope and procedure

Data acquisition

While a previous case study (Kaiser et al., 2015a) focused on the satisfier level and thus, only referred to the first step of the Bewextra-process, we want to extend our findings by analysing the effects that the different learning approaches have on the generated needs, i.e. on the overall outcome of the Bewextra-process.

For this purpose, we conducted a study with 25 students from the specialization field "Information Systems and Operations" at the Vienna University of Economics and Business. We separated our participants into two groups. The 16 students of the first group were introduced to the approach of Learning From an Envisioned Future. We provided them with an enabling space where they felt safe and free to engage with their envisioned future and create unfamiliar scenarios. We emphasized the mental time travelling by playing Richard Strauss' "Thus spoke Zarathustra" and welcomed them in the year 2020. Flip charts were revealed that stated "Welcome to the year 2020". A member of our team acted as a facilitator and engaged them with a narrative where they imagined attending the ideal university in the year 2020. Afterwards, they were asked to write down what made this university ideal in their envisioned future (they were asked to answer two questions: "What has ended in 2020?" / "What has newly emerged in 2020?").

The nine students of the second group were not introduced to our future-based learning approach. Instead, they were asked to write down their ideas for an ideal future academic environment based on their current and past experiences (i.e. what they would like to improve). The two questions for this group were the same: we asked them about what has ended and what has newly emerged in the year 2020. Both groups together produced a total number of 572 satisfiers.

Analysis

We then analysed the generated satisfiers as described in the previous section. Through generative listening we identified 115 codes. Subsequently, we clustered these codes to find underlying needs. The clustering was conducted twice, once with the needs that originated from the past-based workshop and once with the needs of the future-oriented workshop. We generated hypotheses about hidden needs of the students. Table 1 summarizes the quantity structure of our case study.

Table 1: Quantity structure of our case study

No. of participants	25
No. of satisfiers overall	572
Avg. no. of satisfiers per student overall	22.8
Avg. no. of satisfiers per student past group	29.5
Avg. no. of satisfiers per student future group	19.1
No. of codes overall	115
No. of codes past group	41
No. of codes future group	74
No. of hypotheses about needs	19

In a next step, we compared the resulting need clusters of the respective learning modes with regards to quality and quantity. Figure 3 shows that both workshops together generated 19 different need clusters. 4 clusters emerged regardless of the respective learning approach, 7 clusters emerged from the satisfiers collected in the past-oriented learning approach and 8 clusters emerged from the satisfiers collected in the future-oriented learning approach. Similar to our previously conducted case study, this finding suggests that applying both learning methods leads to a considerably higher number of unique satisfiers and resulting need clusters. More precisely, using Learning From an Envisioned Future as an additional source of learning led to an approximately 64 per cent increased number of covered need clusters.
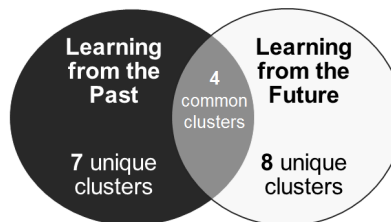
Figure 3: Number of need clusters generated by respective learning source

Validation

After clustering the generatively listened needs, we then formulated concrete hypotheses as a basis for the last step of our method. During this third and last step of Bewextra, we aim to validate the formulated hypotheses in order to find out whether our assumptions about the hidden needs are correct. The validation was performed using an online survey. 16 students from the Vienna University of Economics and Business took part in the survey. Within this questionnaire, each of the 19 needs (formulated as hypotheses along with a short description) was tested for their agreement. The participants could choose between four options for each hypothesis: (1) I agree, (2) I rather agree, (3) I do rather not agree, (4) I do not agree. The results of the approval rates can be seen in table 2.

4.1.2 Results

Overall, the approval rate was 84 per cent. This result is similar to a previous project (Kaiser et al., 2014; Kragulj, 2014a). The needs with the lowest agreement rate originate from the past-oriented workshop. It must be doubted, whether the needs efficiency (50%), security (63%) and sustainability (69%) constitute needs of the whole system; the high rejection rates indicate that further discussion in the system is needed.

Table 2: Acceptance rates of the needs

Need	Learning Source	Agreement Rate
Need for individuality	Past & Future	81 %
Need for community	Past & Future	81 %
Need for freedom and Flexibility	Past & Future	88 %
Need for quality	Past & Future	94 %
Need for efficiency	Past	50 %
Need for security	Past	63 %
Need for sustainability	Past	69 %
Need for self-Realization	Past	88 %
Need for consideration	Past	94 %
Need for practical Relevance	Past	94 %
Need for transparency	Past	100 %
Need for convenience	Future	81 %
Need for communication	Future	81 %
Need for appreciation	Future	81 %
Need for purpose	Future	88 %
Need for variety	Future	88 %
Need for curiosity	Future	88 %
Need for being on the Pulse	Future	94 %
Need for holism	Future	100%

4.2 Case study 2: High school in Austria

The second case study was done with a high school in Lower Austria. This school is part of a compound of six private schools in Vienna and Lower Austria. The presented case was part of a larger project where we sought to identify what needs are shared by the members of the system. The overall project lasted for several months and included a number of crucial steps. One of them was the realization of a "Bewextra-XL-workshop", where we invited over 170 participants to engage with our method at once. In the following, we provide a brief review of our procedure to subsequently present and discuss our findings from the Bewextra-XL workshop.

As mentioned before, the goal of the project was to identify the needs of a school. Our reasoning was that when the members of the school were aware of their needs, they could understand their common needs, which might provide the basis for developing strategies and measures to satisfy them.

4.2.1 Scope and procedure

The first step of our project included the identification of all relevant stakeholders. For this, we conducted a system constellation at the Vienna University of Economics and Business. Inspired by systemic therapy and family constellations, this method has been attracting increasing interest in organizational work to reveal social dynamics (Ameln & Kramer, 2007; Böhm, 2016; Groth, 2004). We invited 12 participants to take part in the constellation; they had no previous experience with the school, i.e. they were unfamiliar with the system. One member of our research team acted as the constellator; he attended the school and had rich experience of how decisions are made, who is involved etc. (Varga von Kibed & Sparrer, 2011). Furthermore, an experienced coach supervised the constellation.

The constellation took about three hours and revealed six stakeholder-groups who should be taken into account for the assessment of the system's needs: (1) school provider, (2) parents, (3) teachers, (4) pupils of the commercial college, (5) pupils of the commercial college in an elite programme, and (6) pupils of the commercial school.

In a next step, we addressed each stakeholder-group to assess their hidden needs. In a first step, each stakeholder-group learnt from an envisioned future. We approached the identified groups differently. While we collected data from groups (2), (3), (4), (5), and (6) using our Bewextra method, we interviewed the school providers (1) in one-on-one settings. One member of our research group visited them in their office and asked two representatives to take part in the study. One executive was responsible for the marketing. Furthermore, we interviewed the CEO of the holding, which supplies the schools. In both cases, we engaged them in a narrative, where they envisioned a school festival in 2020, where everything was just ideal. By letting them describe *what* this festival makes ideal, we collected a number of potential satisfiers.

4.2.2 Bewextra-XL

<u>Data acquisition</u>

Part of the project was the implementation of a workshop where we collected the satisfiers of a large number of participants. Previous research showed that a future-oriented learning approach yields several advantages (Kaiser et al., 2015a, 2015b). However, workshops that we have conducted so far had only included small groups, i.e. groups with approximately 20 participants. Since organizational learning requires methods to include a large number of people in different units, we wanted to see if our approach could be applied to a larger setting. Therefore, we invited more than 170 participants to take part in a workshop, which we named *Bewextra-XL*. We asked pupils of two branches as well as teachers to take part in the workshop.

The workshop took place in the sports hall of the high school. A team of five researchers facilitated and supervised the process. In line with the well-proven procedure of Bewextra, which we applied to workshop 1, the process went as follows.

First, we welcomed all participants. We asked them to take seats and get comfortable. We provided a short introduction to our research and outlined what the project was about.

We then initiated the mental time travel ritual. First, we encouraged them to let go their current doubts and concerns. By playing Richard Strauss' famous piece "Thus spoke Zarathustra", we emphasized that the participants were leaving the year 2015, and after the piece was over, we literally welcomed them in the year 2020. We underlined the mental time leap by enrolling banners where was written, "Welcome to the year 2020" We emphasized that they are in a future, which is *ideal*, i.e. where everything is the way the subjects would imagine it to be in their biggest dreams. We engaged them in a narrative where they imagined attending a school party in 2020 where everything felt perfect and would be as in their biggest dreams. We let them interact with this envisioned scenario and asked them how it feels like to be in this future. Subsequently, we posed the questions, what had come to an end in this future and what new elements had emerged, respectively.

For about 15 minutes they could write down whatever came to their mind. Afterwards they gathered in groups of about five people to think of additional ideas. This step took about 20 minutes.

All sheets were collected and while the process ran anonymously, we labelled each sheet with regards to the stakeholder-group, i.e. whether it came from teachers or pupils.

<u>Analysis</u>

173 participants generated a total number of 2587 satisfiers. This resulted in an average number of 15 satisfiers per participant.

The set of satisfiers emerging from Bewextra-XL and the two interviews were randomly divided into two subsets. One subset was analysed by trained analysts, while the other subset was analysed by bachelor students who practised the method of generative listening (part of a course on „knowledge-based system analysis"). Generative listening fulfils two crucial functions. First, it is the abductive reasoning step, which transforms statements about satisfiers into hypotheses about underlying needs. Second, it condenses the data and reduces the number of items (codes).

We held three rounds of generative listening. In a first round, we collected the results of generative listening (codes) via an online form (students) as well as a work sheet (analysts). Students analysed the data of 72 participants and came up with 391 codes. The team of researchers analysed the statements of 101 participants and came up with 435 codes. In a second round, we clustered and aggregated the resulting codes with regards to their content and created 301 codes. In the third round, we condensed the 301 to 130 codes, which were the basis for formulating 15 need hypotheses including a detailed description, which covers the different dimensions of each need. The need hypotheses are shown in table 3.

<u>Validation</u>

In order to ask the stakeholders for their assessment, we conducted an online survey to validate the need hypotheses and encourage their feedback. We invited all participants to take part in the survey. In total, we gathered 97 responses.

The questionnaire consisted of two questions: "Is the list of need hypotheses complete?" and "Are these need hypotheses correct?". While participants were free to answer the first question by free text statements, in the second part they were asked to rate the need hypotheses on a four point Likert-scale, whether a need hypothesis was (rather) correct or wrong.

4.2.3 Results

Considering the seven free text answers to question 1 of the online survey, we could not identify any significant statements, which were not reflected in the previously defined need hypotheses.

In short, the survey participants accepted all need hypotheses with an average acceptance rate of 89 %. However, only the need hypotheses "persistence" turned out to be controversial, as it was accepted by 69 % of the participants. Table 3 depicts the results. An in-depth analysis of the survey data showed that - different to the concrete satisfiers, which were controversially viewed among different stakeholders - needs have an inclusive quality; different stakeholders can commit themselves to common needs to largely the same degree than others.

Table 3: Acceptance rates of the needs

Need	Agreement Rate
Need for solidarity [dimension A *]	99 %
Need for justice	96 %
Need for quality of school food	96 %
Need for wellbeing	96 %
Need for quality of teaching	95 %
Need for practice orientation	95 %
Need for flexibility	94 %
Need for unfolding the self	90 %

Need for space for unfolding	88 %
Need for participation	87 %
Need for modernity by means of technology	86 %
Need for internationality	83 %
Need for variety	82 %
Need for solidarity [dimension B *]	81 %
Need for persistence	69 %

* The need for solidarity was split into two dimensions A and B indicating that those were of opposing quality. However to our surprise, both hypotheses were accepted by the survey participants.

5. Discussion

Bewextra is a method that allows for identifying needs, which are implicitly anchored in organizations. We argue that they are strongly related to what Goffin et al. (2010) refer to as hidden needs as they are not articulable by the members of the system.

In this paper, we presented two case studies, where we conducted Bewextra and investigated specific elements of this process.

In case study 1, we compared learning from past and learning from future experiences and analysed their impact on the outcome. In line with previous research on enhanced organizational learning approaches, we found that a combination of learning from past and future experiences increases the overall number of identified hidden needs. However, learning from future experiences poses a challenge for the process since we must provide participants with an enabling space where they are free to detach from current restrictions and doubts.

Therefore, we present a second case study where we conducted this process with a greater number of participants to see if this approach can be used in larger organizational settings. We found that such a process requires additional considerations.

First, since large systems cover a variety of stakeholders, we had to identify all relevant stakeholder groups. We did this with a system constellation approach, where we gained knowledge about the groups that were of interest for our project.

Second, we emphasize that an enabling space must be designed so that it affects all participants in a way that they can think freely and outside the box. We found that our existing approaches can be well applied (e.g. a piece of music to facilitate the time travelling ritual). However, we saw that a trustful relationship between the facilitator and the participants is the prerequisite of the success of this alternative learning mode. This must be kept in mind when planning the scenario and evaluating supporting tools; e.g. we advise to be careful when using a microphone as this could have a negative impact on the trustful relationship between the facilitator and the participants.

Third, the sheer amount of data resulting from involving more than 170 participants requires a structured plan of how to analyse the data. We found that it is useful to divide the randomized data among several groups of analysts. This, of course, is only possible when the analysts are familiar with the method and willing to engage in generative listening.

Finally, we found that our existing approach to validate the results with online surveys can be easily scaled to large systems. However, we suggest including an additional loop to be prepared for many participants commenting on the results; in this case, we must conduct an additional cycle to integrate the data.

6. Conclusion

Taking a knowledge perspective on needs and using our Bewextra method it is possible to initiate an organizational learning process and trigger a knowledge conversion among four types of knowledge (implicit satisfier knowledge, implicit need knowledge, explicit satisfier knowledge, explicit need knowledge).

Further research could investigate the possibility of facilitating the analysis using information communication technology in order to conduct the process with even very large systems (e.g. a city); a crucial point would be the question how we can ensure that there is an enabling space providing trust and the willingness to engage with the learning mode.

With regards to the analysis of the data, we suggest investigating the role of the individual analyst when doing abductive reasoning. We would be interested in the extent to which the analyst must be acquainted with the system. We are also interested in the factors, which are crucial for training participants to perform generative listening.

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Article D:

Bewextra: Creating and Inferring Explicit Knowledge of Needs in Organizations

Bewextra: Creating and Inferring Explicit Knowledge of Needs in Organizations

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Abstract

We introduce a new methodological framework, called Bewextra, for the creation of the knowledge of needs in organizations. The development of our framework builds on theoretical engagement with literature from several disciplines including visioning and philosophy of needs as well as empirical data from vision development processes we have accompanied. To the best of our knowledge it is the first theoretical work that describes learning from an envisioned future and the generation of need knowledge as an abductive process in a methodologically replicable way. The advantages and practical implications of our method introduced are discussed in detail.

Keywords: Learning from the future, Knowledge of needs, Vision development, knowledge-based management

Introduction

The satisfaction of human needs may be viewed as being the broadest and most basic physiological and psychological requirement for a person's well-being (Thomson, 2005). If our actions are effective in the sense of fulfilling our needs, we thrive and flourish.

Despite the fact that our needs govern our behavior in general and actions in particular, people are most of the time hardly aware of the needs they are trying to satisfy. Surprisingly, in previous works with large groups it became obvious that people have hard times to reflect on their (abstract) needs and communicate them. They hardly talk about their needs and desires but rather about certain satisfiers (concrete objects or conditions) when asked about what they need for their well-being. It seems that we are used to think in terms of realization possibilities

and solutions (which we will later refer to as the concept of satisfiers). This is in line with the claim of the philosopher Stephen K. McLeod that we cannot be aware of our needs directly but only of their satisfiers. (McLeod, 2011) As a consequence, knowledge about our needs is valuable in the sense that it enables us to find a variety of different solution strategies.

Envisioning how a desirable future might look is a long-standing effort in human evolution and social change. Utopian thought and visions provide direction for actions and behavior; more so, they create identity and community. (Wiek & Iwaniec, 2014) It is assumed that it is more likely that visions become reality if they meet humans' needs. Therefore, it is necessary to know the needs explicitly.

Additionally need knowledge helps us to escape binary decisions (yes or no) on certain actions and rather focus on developing alternative strategies. In general, there are many actions which can be taken in order to satisfy a specific need. Knowing the underlying need opens up a possibility space which otherwise is limited to a yes-or-no decision.

$$\text{Need} : \text{Action} = 1 : n$$

However, if considerations (f.e. in organizations) start on the level of actions and solutions, the possibility space is narrowed, as we are limited to certain solutions we either can implement or reject (binary decision).

So, the hypothesis is that being aware of one's need, rather than a certain satisfier, enables us to find many and different future-oriented solutions to satisfy our needs. We follow (Griffin & Hauser, 1993) and (Arndt, 1978) who point out that the focus on needs dramatically extends the range of possible solutions. The question at hand is how researchers can look *behind* a satisfier at the underlying need. This is about making explicit what is implicitly governing our acting. In a face-to-face setting (e.g. interview) researchers are able to check back what needs an interviewee actually has. However, when working with a large group of people in a non-instantaneous setting (data acquisition and analysis are sequential rather than iterative) this approach seems to be uneconomical and nearly impossible.

The main purpose of this paper is to introduce a conceptual framework informed by an abductive reasoning approach which consists of three steps, namely qualitative data acquisition, abduction and hermeneutic interpretation of the data, which enables the generation of need hypotheses and finally a communicative validation of these hypotheses.

Research gap, research question and research methodology

There are a lot of visioning approaches which emerged in the last 20 - 25 years in research as well as in practice. These approaches include among others backcasting, community visioning, future workshop and many more. (Wiek & Iwaniec, 2014) give an excellent overview of general insights from visioning studies. It would be by far out of scope for this paper to analyze all existing visioning approaches, so therefore we decided to have a very short look on three different approaches, one very popular approach, one not really well known model and one approach which has been developed recently.

Maybe one of the best known approaches is the work by Peter Senge, who states that the skills involved in building shared vision include the following (Senge, 1990): encouraging personal vision, communicating and asking for support,

visioning as an ongoing process, blending extrinsic and intrinsic visions and distinguishing positive from negative visions. He also stresses the importance of the tension between the presence and the future as a resource, when stating "that leadership in a learning organization starts with the principle of creative tension. Creative tension comes from seeing clearly where we want to be, our "vision," and telling the truth about where we are, our "current reality." The gap between the two generates a natural tension (Senge, 1990).

Another model which has a strong connection to vision development is the Intentional Change Theory (ICT) by Richard Boyatzis. His model proposes that a change process involves a sequence of discontinuities, called discoveries, which function as an iterative cycle in producing the sustainable change at the individual level. These are: (1) the ideal self and a personal vision; (2) the real self and its comparison to the ideal self resulting in an assessment of one's strengths and weaknesses, in a sense a personal balance sheet; (3) a learning agenda and plan; (4) experimentation and practice with the new behavior, thoughts, feelings, or perceptions; and (5) trusting, or resonant relationships that enable a person to experience and process each discovery in the process. (Boyatzis, 2006) The ideal self plays an important role in the ICT and it is outlined that it is the driver for a personal vision and that there are three major components converging into the articulation of the person's ideal self, and the resulting personal vision: (1) The ideal self contains imagery of a desired future; (2) the ideal self is emotionally fuelled by hope; (3) the third component of the ideal self is the person's core identity. (Boyatzis & Akrivou, 2006)

Theory U is a core process of profound innovation and a model for social technology processes involving inner knowledge and social innovation. Scharmer developed the model in the context of change management, learning from the emerging future and social innovation (O. C. Scharmer, 2007). Theory U describes a multi-step process in the form of the letter "U" which enables radical changes on a collective as well as on an individual level. Scharmer describes his model as opening one's mind, heart and will in order to give the highest future possibilities the chance to become reality. He argues that it is necessary that something within an organization has to "die" in order to let something new "be born". One of the main purposes of the U-process is to overcome mere reactive (= "downloading") practices and move on to generative fields of attention in which acts from the perspective of the best possible future are performed. (Claus Otto Scharmer, 2001) In its essence, the U-process describes seven stages of an opening process (= U-process of presencing), while stage four ("presencing") marks the turning point where things start to change.

Of course, these three approaches are – as mentioned above – a selected sample out of a vast number of existing visioning methods. However, from our point of view the main research gap of nearly all existing visioning approaches can be identified as the lack of generating and integrating explicit knowledge about substantial needs in developing sustainable visions. As (Wiek & Iwaniec, 2014) state "As our societies struggle to fulfill human and social needs without detrimentally impacting other societies or compromising the viability of supporting ecosystems, calls are repeatedly made for visions that can guide us towards sustainable futures." Making the knowledge about needs explicit is crucial for the creation of innovative and sustainable solutions, products or services and as shown above it is assumed that it is more likely that visions become reality if they meet humans' needs.

Furthermore, we identified the lack of theoretical work to describe the generation of need knowledge as an abductive process, which defines this knowledge creating process in a methodologically consistent and replicable way.

Based on these research gaps and based on the preliminary work we have done in the last few years in the fields of visioning and vision development (Kaiser, Feldhusen, & Fordinal, 2013), the following research question can be defined:

> *How to infer abductively - in a methodological replicable and consistent way - human needs from observable satisfiers in a non-instantaneous setting using qualitative research methods?*

Due to the emergent nature of our research, we used a Grounded Theory based analytic approach that provides a set of flexible analytic guidelines enabling iterative data analysis and conceptual development. In Grounded Theory (Charmaz, 2014; Glaser & Strauss, 1967) empirical data of most heterogeneous sources is used. The development of our conceptual framework especially builds on theoretical engagement with literature and our insights and empirical data from different knowledge-based change processes we have facilitated in the last years.

The remainder of this paper is organized as follows. In the next section we provide the theoretical background for our framework. Subsequently, we introduce the Bewextra framework for generating need knowledge in organizations. Afterwards we give an overview on several projects where we used the Bewextra framework and point out key findings. Finally, we discuss our lessons learned and present implications for further research.

Theoretical Background

Our methodological framework is based on three main theoretical pillars, namely theory of needs, learning from an envisioned future and generative listening. In the following we will cover each of these pillars with a compact overview.

The theory of needs

According to (Goffin, Lemke, & Koners, 2010), there are three different kinds of needs. He distinguishes between known needs, unmet needs and hidden needs. The first ones are commonly known within an industry and are already addressed by products and solutions. The second ones are needs that are known on the market but have not been serviced yet. Hidden needs have not been articulated by customers nor are they known by the industry. (Goffin et al., 2010) argue that individuals are not consciously aware of their hidden needs. Their identification may yield the potential for an organization to enter new markets with innovative products and services; thus, learning about hidden needs of their customers may provide organizations with competitive advantage. However, identifying hidden needs appears to be challenging since they cannot be articulated by the individuals themselves.

Traditional market research is based on the assumption that customers can fully express their needs. However, surveys and other ordinary market research tools often fail in identifying customers' product requirements, particularly where customers are not really aware of their own needs, i.e. their hidden needs. (Goffin et al., 2010)

We are proposing a hierarchy of needs, desires and satisfiers, where needs are the fundamental. (Kaiser, Fordinal, & Kragulj, 2014; Kragulj, 2014a)

A **satisfier** is either an object or description of a proposed state of affairs in which a need is satisfied. This might be a description of a vision or the imagined future (c.f. learning from the future, storytelling). Satisfiers are seen as a precise realization of needs and desires, respectively. The question to be asked is "how does it look or feel like when the fulfillment of a need or desire has become real?"

Desires are personally coined and intentional. (Thomson, 2005) There are differences in personal desires: I may desire (or want) x and *not* y, although x *and* y are of the same quality and both satisfy the need Z. (Wiggins & Dermen, 1987) Additionally, what I desire need not be desired by person B.

Needs have, according to Thomson (2005), three distinctive qualities:

- They are objective in the sense of being a discoverable fact,
- they are matters of priority, and
- are undeniable values.

McLeod suggests in contrast to the phenomenological thesis, that "needs are not themselves experienced". They "are not to be confused with the desires they generate." (McLeod, 2011, p. 215)

To sum up, satisfiers are explicit and concrete realizations of desires and needs: *What* satisfies my desires and needs? Desires are personally coined instances of needs: *How* do I want to satisfy my need? These two questions are usually answered by a formulated vision, i.e. a description of a desired future state. (Wiek & Iwaniec, 2014) Needs are most fundamental and are the basis for our desires and satisfiers, they are the motivational source of our acting. *Why* do I desire a certain thing or an imagined future?
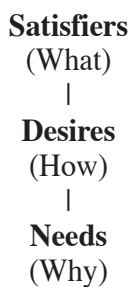
<div align="center">

Satisfiers
(What)
|
Desires
(How)
|
Needs
(Why)

</div>

Figure 1. Hierarchy satisfiers – desires – needs

Of course it can also be argued that both the desires and the needs could be independently satisfied by the satisfiers. The discussion of our proposed hierarchy of needs, desires and satisfiers is out of scope of this paper and does not critically influence the design of our methodological framework.

Learning from an envisioned future

Conventional experiential learning theory defines learning as "the process whereby knowledge is created through the transformation of experience" (Kolb, 1984, p. 41). Knowledge results from the combination of grasping and transforming experience. Accordingly, learning is understood as an action-reflection process based on reflecting experiences from the past. Learning from the past is well known and well developed. It underlies all our major learning methodologies, best practices and approaches to organizational learning. There are several learning theories which all are based on the paradigm of learning from past experiences; the most influential

theories may have been formulated by (Argyris & Schön, 1978, 1996; Bateson, 1972; Kolb & Boyatzis, 2000; Kolb, 1984).

Breaking with the conception of learning as strictly and solely connected with our past experiences and questioning the belief that the future is a mere forward projection of the past, several authors (Greenleaf, 1977; Jaworski, 1998; Claus Otto Scharmer, 2000; Senge, Scharmer, Jaworski, & Flowers., 2005) are proposing an alternative source of learning: learning from the future. The idea is to shift attention to the individual's inner world and to sense the very moment by "connecting with the source of one's best future possibility and of bringing this possibility into the now" (C. Otto Scharmer & Kaeufer, 2010, p. 28f). Thus, it is about learning "from a reality that is not yet embodied in manifest experience" (Claus Otto Scharmer, 2000).

We extended Scharmer's idea and introduced "Learning from an Envisioned Future" (Kaiser et al., 2014; Kragulj, 2014a, 2014b), which is a method that fosters the imagination of an ideal future scenario, i.e. imagine a situation in which all desires, wishes and dreams have become true, and to experience how this looks and feels like. (Atance & O'Neill, 2001) Thereby, people must not think of possible restraints that result from current limitations or previous experiences. So our approach makes use of our capability of imagination (i.e. to have experiences in the absence of sensory input) and, thus, it enhances the creation of knowledge that is less affected by past experiences. Our experience shows that the outcome of this learning approach covers categories that are more substantial since their generation is not influenced by every day limitations, problem-oriented aspects and thoughts about implementation.

The articulated dreams, wishes and desires that result from this learning mode are satisfiers. They do not yet represent the needs of organizations directly but they embody patterns that point towards their hidden needs.

Generative listening

Generative listening describes a dialogue setting where knowledge is generated transcending the information carried by spoken or written words (Kaiser & Kragulj, 2015; Claus Otto Scharmer, 2008). The idea is that while listening to what someone is saying, we dwell in a state where we are open for whatever knowledge wants to emerge; we suspend our assumptions, prejudices and unquestioned assumptions to connect with a "deeper source of knowing" (Claus Otto Scharmer, 2008, p. 58). By listening to the articulated satisfiers we try to understand what the speaker wants to express; we aim to grasp the essence of not what is being said but what is being meant. Thereby, we create new valuable knowledge about hidden needs.

With this approach we follow several authors, e.g. (Peet, Walsh, Sober, & Rawak, 2010) who introduced and used this special kind of listening in different contexts. Generative listening is described as a listening from the emerging field of future possibility and transformative conversation (Claus Otto Scharmer, 2008). Generative listening is seen as the most valuable mode of listening. It transforms the listener's self profoundly and enables him to connect to deeper source of knowing, including the knowledge of your best future possibility and self (O. C. Scharmer, 2007).

So generative listening is on the one hand strongly connected with learning from the future and on the other hand it enables the creation of self-transcending

knowledge. (Kaiser & Fordinal, 2010). Using the approach of generative listening on the satisfiers generated with the approach of learning from an envisioned future enables the emergence of (hidden) needs.

The Bewextra framework

The conceptual framework for the creation of need knowledge in organizations consists of three steps. We name this framework "Bewextra". Bewextra is an acronym for the German translation of generating explicit need knowledge (Bedürfniswissensextraktion). The first step is the data acquisition based on the approach of learning from the future. The output of this step is a number of satisfiers, articulated by the members of the organization in a process of asking questions by facilitators. The second step generates hypotheses about the substantial needs on which the satisfiers are based on, stimulated by the observations of the first step and enabled by different views on these observations. Finally, the third step covers the validation of the hypotheses by communicative validation and quantitative analysis. In the following the three steps will be described in detail. Figure 2 shows the whole Bewextra framework at a glance.
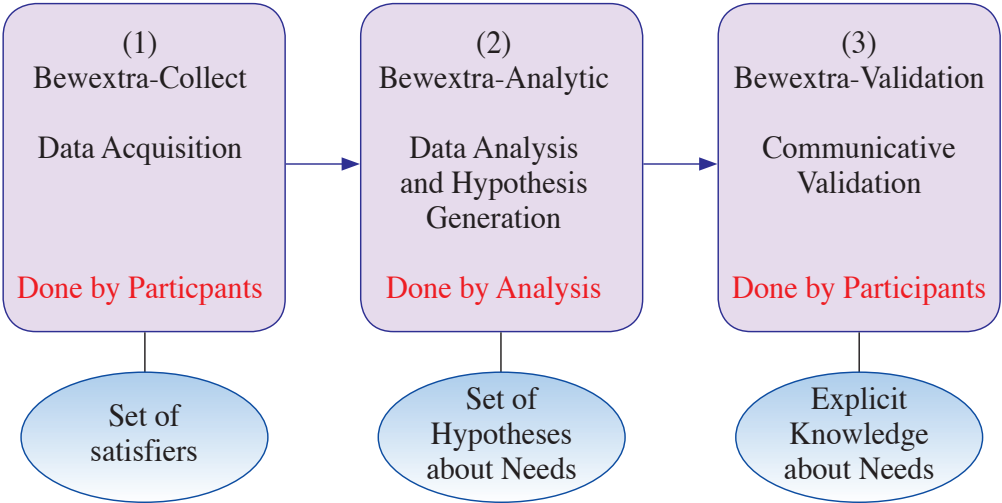

(1) Bewextra-Collect	(2) Bewextra-Analytic	(3) Bewextra-Validation
Data Acquisition	Data Analysis and Hypothesis Generation	Communicative Validation
Done by Particpants	Done by Analysis	Done by Participants
Set of satisfiers	Set of Hypotheses about Needs	Explicit Knowledge about Needs

Figure 2. Overview on the whole Bewextra process

Bewextra-Collect

The most important purpose of the first step is the creation of an enabling space or special kind of Ba. Ba is a time-space-nexus which can be described as a "shared space" of interaction, interpretation and dialectical processes, a form of "learning foundation" in its own right which generates knowledge. (Creplet, 2000) The special kind of Ba which is essential for Bewextra-Collect has its center in the access to self-transcending knowledge. We have introduced this Ba as vocation ba. (Kaiser & Fordinal, 2010) This Ba enables the participants to make explicit a rather huge number of wishes, dreams, visions, goals and ideas. As described in the previous section, we use our approach of learning from an envisioned future to support the participants in reporting their wishes for a fulfilled life.

The creation of such an enabling space is realized by a setting, which is designed to facilitate the detachment from the current system's situation and to fantasize about the participants ideal future scenarios. Thereby, a facilitator makes the participants imagine that they were actually present in a scenario taking place in the future (5 to 10 years from now); the narrative time journey takes up to several minutes and the imagined time leap is illustrated with appropriate music, e.g. Richard Strauss' Zarathustra. Furthermore additional rituals like change of physical gesture (e.g. changing the sitting position). Now, participants are encouraged to interact with their imagined future scenario, e.g. taking a walk in their organization's building and observing their surrounding. This sequence is structured by to questions: "What has emerged and is new?" and "What has come to an end?" Not until then participants are asked to write down features and descriptions of this personal ideal future answering the two questions.

Engaging in a learning cycle that allows for learning from an ideal future scenario, we can more effectively generate sustainable satisfiers, compared to the reflection on past experiences. This approach should foster the detachment from today's circumstances, including restrictions, boundaries and impossibilities. Situated in these enabling surroundings, people should be able to shift their thinking to come up with visionary and creative results transcending the boundaries of the current situation and environment.

Throughout the process, participants are encouraged to mention also satisfiers whose realization is not realistic at the moment, because of the embedded need knowledge in these satisfiers. (Peltokorpi, Nonaka, & Kodama, 2007, p. 56) point out that "… exposure to diverse ideas during the externalization phase is important as every step in the innovation process is proposed to be about someone asking about imaginary possibilities, speculating about what would happen if, and reflecting on yet-unrealized and perhaps unrealizable solutions."

From a system theoretic point of view (Von Bertalanffy, 1968) it is essential that the learning from the envisioned future occurs in all relevant (sub)systems. Therefore, it is necessary to involve all stakeholder groups concerned, i.e. learn from the future from different point of views. These multiple perspectives in learning from the future ensure that all aspects relevant to the overall system are covered in the learning. This is the basis for detecting and generating need knowledge in the second step of Bewextra. Figure-3 sums up the first step of our framework.
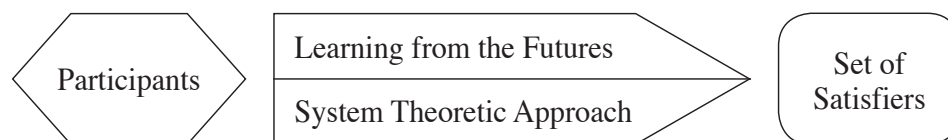

Figure 3. Bewextra-Collect (step-1)

Bewextra-Analytic

For the data analysis and the generation of hypotheses about needs we follow a hermeneutic approach (Davis, 1997) and use generative listening (Senge et al., 2005; Yackel, Stephan, Rasmussen, & Underwood, 2003). As described in the section on the theoretical background, generative listening is a listening from the emerging

field of future possibility (O. C. Scharmer, 2007) and transformative conversation (C. Otto Scharmer & Kaeufer, 2010). The method of generative listening aims at hearing the essence of what the participants say, thus, trying to hermeneutically understand which need they try to express by the satisfier they mention. It is about capturing the essence by not letting prejudice take over, trying to see the world with the eyes of the participant, thus, hermeneutically.

The method of generative listening is used in the following way: To adjust oneself towards the necessary attitude of generative listening, a ritual is introduced. Analysts pair (A and B) and adjourn to a pleasant and silent space. Rotationally, one analyst (A) reads out the related worksheets of one workshop participant connecting the bullet point-like statements/items into a short narrative without changing the content and adding additional information. The partner (B) listens generatively without any other task to do. After reading the text and a moment of silence, the partner (B) reflects and vocalizes what he/she heard, what the need might be which wants to be satisfied in the narrative. The reader (A) documents the statements of the partner (B). Using the approach of generative listening on the satisfiers which were generated in step-1, we are coding the articulated ideas, wishes and answers. For this purpose, we are using the software suite ATLAS.ti to organize codes (and groundedness) and to illustrate hierarchies. The unit of the analysis (defined as a quotation in ATLAS.ti) is each participant. The unit of coding (a code in ATLAS.ti) is the needs that are included (implicit as well as explicit) in their ideas and wishes. Finally, we utilize a haptic approach and place the codes (often several hundreds) on the floor. We then organize and cluster them so that patterns are found and the main categories of the hypotheses about possible hidden needs can be generated. These need categories should be as separable as possible and should not overlap in meaning.

In short, Bewextra-Analytic enables the emergence of hidden needs of the participants and results in a set of hypotheses about needs. Figure-4 sums up the second step of our framework.
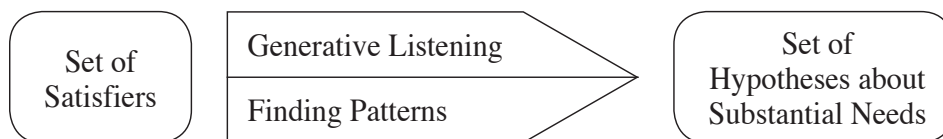
Figure 4. Bewextra-Analytic (step-2)

Bewextra-Validation

In the final step, the set of need hypotheses generated during Bewextra-Analytic has to be validated. The hypotheses shall be validated in terms of both correctness and completeness. For the correctness validation we use an online questionnaire containing the hypotheses generated in Bewextra-Analytic. This questionnaire is sent to all participants and consists mainly of Likert scale questions. Each need hypothesis can be rated from 1 to 4, where 1 means that the hypothesis does not fit at all and 4 means that the hypothesis fits perfectly. Further, the participants are asked to give us some general demographic information about them as well as specific questions on their professional environment (e.g. size of the organization, the region where the company operates, etc.).

Additionally, the participants are asked to comment on the completeness of the proposed need hypotheses in case that relevant needs or need aspects are missing. This communicative validation can either be done in a workshop setting (as in case 1) or as part of the online questionnaire.

The simultaneous use of completeness (qualitative) and correctness (quantitative) validation allows us to accept or reject the generated hypotheses about needs in order to finally create a catalogue containing explicit knowledge about substantial needs. Figure-5 sums up the final step of our Bewextra framework.
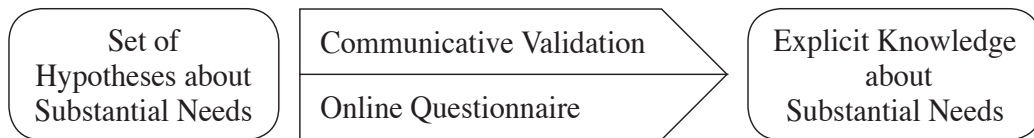

Figure 5. Bewextra-Validation (step-3)

Empirical findings

This section exemplifies our conceptualization of needs, desires and satisfiers we introduced in section 2 with empirical data. Thereby we illustrate the interrelation between the three steps of our framework (see section 3). Additionally, we summarize key figures and specific findings from three different projects (case studies) and reflect on the lessons learned.

Examples for the conceptualization of needs, desires and satisfiers

Our proposed hierarchy of needs, desires and satisfiers (see section 2) has been theoretically founded as well as empirically tested. In previous projects we analyzed how people are used to articulate ideas and wants, namely as artifacts or actions. We make use of this habitual way of communication and refer to this type of statements as satisfiers. In Bewextra's step-1, we acquire the satisfiers by which the participants describe (narratively) the desired future they imagine. Subsequently, in step-2, we approach the data by generative listening. This abductive analysis results in sound assumptions about the desires participants may have and which are not apparent in the raw data (satisfiers). Further, we condensed and aggregated these desires and hypothesize need categories.

Examples from the subsequently described cases for these three concepts are given in table 1. Although concrete examples are given, the reader should be aware of the fact that the related statements of each participant stem from a narrative which draws a whole and coherent picture of the desired future in mind and therefore it has to be interpreted holistically and must not be analyzed in isolation. As described, in step-3 the need hypotheses are discussed and validated by the members of the system.

Table 1. *Examples for needs, desires and satisfiers from three cases.*

	Case 1	Case 2	Case 3
Satisfier (What?)	"Children talk about the baker."	"Everyone is allowed to take the final exams whenever s/he feels ready to."	"E-bicycles to shuttle between buildings on the campus"
Desire for … (How?)	I want my profession to be valued from outside my professional sphere. I want my work to have value for my customers.	Individualize my learning progress and adjust my efforts accordingly.	I want to economize my mobility on the campus in a fashionable way. Using technology is cool.
Need for … (Why?)	Appreciation of the professional group	Self-unfolding	Efficiency

Due to the use of a qualitative data analysis software (ATLAS.ti) the groundedness, i.e. the relation between the need (hypothesis) postulated by the researchers and the raw data (satisfiers acquired in step-1), is ensured and made transparent.

Case Studies

Case 1 – Austrian Bakers, Austrian Federal Economic Chamber (WKO)

The Austrian Federal Economic Chamber (WKO) offers various services to their compulsory members. In order to (re)define new and adapted services, the WKO is interested in understanding their members' needs. Therefore, an action research project was conducted in 2013 to gain knowledge about the substantial needs their members have to work successfully. The aim was to generate a catalogue of the substantial needs of the WKO member companies which are in business for more than 10 years (maturity stage) and employ more than 5 and less than 50 people (small and medium-sized enterprises). For this research enterprise, one important industry was chosen by the WKO, namely the Austrian Bakers. Accordingly, the research question was "*What are the substantial needs Austrian bakers have?*"

In order to gain data from the envisioning task in Bewextra's step-1, the guiding question was "*From the perspective of [role], how does your fulfilled reality in 2015 look like, in which all your wished and goals have become true?*" The question was intended to guide participants in their ideal future scenario. Additionally, two questions sharpened the focus of preexperience and the subsequent narrative reporting: "*In this year 2015, what has come about, what is new?*" and "*What has disappeared?*" By design, asking these two questions emphasizes the difference between 2015 and today (spring 2013). The year 2015 as the future point in time has been chosen in accordance with the project partner WKO.

Accounting for the system theoretical considerations discussed earlier (see section 3), each participant put himself/herself into four related perspectives and thereby covered all relevant views in the respective system: Customers, entrepreneurs, employees and the perspective of the WKO as a support giving institution. The considered role changed the guiding question respectively.

Using the method of generative listening, we identified 591 codes representing hypothetical desire(s) and/or need(s) underlying the satisfiers. In a second coding cycle, we consolidated these codes to a final number of 441 codes.

Similar codes (e.g. typos, synonyms) were consolidated, then analysts tried to find emerging patterns and corresponding concepts in there. The resulting structure was transferred into ATLAS.ti. We finally derived twelve main hypotheses (with several sub-hypotheses each) about categories of needs from these codes.

According to our framework described in section 3, the validation was done by the persons concerned in two ways, quantitatively (correctness) and qualitatively (completeness). Firstly, an online survey testing the correctness of the hypotheses was conducted, and secondly, a final workshop in which the results (hypotheses) were presented and feedback was obtained to test the results' integrity (communicative validation). All need hypotheses were accepted by the bakers. These were the following:

Table 2. *Need hypotheses (bakers).*

Need for handcraft working	Need for quality of life and social safety
Need for time	Need for an orderly world and cooperation
Need for relief of the entrepreneur	Need for appreciation of the professional group
Need for co-responsibility of employees	Need for innovation
Need for qualification	Need for security
Need for profitability	Need for customer satisfaction

Based on these needs the Austrian Chamber of Commerce (WKO) has developed several new services that support the bakers in their entrepreneurial activity. For example they developed an innovative coaching service for bakers, which helps bakers to have more time for handcraft working by learning how to relieve in the fields of administration and organization. For more details on this case see (Kaiser et al., 2014; Kragulj, 2014a).

Case 2 – High School in Lower Austria

This project was conducted with a high school in Lower Austria. The project was intended to be a research project, however, during the carrying out, it turned out that the results are valuable for the quality management initiative the school runs to ensure continuous quality improvement. Therefore, it gained practical relevance.

The main purpose of this project was to make the needs of teachers, pupils (separated by branches within this school called "HAK", "HAK" and "HAS"), parents and the private school provider explicit. Prior the data acquisition, these stakeholder groups were identified as concerned and crucial to be asked. Different to other projects, the stakeholder groups were represented by themselves and the data acquisition was twofold. The vast majority of participants (teachers, pupils) took part in a data acquisition workshop in their school. Additionally, managers of the private

school provider were interviewed separately in their offices. This was intended to gather in-depth information from a stakeholder group crucial for the process, but with a small number of representatives involved (two interviewees). The interview data was equally integrated into the workshop data. Unfortunately, neither pupils of branch "HAS" nor parents participated in the project.

The data analysis approach was similar to other Bewextra projects, except that university students, who were trained prior to the analysis, took part in the generative listening task too. Their results were equally integrated and coded. In this project we conducted three coding cycles in order to come up with data density that allowed for establishing the 15 need hypotheses which were the following:

Table 3. *Need hypotheses (high school).*

Need for solidarity [dimension A *]	Need for justice
Need for quality of school food	Need for wellbeing
Need for quality of teaching	Need for practice orientation
Need for flexibility	Need for unfolding the self
Need for space for unfolding	Need for participation
Need for modernity by means of technology	Need for internationality
Need for variety	Need for solidarity [dimension B *]
Need for persistence	

(*The need for solidarity was split into two dimensions A and B indicating that those were of opposing quality. However to our astonishment both hypotheses were accepted by the survey participants.)

The need hypotheses were validated with an online survey to which all workshop participants were invited. In short, all need hypotheses were accepted by 97 survey participants with an average acceptance rate of 89%. However, only the need hypotheses "persistence" turned out to be controversial, it was accepted by (only) 69% of the survey participants. An in-depth analysis of the survey data showed that - different to the concrete satisfiers, which are controversially viewed among different stakeholders - needs are of inclusive quality meaning that different stakeholders can commit themselves to common needs to largely the same degree than others. This has been analyzed by the different acceptance rates of different stakeholder groups. The most controversial need hypothesis "persistence" had a maximum delta of 38%-points in acceptance rate between teachers (94%) and pupils HAK+ (56%). The average delta over all need hypotheses between the maximum acceptance and the minimum accepted among the stakeholder groups was 14%-points; only three need hypotheses showed a delta in acceptance greater than 20%-points ("variety", "solidarity, dimension B", "persistence").

These results confirm our assumption that organizations may be well advised to engage with their common needs first in change processes, in order to find common ground for sustainable solutions and strategies based on their needs.

Case 3 –Vienna University of Economics and Business

This Bewextra case study had a special focus on the data acquisition part (step-

1). We intended to analyze the effects learning approaches (Learning from an Envisioned Future versus conventional learning) have on the generated needs, i.e. on the overall outcome of the Bewextra process. For this purpose, we conducted a study with 25 students from the specialization field "Information Systems and Operations" at the Vienna University of Economics and Business. Participants were separated into two groups employing either Learning from an Envisioned Future or conventional learning from past experiences. Both groups together produced a total number of 572 satisfiers. Subsequently, we analyzed the generated satisfiers as described in section 3 and identified 115 codes. Subsequently, we clustered these codes to find their underlying needs. Combining the two learning approaches, we identified 19 different need categories; 4 categories emerged regardless of the respective learning approach, 7 categories emerged from the satisfiers collected in the past-oriented learning approach and 8 clusters emerged from the satisfiers collected in the future-oriented learning approach. These were:

Table 4. *Need hypotheses (university).*

Need for individuality	Need for community
Need for freedom and flexibility	Need for quality
Need for efficiency	Need for security
Need for sustainability	Need for self-realization
Need for consideration	Need for practical relevance
Need for transparency	Need for convenience
Need for communication	Need for appreciation
Need for purpose	Need for variety
Need for curiosity	Need for being on the pulse
Need for holism	

These findings suggest that applying both learning methods leads to a significantly higher number of unique satisfiers and resulting need categories. More precisely, using Learning from an Envisioned Future as an additional source of learning led to an approximately 64% increased number of covered need categories. 16 students from the Vienna University of Economics and Business took part in the validation survey. Within the questionnaire, each of the 19 need hypotheses (along with a short description) was tested for the participants' agreement. Overall, the approval rate was 84 %. The needs with the lowest agreement rate originate from the past-oriented workshop. It is unclear, whether the needs "efficiency" (50%), "security" (63%) and "sustainability" (69%) constitute needs of the whole system; these high rejection rates should serve for further discussion within the system. For more details on this case see (Kaiser, Kragulj, Grisold, & Walser, 2015).

Summary of the three cases and lessons learned

In the following table 5. summarizes the key figures of the three cases discussed.

Table 5. *Overview of empirical benchmarks.*

	Case 1	Case 2	Case 3
Participants in data acquisition	120	173	25
Answers and ideas (satisfiers)	3.600	2.587	572
Codes after first coding cycle (desires)	591	826	115
Codes after second coding cycle	441	301	n/a
Codes after third coding cycle	n/a	130	n/a
Hypotheses about needs	12	15	19
Participants in validation	121	97	16

These three projects cover a diverse range of organizational domains. Thus, the insights we gained from the cases are based on a variety of empirical data. In the following we outline our lessons learned from these projects which are valuable for refining our framework and the specific procedures.

• Combination of learning approaches

Based on the results from case 3 we can conclude that an additional learning source enables a more holistic view on the needs individuals have in a social system.

A corresponding study (Kaiser et al., 2015) has not revealed a significant qualitative difference between learning from an envisioned future and learning from past experiences; learning from one source does not appear better than learning from the other source. Consequentially, to get a holistic understanding of the needs in a social system, it may be best to use a combination of both learning sources, i.e. using conventional learning approaches in the form of learning from the past as well as Learning from an Envisioned Future, as they both together increase the spectrum of needs.

• Involve stake holder groups concerned in person

As argued, we cover multiple perspectives within the system under investigation. This was done either by putting oneself into the shoes of another person (case 1) or by involving the stakeholder groups in person. Comparing the data from these two cases (1 and 2) reveals that the results are more ecological stable in case 2 where the groups took part in the project themselves. For example, we observed that bakers reported the same satisfiers from their own and the imagined perspective of being their customers (case 1). This provokes doubts about whether people are really able to put themselves into the other stakeholders' shoes in this setting.

• Format of data collection

One of Bewextra's main feature is to be efficient in involving many people with relatively little time needed. In these workshops, the time travel ritual should enable people to detach from past and today's limitations and shift their thinking towards an ideal future. The instructed ritual is a time journey encouraging participants to construct their desired future as an imagined narrative. To best report from "there", the format of data collection should be suitable for the imagined narrative. In short, we may conclude that it is easier for analysts to access and understand these

narratives meaningfully if the raw data is collected in a semi-structured format, which allows for continuous text on the one hand side and on the other hand side keeps it structured (guiding questions, suggestion of bullet point lists).

• Online communicative validation

Researchers are interpreting the participants' satisfiers. This interpretation might be either wrong or incomplete (or both). To avoid this, the hypotheses are validated by the members of the respective social system on two dimensions "Are these needs complete?" and "Are these needs correct?" (step-3). To answer the latter question an online questionnaire has proven to be suitable. We initially proposed to approach the first question by an additional workshop following the idea of communicative validation. (Kvale, 1995) In case 1, we conducted such a designated workshop, whereas in the other cases we integrated the "completeness" validation into the online survey and considered the inputs in the final project results. This approach turned out to deliver results comparable to the workshop approach, however it does not offer the possibility to discuss the hypotheses in person with others, i.e. immediate knowledge transfer (and knowledge implementation). Therefore, we are going to consider more sophisticated online tools for this validation which efficiently and effectively support a discussion and consultation of the need hypotheses (Taudes & Leo, 2015).

Conclusion

The focus on needs and knowledge about needs in organizations drastically extends the range of possible solutions and enables organizations to create more innovative and sustainable products and services.

The overarching goal of this work is to introduce a framework for the creation and discovery of knowledge about needs in organizations. To the best of our knowledge, it is the first theoretical work that describes the generation of need knowledge based on learning from an envisioned future as an abductive process in a methodologically and replicable way.

Even though we do not discuss external social change, we believe Bewextra is relevant for futures studies because learning from an envisioned future in combination with abductive reasoning seems to be helpful for a foresight process. Further, the two large case studies (cases 1 and 2) have shown that our Bewextra framework enables even rather large organizations to detect and generate need knowledge with a small amount of time. Based on the discussed lessons learned and the plan to work with even larger social systems (e.g. communities) our future research will cover the following areas:

• Analyzing whether an IT support for Bewextra-Collect as well as for Bewextra-Analytic is possible and useful.
• Designing and implementing additional methods for learning from an envisioned future in organizations.
• Theoretical foundation of an enhanced learning theory, which covers learning from the future as well as learning based on experiences in the past.

Acknowledgement

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Article E:

Learning from an Envisioned Future: An Empirical Account

Kaiser, A., Kragulj, F., Grisold, T., & Walser, R. (2016). Learning From an Envisioned Future - An Empirical Account. *Electronic Journal of Knowledge Management 14*(1), 18-30. ISSN 1479-4411.

Learning from an Envisioned Future: An Empirical Account

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Abstract: Innovation processes require organizations to transcend current boundaries. These include not only technological as well as social limitations but -above all- the way we address the future. We are used to face the future with our existing knowledge and experiences from the past. This strategy, however, can hardly lead to knowledge off the beaten path. We therefore suggest a new learning approach for organizations, which enables to literally envision a desired future scenario and thereby, allows for the creation of radical new knowledge. We argue that the created knowledge yields a higher degree of novelty and radicalness. Along with an enhanced theory of learning including learning from the future, we present our empirical findings from comparing the outputs of *Learning from an Envisioned Future* and learning from the past. For this purpose, we use data from two organizational learning projects; one, which was conducted with a high school in Austria and another one, which was conducted with members of the Austrian Economic Chamber. Our findings from both case studies suggest that *Learning from an Envisioned Future* does produce significantly more paradigm challenging knowledge compared to the output gained from conventional learning from past experiences. We conclude that the combination of both learning sources may lead to best learning outcomes in organizations.

Keywords: organizational learning, learning from an envisioned future, knowledge management, multi-case study, learning modes

1. Introduction

It is generally assumed that companies have to continuously progress in order to gain competitive advantage and to be able to innovate. Accordingly, an organization is seen as a dynamic entity (Nonaka, Toyama, & Nagata, 2000), which creates knowledge in order to cope with its changing environment. A common approach to innovate is to apply well-proven solutions to new contexts. Thereby, we may enable incremental innovations that include new aspects but are restricted by the past (e.g. by experienced limitations, cognitive boundaries etc.); they tend to share common features and are "more of the same".

We suggest an additional type of learning which yields the potential to overcome these limitations; we argue that by shifting our attention towards an ideal future scenario we enable the creation of knowledge, which is less biased by our experiences from the past. We label this method *Learning from Interacting with an Envisioned Future*, in short *Learning from an Envisioned Future* (Kaiser, Fordinal, & Kragulj, 2014; Kragulj, 2014a, 2014b). Thereby, subjects are guided into an envisioned future scenario where they create knowledge. We assume that the outcome of our method differs from conventional learning modes, both in terms of quality and quantity. However, this has rarely been tested empirically and will be the subject of this paper (Kaiser, Kragulj, Grisold, & Walser, 2015a).

In the following section, we will outline the theoretical background *of Learning from Interacting with an Envisioned Future*, in short *Learning from an Envisioned Future*, to then present our findings from two empirical studies where we contrasted learning from the past with learning from the future. Finally, we will discuss the result and provide a conclusion along with implications for practical implication.

2. Theoretical background

2.1 Research on learning – where is the future?

What is learning? Albeit defined by many authors in slightly different ways, conventional experiential learning theory defines learning as "the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience" (Kolb, 1984, p. 41). Thereby, learning is defined as an action-reflection process based on reflecting experiences from the past, i.e. experiences are acquired in the past and by processing these experiences, we adjust our behaviour to meet later demands. A popular illustration may be a child who, after burning her hand by touching a hot stove, has learnt not to touch the hotplate again. The concept of learning from the past is well developed and underlies all major learning methodologies, best practices and

approaches to organizational learning. There are several learning theories, which are all based on the paradigm of learning from past experiences (Argyris & Schön, 1978, 1996),(Kolb, 1984), (Kolb & Kolb, 2005), (Bateson, 1972).

However, this conventional conception of learning heavily rests on the assumption that what we learn is always dependent on success or failures that have been made in the past, i.e. all behaviour is anchored in a previous point of time. Psychologist Seligman and colleagues point out that the idea of such a "driven by the past-framework" has been dominant in the research on cognition-related topics, such as learning (Seligman, Railton, Baumeister, & Sripada, 2013, p. 120). The authors draw attention to a lack of considering prospection - i.e. the ability to represent possible future states that have never occurred – in theories on human cognition (ibid.), even though this feature is central and unique to humans (Roberts, 2002). They reason that this lack may be due to the supremacy of behaviourism in psychology and learning theory, where behaviour was thought to be determined by the organism's past while mental events (such as prospection) were strictly excluded "in favour of drives and habits" (p. 121).

While "learning and memory necessarily reflect past experiences" (Seligman et al., 2013, p. 120), psychology should also focus on an organism's capability to anticipate and act in view of possible future states; the authors intend the idea that "intelligent action is guided by assessment of future possibilities rather than driven by the past" (p. 129).

In line with Seligman and colleagues, we want to emphasize that conceptualizing learning, as being solely rooted in past experiences, may be only one side of the coin; rather, past experiences should be understood as a basis to *selectively* extract information and behaviour based on goals on needs in the future (Seligman et al., 2013, p. 119). Hence, the imagination of future states shall serve as an additional source of learning and past experiences.

There is a strong demand for a future-related learning approach in the field of knowledge management; here, experiences from the past are often referred to as constraints for successful future behaviour (Tsang & Zahra, 2008). Nonaka highlights that "companies have to create new futures in order to survive. Those features can no longer be extensions of the past; they must be leaps of faith into the tomorrow" (Nonaka & Takeuchi, 2011, p. 67). Scharmer takes a step further and calls for "learning from the future as it emerges" to transcend the boundaries of what we are used to know and think in order to facilitate the creation of new knowledge (Claus Otto Scharmer, 2001). In a similar vein, Buchen (1999) suggests that in order to move beyond "incrementalism", i.e. the repetitive use of well-known strategies and thinking patterns, we must shift the attention to anticipating and learning from future states (Buchen, 1999, p. 121).

An alternative kind of learning may be of particular interest for the research on innovation as it may help us to understand how *radical* innovations occur. The conventional idea of learning from past experiences may explain how incremental innovations occur as they are seen as "extensions to current product offerings or logical and relatively minor extensions to existing processes" (McDermott & O'Conner, 2002, p. 424). However, it remains puzzling how radical innovations can be achieved, as they are "new technologies or ideas into markets that are either non-existent or require dramatic behaviour changes to existing markets" (ibid). Radical innovations cannot be extrapolations of past experiences and thus, they constitute a radical rupture with the conventional view of learning.

The inclusion of future states has been happening in different research areas, such as rationality (Kahneman, 2011), empathy and emotion (Gilbert, D. T., Wilson, 2000) or psychotherapy (cf. "future-directed therapy", Vilhauer et al. (2012)). Surprisingly, it has only been vaguely considered in learning theory even though it has been found that remembering the past and imagining the future rely on the same cognitive resources; both episodic memory and prospective simulation share cortical substrates and common process, such as "the storage and recall of individual details, mental imagery, and self-referential processing". Additionally, "both involve constructive operations that bring together these elements in a coherent mode" (Schacter & Addis, 2007; Seligman et al., 2013, p. 129; Szpunar, 2010).

By merging both sources, our idea of "Learning from an Envisioned Future" may be an approach to fill the gap, as it adds an additional future-related learning source. It seems especially interesting to scholars and practitioners in the field of knowledge management as it suggests to getting rid of past experiences and thereby, to facilitate the creation of (radically) new knowledge (Buchen, 1999; Seligman et al., 2013; Tsang & Zahra, 2008).

2.2 Learning from an envisioned future

Inspired by Scharmer's *Learning from the Future,* we developed a methodological framework, which takes the approach of learning from the future to a literal use. Our method of *Learning from Interacting with an Envisioned Future*, in short *Learning from an Envisioned Future*, embraces the imagination and the actual interaction with a

desired future scenario. (Kaiser et al., 2014; Kragulj, 2014a) Essentially, the method calls for projecting ourselves forward in time and to pre-experience a world, which we construct mentally (Atance & O'Neill, 2001). By doing so, we generate knowledge from the experience we make in our imaginary environment in the absence of actual sensory experience, by guiding subcortical structures in situations where they respond as if to actual sensory experience (Gilbert, D. T., Wilson, 2007; Seligman et al., 2013; Szpunar, 2010). By developing a goal worth striving for and by identifying actions to reach this goal from the present situation, we add an a-priori teleological dimension (i.e. we introduce a goal before the learning process initiates), which appears essential for successful future learning (Seligman et al., 2013). This teleological dimension forms a crucial difference between our Learning from Envisioned Future and Scharmer's idea of Learning from the Future. While we explicitly encourage subjects to construct goals to then find out how they can reach these goals, Scharmer proposes to shift attention towards the individual's inner world, to accept the pure experience and to sense the very moment by "connecting with the source of one's best future possibility and of bringing this possibility into the now" (C. Otto Scharmer & Kaeufer, 2010, p. 25f); what wants to emerge, however remains unclear until it has been embodied in manifest experience (Claus Otto Scharmer, 2000).

The methodological procedure for our approach looks as follows: in a workshop or interview setting, we encourage participants to imagine and report from an ideal future scenario. Participants should fully immerse into their imagination, which contains the desired state of the respective social system from their point of view (e.g. the ideal school in the future from the perspective of a teacher working there). From "there", the participants should narrate as if they already interacted with their envisioned future environment – how does it look like; how does it feel to be "there"? We facilitate the process of "time travelling" by providing an enabling space (Peschl & Fundneider, 2014), using rituals like music and change of physical gesture (e.g. changing the sitting position when "reaching" one's ideal future scenario).

Our method aims to facilitate the detachment from today's circumstances, including restrictions, boundaries and impossibilities experienced in the past. We want to enable people to come up with visionary and creative results transcending the current state of affairs and leaving behind the "dirty work of the past" (Seligman et al., 2013, p. 134).

By learning from an envisioned future, we can mentally create images of solutions and scenarios that seem unrealistic with respect to any given circumstances including social, economic or technical limitations, but are nevertheless attractive to us, i.e. they may please us and meet our needs (Goffin, Lemke, & Ursula, 2010). Thereby, we can model our own desired future and subsequently align our actions in order to bring our imagination to life.

Furthermore, learning from an envisioned remote future may facilitate the articulation of more intrinsic thoughts as "a more distal time perspective shifts attention inwards, towards the core and most defining characteristics of the person, activating the ideal self" (also see Boyatzis & Akrivou, 2006; Kivetz & Tyler, 2007, p. 196).

In the following section, we introduce an enhanced theory of learning, including learning from the future, to show that our approach may be a well-fitting extension to theoretical consideration about learning.

2.3 An enhanced theory of learning including learning from the future

In (Kaiser, 2016) our enhanced theory of learning has been described in detail. In this paper we will provide a brief outline of the most crucial aspects of our theory.Our suggested theory is based on the learning theory by Gregory Bateson (Bateson, 1972). He proposed several levels of learning. In the following, we use Bateson's learning theory (without taking into account Learning 0) as a basis for conceptualizing a coherent theoretical framework that integrates both learning from the past and learning from the future. In a <u>first step,</u> we will present Bateson's three different levels of learning in a more formalized way. For this we define the following domains/sets, which are relevant at each level of learning:

A:	set of (action) alternatives
G:	set of goals
R:	result (outcome, output) of a learning process
o U:	o set of underlying values, needs, assumptions, beliefs – "the underlying mental model"

Using these domains, we can define Bateson's levels of learning Learning-1, Learning-2 and Learning-3 as follows.

Learning-1 (L-1): L-1 is described as change within a set of alternatives (Bateson, 1972). It involves optimizing the choices of alternatives taken out of *A*. This learning and optimization is based on experiences from the past, driven by the elements of *U* and controlled via the goal *G* and the resulting outcome *R,* by taking the selected alternatives *A'* out of *A*, where $A' \subseteq A$. In short, L-1 leads to knowledge about the optimal choice of alternatives out of a static set of (action) alternatives.

Learning-2 (L-2): L-2 is described as change in the set of alternatives (Bateson, 1972). So in L-2, the set of (action) alternatives becomes dynamical. This change in the set of alternatives is based on experiences from the past driven by the elements of *U* and controlled via the goal *G* and the resulting outcome *R,* by taking the selected alternatives out of *A+*. As L-2 is a change in the set of alternatives, *A+* refers to the changed set. We can define that $A+ \neq A$. The main learning outcome of L-2 is knowledge about the changed set of alternatives along with knowledge about the new action alternatives, i.e. all elements of *A+,* which have not been elements of *A*. Methods like case based reasoning or forecasting enable L-2.

Learning-3 (L-3): L-3 is described as a corrective change in the system of sets of alternatives from which a choice is made (Bateson, 1972). So while L-1 optimizes the choice of alternatives out of a static set of action alternatives (*A*) and L-2 changes the set of action alternatives (A) and creates *A+*, the main focus of L-3 is *U*, which is the set of underlying needs, values, etc. – summarized as "mind set". While Bateson points out that L-3 rarely if ever occurs, we propose that L-3 certainly is a very challenging learning mode but nevertheless it may occur more often than not.

Remember that *U* mainly drives L-1 as well as L-2 and determines *A* as well as *A+*. *U* is a rather complex construct. In our approach, we propose that the current set of *U* is determined by two influencing variables:

- an internal motivated part *UI* and
- an external motivated part *UE*

UI furthermore can be split into a conscious part *UIC* and an unconscious part *UIU*. Needs, values or aspirations which I am aware of are examples for *UIC,* e.g. the aspiration of earning a lot of money or the need of receiving a lot of compliments; needs and values which I am currently not aware of are examples for *UIU*, e.g. the need for safety in different forms which strongly influences a lot of my actions but I wouldn't be able to articulate it. Examples for UE are expectations of others, general valid values and rules or widely acknowledged knowledge.

At this point, it must be emphasized that L-3 changes the current set of *U* and this change is based on experiences from the past. The main learning outcome of L-3 is threefold:

- Creation of knowledge, which elements of UIC are currently strongly action driving when selecting alternatives and which other elements of UIC are – currently – more in the background. Hence, the externalization of the elements of UIC and the roles they are playing at any given moment are one crucial aspect of L-3;
- Becoming aware and making explicit the elements of UIU – as far as possible – is another learning outcome of L-3. L-3 is strongly connected with reflection work, may it occur in a therapeutical setting (psychotherapy, etc.) or in a consulting/counselling oriented setting (coaching, supervision, mediation, etc.) on an individual level as well as on an organizational level (group coaching, group supervision, etc.). Furthermore, L-3 can be seen as a learning mode for becoming aware of some main components of the ideal self (Boyatzis & Akrivou, 2006) ;
- Knowledge is gained by focusing on the set of UE. This essentially means to consider consequences for those entities which are involved by the action alternatives (A). This third learning outcome is strongly connected with the aspects of phronesis (Nonaka & Toyama, 2007) or common good and with the whole field of sustainability.

All three learning outcomes together change the set of *U* to an updated current set $U_{mod.}$.

In a <u>second step,</u> we will enhance the described learning theory consisting of those three levels of learning by adding an alternative source of learning along with three additional levels of learning. Based on the idea of *Learning from an Envisioned Future*, which embraces the imagination and the actual interaction with a desired future scenario, we are able to define Future-Learning-1, Future-Learning-2 and Future-Learning-3.

Future-Learning-1 (FL-1): FL-1 can be defined as a change within a set of alternatives based on experiences from an envisioned future. It refers to optimizing the choices of alternatives taken out of *A*. This learning and optimization is based on experiences from the envisioned future *F* determined by *G*. It is driven by the elements of *U* and controlled via a backcasting approach beginning in the envisioned future and ending in the presence based on which the selected alternatives A_F' out of *A* are identified, where $A_F' \subseteq A$. FL-1 leads to knowledge about an optimal choice of alternatives out of a static set of action alternatives.

Future-Learning-2 (FL-2): FL-2 can be defined as change in the set of alternatives based on experiences from an envisioned future. So in FL-2, the set of (action) alternatives becomes dynamical.

This change in the set of alternatives is based on experiences from the envisioned future F determined by *G*, driven by the elements of *U* and controlled via a backcasting approach beginning in the envisioned future and ending in the presence. As FL-2 is a change in the set of alternatives, it creates A_F+, where A_F+ denotes the changed set of alternatives. Therefore, we can define that $A_F+ \neq A$. The main learning outcome of L-2 is knowledge about the changed set of alternatives, i.e. knowledge about new action alternatives, more specifically those elements of A+ which have not been elements of A.

Future-Learning-3 (FL-3): FL-3 can be defined as a corrective change in the system of sets of alternatives from which a choice is made based on experiences made in an envisioned future. Accordingly, FL-3 changes the current set of *U*. This change in the current set of *U* is based on experiences from an envisioned future determined by *G*, and controlled by an abductive reasoning process. Abductive inference may help us to construct an intentional explanation through motives (reasons) that makes the behavior tangible. It is the only logical operation which introduces any new idea (Fischer, 2001).

The main learning outcome of FL-3 is threefold:

- Creation of knowledge, which elements of UI are substantial for me in the long run;
- Transcending existing boundaries by envisioning the future enables the creation of knowledge of how to serve the common good. This high-quality knowledge is described as phronesis (Nonaka & Toyama, 2007). Phronesis takes into account contextual circumstances, addresses particulars, and shifts aims in process when necessary and is guided by values and ethics.
- Identifying and creation of knowledge about hidden needs (Goffin et al., 2010) is another learning outcome of FL-3. Hidden needs are defined as requirements that customers or users have but which they have not yet directly recognized. As these requirements rest on a subconscious level, users are unable to articulate them (Goffin et al., 2010). So, hidden needs are strongly connected with *UIU* in our theory (Kaiser, Kragulj, Grisold, & Walser, 2015b).

All three learning outcomes together change the set of *U* to an updated current set $U_{mod.}$.

Relationships between the six learning modes

Analyzing those six learning modes, we can see that *G* plays an important role in this learning theory.

On the one hand, in the case of learning based on the experiences from the past, *G* determines *R* in L-1 and L-2 and enables as well as creates the experiences from the past, which are essential for the learning modes L-1, L-2 and L-3. Hence, *G* also influences *A+* and *A'* which are the main output of L-1 and L-2. On the other hand, *G* is an important driver for the envisioned future *F* in the case of FL-1, FL-2 and FL-3. *G* itself is determined by *U*, (respectively *UIC*, *UIU* and *UE*) which is changed by L-3 as well as FL-3, and so the twofold learning cycle is complete. Figure 1 depicts this twofold learning cycle.

The set of *U* is changed by L-3 and FL-3 as well and therefore it determines and may possibly change the goal *G* to a modified goal G_{mod}. Assuming that G_{mod} could be the starting point for the subsequent learning cycle, this learning theory describes a recursive and iterative process of holistic learning.
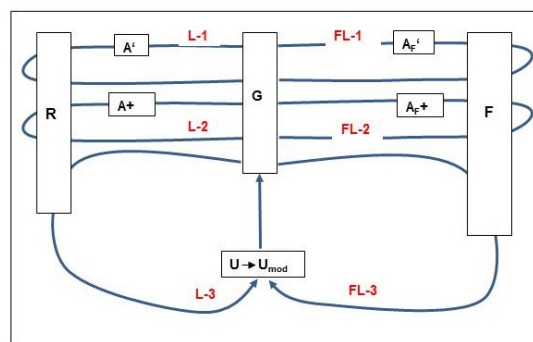

Figure-1: twofold learning cycle

Now let us have a look at the relation between *G* and *R* and the relation between *G* and *F*. The result *R* is the concrete output by taking actions in order to achieve the goal *G*, whereas *F* is the consequence of a fulfilled goal, without taking into account in which way it has been reached. Therefore, we can compare *R* and *G* and describe respectively "measure" the differences between them. This measurement constitutes experiences which are more oriented towards the past. *F* gives a good orientation and description of what it actually looks and feels like when *G* has been reached. So *F* is some kind of corrective whether *G* is a "good and correct goal" and it constitutes experiences which are more future-oriented.

In short, we have **two kinds of experiences**, which determine the learning outcome and are responsible for the continuous change and development of *U* as well as *G* and *A*.

3. Research gap, research question and research methodology

The bulk of empirical studies focusing on the output of learning processes are based on the conventional learning paradigm, i.e. learning from past experiences (e.g. Engeström & Sannino, 2010; Goh, 2003; Issenberg, McGaghie, Petrusa, Lee Gordon, & Scalese, 2005; McEneany, 1990; Mishra, 2001; Simonin, 1997; Smits, Verbeek, & de Buisonje, 2002). Although we do notice an increasing relevance and popularity in the approach of learning from the future in literature and practice (Jaworski & Scharmer, 2000; Kaiser et al., 2014, 2015b; C. Otto Scharmer & Kaeufer, 2010, 2013; Claus Otto Scharmer, 2007; Szpunar, 2010), there is a lack of empirical studies exploring the output of this learning approach. There are no empirical studies, which compare the output of learning based on past experiences with the output of learning from the future.

Based on this research gap, the main purpose of our paper is to investigate the output of learning from the future empirically. Accordingly, the research question is: *"How does the use of Learning from Interacting with an Envisioned Future as an additional learning mode support the quality and quantity of innovative ideas?"*

In line with the definition of Yin (1994) and (Eisenhardt & Graebner, 2007), we use empirical data from two distinct projects to conduct a multi-case study. The two case studies differ in terms of their domains, persons involved (age, role, professional background), goals and structures. In both cases, we used and compared the same learning approaches, namely the traditional learning approach based on the past and Learning from an Envisioned Future as a future-related learning source. Thus, the results of both case studies are comparable in terms the genesis of data. As a result, we gained a rich set of empirical data incorporating two perspectives on the focal phenomenon (learning source), which we evaluated with regards to their creative potential.

Generally speaking, research on creativity and innovation shows that the assessment of output can be done with respect to different paradigms and evaluation procedures (Dean, Hender, & Rodgers, 2006; Piffer, 2012). We decided to analyze the collected output of both groups using the *Paradigm Relatedness Framework.* It allows for evaluating the novelty of an idea with regards to the status-quo of a particular system (cf. Dean et al., 2006; Nagasundram & Bostrom, 1994). Compared to other methods to measure creativity, the Paradigm Relatedness Framework allows for assessing novelty without having a *specific* problem context or goal that should be resolved with an idea; in our cases, (1) pupils were free to come up with whatever they found most desirable in their ideal school settings and (2) members of the Austrian Economic Chamber could fantasize about how ideal future states could be met.

The framework by Nagasundram & Bostrom (1994) depicting the relationship between elements and relationships between elements is shown in Figure 2.
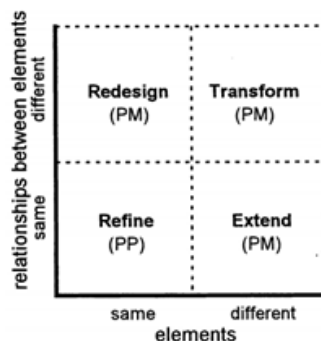
Figure 2: Analyzing paradigm-relatedness (Nagasundram & Bostrom, 1994, p. 94).

According to the *Paradigm Relatedness Framework*, the novelty of an output can be evaluated and classified as being either paradigm-preserving (i.e. an adaptation to the current conditions in a system) or paradigm-modifying (i.e. a modification of the current conditions in a system). Thereon, output can belong to one of *four categories*:

- Category 1 (Refine): Ideas are paradigm-preserving when they refine a system or a problem context.
- Category 2 (Extend): Ideas are paradigm-modifying when they change the system by adding a new element to the context.
- Category 3 (Redesign): Ideas are paradigm-modifying when they alter the relationship between elements of a system.
- Category 4 (Transform): Ideas are paradigm-modifying when they both add a new element as well as change the relationship of the elements.

In order to investigate the degree of novelty and radical change for the respective learning modes, we approached both case studies in the same way. In both cases, we randomized the collected data of both learning sources to remove any bias with regards to which learning source they came from. Subsequently, by going through all items we assessed each item for its creative potential by assigning one of the four categories suggested by the Paradigm Relatedness Framework. Finally, we merged the complete data for each case study and analyzed the overall output of each learning source in terms of quality and quantity. A detailed description for each case will be presented in the following section.

4. Case studies

Both case studies were organizational learning processes in different domains with different scopes (change management and strategy development).

Case study 1 was conducted in a high school with pupils in the age of 17 – 18 years. The intended outcome of the learning process was to describe an ideal situation of the high school, which potentially satisfies the pupils' needs. We refer to these describing statements as *satisfiers*, indicating one of many ways to potentially satisfy a need.

Case study 2 was conducted with the Austrian Economic Chamber (WKO). Around 50 official representatives participated in two workshops which were held to define concrete actions to realize four pre-defined long-term goals. Instead of describing satisfying states of affairs (which were already represented by the pre-defined goals), the guiding question in this project was what concrete actions could be taken WKO and politics to accomplish the goals.

Case study 1 strived for answering a *"what"* question, i.e. *what* satisfies pupil's needs in the particular high school, resulting in a description of an ideal state of affairs. In case study 2, participants elaborated on a *"how"* question, i.e. *how* could members of the WKO reach the pre-defined goals, resulting in a definition of concrete actions that can be taken.

4.1 Case study 1

The first case study was part of a large organizational learning project with 400 participants in a high school in Lower Austria, where we applied our methodological framework *Bewextra*. In short, the overall goal of Bewextra is to externalize knowledge about people's needs in a social system. In doing so, we differentiate between *satisfiers* (i.e. concrete solutions and products) and underlying *needs* (i.e. normatively important urges that themselves do not specify a concrete satisfier). (for further information on this framework, see e.g. Kaiser & Kragulj (2016)). We will now focus on the first step of the method, where we ask subjects to name a variety of concrete satisfiers. Here, we contrasted the satisfiers resulting from Learning from an Envisioned Future with the satisfiers resulting from the conventional learning from past experiences.

The case study was conducted in 2014 with pupils and a few teachers of two high school classes. They took part in two data acquisition workshops, i.e. we hosted one workshop for each class. All pupils were about the same age (17-18 years). In total, a number of 31 pupils and teachers participated in the study, where 12 pupils and 2 teachers were learning from their envisioned future (workshop 1), and 17 pupils learned from past experiences (workshop 2).

In workshop 1, we used our method Learning from an Envisioned Future. In workshop 2, the pupils were asked to think of their ideal future scenario while taking into account their past experiences. The participants of workshop 1 answered the following questions: (a) "What has emerged and is new?", (b) "what has come to an end?"; in workshop 2: (a) "What will have had emerged and is new?", (b) "what will have had come to an end?" So according to our

proposed enhanced theory of learning, in workshop 1 the participants primarily used the learning mode FL-2 and also FL-1, while in workshop 2, the primary learning modes were L2- and also L-1.

4.1.1 Analysis

In workshop 1, participants generated a total number of 369 satisfiers and in workshop 2, the participants generated a total number of 520 satisfiers. A team of four researchers analyzed the two data sets. The collected satisfiers were transcribed and randomized; any hint for whether they come from workshop 1 or workshop 2 had been effaced. Thereby, it was ensured to remain unbiased during the analysis. The procedure consisted of three steps. First, a subset of about 200 satisfiers was analyzed together in four in order to get a common understanding of how to approach the data. Second, the remaining satisfiers were distributed among the four researchers for individual analysis; this allowed for an efficient process and reduced a potential group-bias. In a third step, all satisfiers were jointly re-assessed and checked for intersubjective consistency.

We analyzed the satisfiers with two respects. First, we clustered the output according to abstract domains that emerged in the data sets. These domains were refined over several iterations. Thereby, we added structure to the high number of collected answers and facilitated a consistent assessment of the satisfiers. Second, we assessed each satisfier in terms of its creative potential according to the Paradigm Relatedness Framework. The following two examples are from the data set and illustrate how we assessed the items of different domains using the Paradigm Relatedness Framework as previously described in section 3.

Example A (domain: curriculum design): suggestions for a future curriculum design were:

- Category 1: Better explanations by teachers (refining current situation)
- Category 2: New teaching methods (new element into system)
- Category 3: Curriculum is organized as a flexible module system (relationship between existing elements)
- Category 4: No attendance at all, pupils can attend school via Skype (changed relationship of the elements and adding a new element).

Example B (domain: support of talent/strength): suggestions for future support of skills and talents were:

- Category 1: Generally more focus on recognizing and enhancing talents (refining current situation)
- Category 2: Offer of special course to support strengths (new element into the system)
- Category 3: Pupils are individually supported (changing relationship between existing elements, i.e. teachers and pupils)
- Category 4: Individual support of talents with special campaigns, e.g. sending them to universities (changing relationship of the elements and adding a new element)

4.1.2 Results

The key figures of case study 1 are summarized in Table 1.

|	Workshop 1 (Learning from an Envisioned Future)	Workshop 2 (Conventional learning from the past)
Number of participants	14 (12 pupils + 2 teachers)	17 pupils
Number of satisfiers	369	520
(Avg.) satisfiers per participant	26	31
Covered domains	61	59

Table 1: Key figures of case study 1

Figure 3 shows the number of different domains to which the generated satisfiers were assigned. Overall, we identified 70 different domains. 50 of them were represented in both workshops by at least one satisfier. The pupils participating in workshop 2 came up with 9 additional and unique domains whereas workshop 1 delivered 11 unique domains.
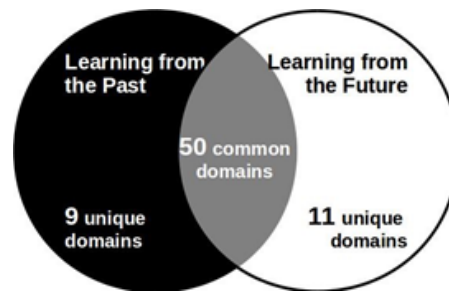
Figure 3: Common and unique domains of satisfiers produced in the respective learning mode

Furthermore, by comparing the respective outcome using the Paradigm Relatedness Framework, we can see in Figure 4 that Learning from an Envisioned Future generates almost 90% of all satisfiers that are ascribed to category 4 (i.e. containing the suggestions that are most paradigm-challenging and radical new for the system). Similarly, Learning from an Envisioned Future facilitated the creation of category 3-satisfiers, as it is evident with about 75%.
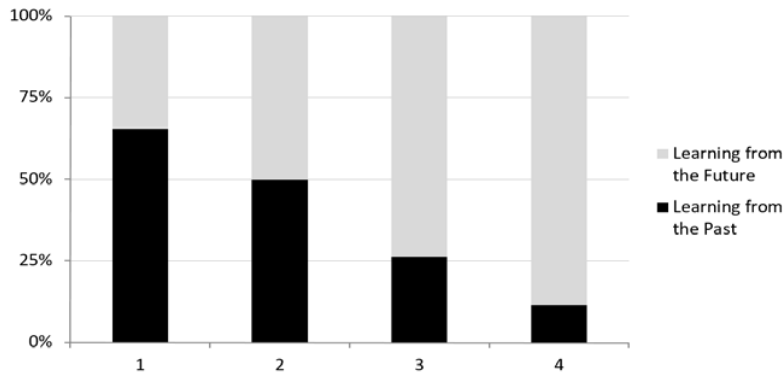
Figure 4: Composition of each category of paradigm-relatedness framework with regards to the learning mode

4.2 Case Study 2

The second case study was a strategy developing process we conducted with the Austrian Economic Chamber (WKO). The process was framed by four long-term goals pre-defined by WKO's management. The project's objective was to collaboratively create a goal-directed strategy for the industry sector Crafts and Trades with a time scope reaching into the year 2020. The project's intended outcome was to develop a widespread catalogue of concrete actions to reach the four pre-defined goals.

Similar to case study 1, we conducted two workshops where we used the learning modes respectively. Around 50 officials participated in both workshops.

For the purpose of this project and the subsequent analysis, a clear distinction between concrete actions and vague requests has been drawn. A statement has been identified to be an action when it concretely describes *what entity* shall be changed *in what way*. This action may be unrealizable under given circumstances, however, due to its concrete wording, it has to be conceivable in a way that members of the WKO would actually know *how* to actually take the action.

In both workshops, participants collectively developed concrete actions. Workshop 1 was led by a professional facilitator (not part of the researcher team) who facilitated a traditional past-oriented learning approach. 16 officials developed 79 statements of which 41 (52 %) were classified as actions. According to our proposed enhanced theory of learning, in this workshop learning mode L-2 has been primarily used complemented with learning mode L-1.

In workshop 2, 34 participants developed actions using Learning from an Envisioned Future as a learning source. They worked in four groups, where each group thought of actions to reach one of the four pre-defined goals. The participants generated 237 statements of which 62 (26 %) were classified as actions. In accordance with our enhanced theory of learning, mainly learning mode FL-2 has been used in addition with FL-1.

4.2.1 Analysis

The analysis of this case study resembled the analysis of case study 2. The classification of statements as actions (workshop 1: 52 %; workshop 2: 26 %) was done irrespectively of their origin (items of both workshops were randomized and any hint for which learning mode they came from had been effaced). In a next step, we categorized all actions into domains. Finally, we analysed all items using the Paradigm Relatedness Framework.

4.2.2 Results

The key figures of our case study are summarized in Table 2.

Table 2: Key figures of case study 2

	Workshop 1 (Conventional learning from the past)	Workshop 2 (Learning from an Envisioned Future)
Number of participants	16	34
Number of statements	70	237
Number of actions *(cleared up)*	41	62
(Avg.) actions per participant	2.56	1.82
Covered domains	7	7

The 103 items, which were identified as actions, covered 8 domains. 6 domains were addressed in both workshops. One domain was almost exclusively covered by the first (past-oriented) workshop whereas one domain was covered by the second (future-oriented) workshop. Thus, conducting two workshops using both learning approaches led to an increase of 14.3 % with regards to the number of domains that were covered by the actions.
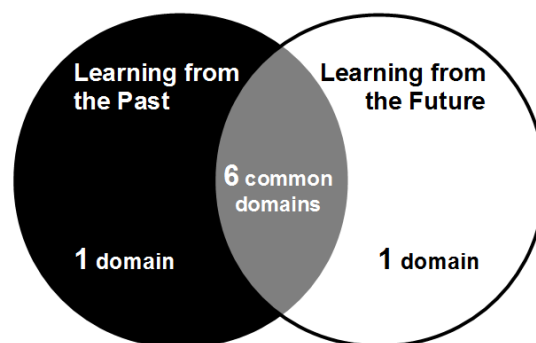
Figure 5: Common and unique domains of actions produced by the respective learning mode

Using the Paradigm Relatedness Framework, the analysis reveals results similar to those of the first case study. Figure 6 shows that a significant majority of the actions that were found to belong to category 4, i.e. the most paradigm-challenging, originate from Learning from an Envisioned Future, as it is evident with 86%. On the contrary, actions that were found during the past-oriented workshop make up almost two thirds of group 1, the least radical and possibly least innovative category. It has to be stated that workshop 2 produced more actions than workshop 1, which may be due to the higher number of participants in workshop 1. However, the distributions in category 2 and category 3 confirm the trend that the future oriented workshop results in more status-quo challenging actions.
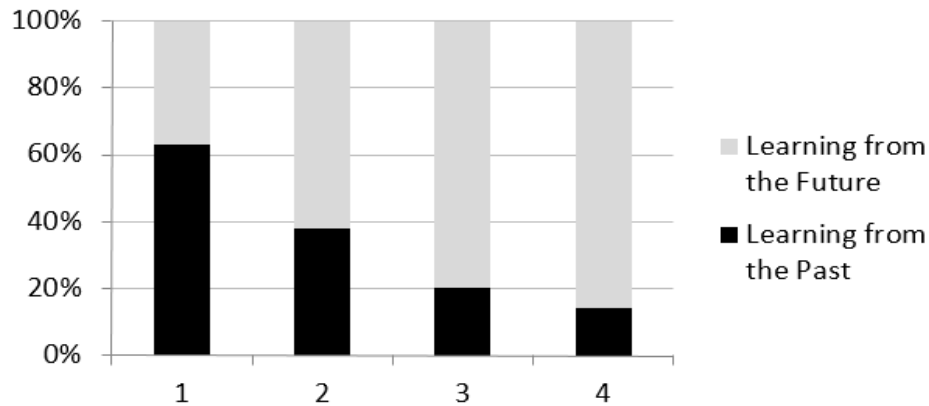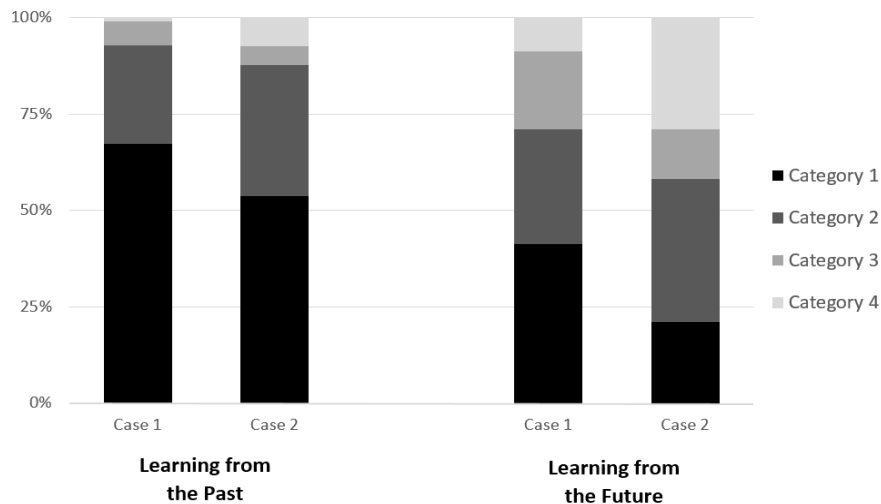
Figure 6: Distribution of the four categories of the paradigm relatedness framework that were produced in the respective learning modes

4.3   A comparison of the main outcomes of the two cases

Figure 6 shows the distribution of the categories for both workshops separately. The results indicate that Learning from an Envisioned Future supports the generation of paradigm-challenging action (i.e. actions that belong to categories 2, 3 and 4). Overall, the output of the past-oriented workshop was paradigm preserving with a rate of 53 %. On the other side, only 20 % of the actions of the future-oriented workshop refer to existing paradigms. These results are in line with the findings from case study 1.

Following our research question and comparing the outputs of both case studies, we can observe differences of both learning sources in terms of quality and quantity.

Firstly, Learning from an Envisioned Future generates output that is more challenging to the status-quo of a social system and yields a higher degree of novelty. On the contrary, the conventional learning from past experiences produces a considerably higher number of satisfiers that are paradigm preserving, i.e. that refine the current state of the system. Therefore, there is an overall tendency for providing more moderate and less novel ideas in a conventional learning based on past experiences. These results indicate that Learning from an Envisioned Features tends to facilitate the generation of paradigm-modifying output (i.e. satisfiers assigned to categories 2, 3 and 4). Figure 7 comparatively illustrates the distribution of the categories for the respective learning modes.

Figure 7: Comparison: distribution of the four categories of the paradigm relatedness framework produced in the respective learning mode

Secondly, by combining both learning approaches, the number of overall covered domains increases considerably (case 1: + 18.7 %; case 2: + 14.3 % compared to learning from the past only). Although the number of different

domains should not be taken as a guarantee for a higher quality per se, we can reason that a more diverse output provides an additional valuable scope for action. Furthermore, it increases the possibility that less obvious but possibly important topics are revealed.

5. Conclusion and implications

Our analysis of two different cases provides three main findings.

Firstly, it demonstrates that Learning from an Envisioned Future yields the potential for being an additional learning mode as it most likely enables the creation of creative and innovative solutions.

Secondly, our case studies show that the combination of learning based on experiences from the past with Learning from an Envisioned Future leads to a higher number of innovative ideas, both in terms of quality and quantity. The results suggest that an optimal learning strategy is not about deciding to either learn from the past or from the future, but to use both modes complementarily. The results of the case studies illustrate that combining both learning modes increases the number of domains covered in the learning processes.

Finally, there is solid evidence that these findings hold for diverse domains and even for different intended learning outcomes.

As a result, this research has important implications for practice. Utilize alternative learning modes like Learning from an Envisioned Future fosters innovative and sustainable solutions, irrespective of the field in which they are applied.

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Article F:

Investigating the Impact of Need Knowledge on Strategy Development in Organizations

Kragulj, F. and Fahrenbach, F. (2016). Investigating the Impact of Need Knowledge on Strategy Development in Organizations. In S. Moffett and B. Galbraith (Eds.), *Proceedings of the ECKM-2016 (17th European Conference on Knowledge Management)* (pp. 485-493). Reading, UK: Academic Conferences and Publishing International Limited. ISSN: 2048-8961. ISBN 978-1-911218-02-9.

Proceedings of the
17th European Conference on Knowledge Management
Ulster University
Northern Ireland, UK
1-2 September 2016

Edited by
Dr Sandra Moffett and Dr Brendan Galbraith

Proceedings of
The 17th European
Conference on
Knowledge Management

1-2 September 2016

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Investigating the Impact of Need Knowledge on Strategy Development in Organizations

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Abstract: Strategy development results from a knowledge-creating process to guide organizational behavior and achieve (long-term) goals. However, a strategy rarely considers the needs of the organization and its members explicitly. If known and considered, needs might have an existential impact on behavior. Therefore, we propose that a profound strategy should take into account needs. Arguably, the generation of any strategy can be considered as an organizational learning process, which is shaped by and results in knowledge. Therefore, a knowledge perspective might be helpful to study what impact the consideration of needs has on the outcome of a strategy development process. Since the concept of need knowledge has only been introduced recently to knowledge-based management, the impact of this type of knowledge has not been considered in strategy development processes. Our empirical research aims at understanding the differences between strategies, which emerge with regards to needs in the social system and strategies, which are developed without explicitly considering needs. Therefore, we conducted an experiment with two groups of students, who were encouraged in a collaborative learning task to design strategies for a better learning and teaching environment at their university. To evaluate these strategies, we used a repertory grid analysis to investigate how explicit need knowledge affects the outcome of the organizational learning process.

Keywords: need knowledge, organizational learning, strategy development, repertory grid, personal construct theory

1. Introduction

A strategy provides a path for achieving long-term goals. At best, it is the result of a knowledge-creating planning process (Takeuchi, 2013) and reflects a description of the course of actions to be taken in order to reach set goals (Chandler, 1962). Many variables potentially affect the emergence of strategies (Alexander, Graham, & Harris, 1998). Presumably, one of them are needs. Although we are usually unaware of our needs, they play a central role in the guidance of our behavior.

However, needs are not the means of their realization (actions, strategies, etc.; in short, satisfiers). A focus on needs rather than on their concrete realizations helps us escaping binary decisions (yes or no) on certain actions and allows for developing alternative strategies. Our previous research concentrated on how to turn implicit needs into explicit knowledge about them. In this paper, we investigate the impact of need knowledge in terms of the resulting strategies by conducting an experiment in an organization and thereby, collecting data with high ecological validity.

We compare strategies, which are explicitly informed by need knowledge, to strategies, which are not. Concretely, we aim at understanding the perceived differences between strategies, which knowingly address needs of students in the social system ("need-based strategies" (NBS)), and strategies which are developed without such a preceding consideration ("non-need-based strategies" (N-NBS)). By contrasting these categories of strategies, we empirically investigate what impact explicit knowledge about needs has on strategies. Figure 1 illustrates this approach.
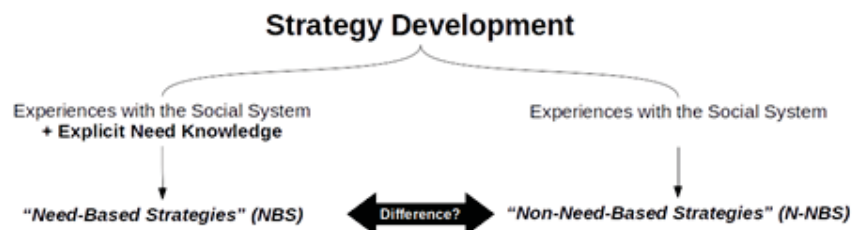
Figure 1: Schematic depiction of the experiment including the influencing knowledge categories

We structure the remainder of this paper as follows: First, we outline the research gap and define our research question. Second, by taking a knowledge perspective, we introduce our notion of needs in order to grasp the

impact of needs on strategy development. Third, we describe our experiment in which we used the repertory grid method. Fourth, we present the results along with limitations and future directions for research.

2. Research gap and research question

Psychologists suggest that needs are the driving force (i.e. motivation) for behavior in general and adaptation and learning in particular. They defined human needs as stable and absolute categories, without taking into account the dynamics and the current (temporal) state of a social system, such as an organization (e.g. university) (Gasper, 1996; Kesebir, Graham, & Oishi, 2010). Furthermore, it has been argued that needs are most effective when we are consciously aware of them (Stampe, 1988).

However, it has not been investigated what impact awareness of needs has on adaptation processes of small-scale social systems, i.e. organizational learning processes. Following Huber (1991), who argues that organizational learning results in a change of the potential behaviors an organization can perform, we argue that strategy development reflects a realization of such a learning process. Consequently, we investigate a strategy development process in order to understand what impact awareness of needs has on the process' outcome. Consequently, the research question is as follows: *How does explicit knowledge about needs condense in collectively created strategies for the organization?*

3. Theoretical background

We will briefly discuss our notion of needs and their relation to the means of their satisfaction. Subsequently, we will outline the concept of explicit knowledge about needs and argue why this knowledge may be helpful in organizational learning processes such as strategy development.

3.1 Relation between needs and satisfiers

Needs are defined differently across disciplines. However, two major notions of needs can be identified in the literature: while psychology treats needs as explanatory drivers for behavior, which are unique to humans, have a psychological or physiological nature and are accompanied by experiential sensations (e.g. Deci & Ryan, 2000; Hull, 1943; Maslow, 1970; Murray, 1938), other disciplines such as customer-oriented subjects (e.g. Bayus, 2008; Goffin & Lemke, 2004; Hyysalo, 2003; Pincus, 2004; Wagner & Hansen, 2004) or management define needs as *instrumental necessities towards an end*, i.e. targeting a purpose (e.g. customer satisfaction or well-being). Theorists and practitioners alike draw an important ontological distinction between needs and satisfiers (e.g. Braybrooke, 1987; Max-Neef, 1992; Patnaik & Becker, 1999). Satisfiers refer to concrete measures to fulfil a need, i.e. strategies, actions, products, services, etc. In light of this dichotomy, they put an emphasis on needs for several reasons: First, "needs last longer than any specific solution" (Patnaik & Becker, 1999). Needs are stable over time, whereas concrete solutions are coined by current circumstances (e.g. technology). Second, needs provide a roadmap for developing a strategy towards need satisfaction. In so doing, the articulation of needs may profoundly affect such processes. And third, a focus on needs "keeps all possible solutions open for consideration and avoids prematurely limiting possibilities" (Patnaik & Becker, 1999). This reflects the potentiality of explicit needs compared to instances of solutions (i.e. satisfiers) (Holst & Stahlbröst, 2006); especially, in cases when concrete solutions are lacking, even if the need is given: "Before microwave ovens were invented it was not possible to consult users about requirements. [...] However, the need[s], i.e., heating food [...] could have been identified" (Ericson & Stahlbröst, 2006; Preece, Rogers, & Sharp, 2002).

Synthesizing the two major views on needs in literature, i.e. needs are motivational forces, as suggested by psychology, and needs are instrumental necessities towards a goal, as suggested by philosophy and adopted in customer-related and management fields, we define needs as *instrumental necessities depending on a substantial purpose, which gain motivational power through conscious reflection; thereby,* we contrast them with satisfiers, which are *concrete means to meet needs*. We argue that there may be several potential satisfiers to one need.

To sum up, the relationship between needs and satisfiers is a "one-on-many" relation. It seems promising to consider needs at the beginning of an organizational learning process: they offer prioritized guidance for strategy development, since needs are necessities to reach a substantial end (purpose) and different to mere demands. Second, needs do not entail a specific solution (i.e. strategy), but trigger and inform a sustainable learning process (Kaiser, Kragulj, & Grisold, 2016).

3.2 Explicit knowledge about needs fostering strategy development

According to Idenberg (1993), a strategy development process follows two dimensions; goal orientation (what) and process orientation (how). On the intersection of these, four types of strategy development approaches are observable: (strong process orientation (p.o.)/strong goal orientation (g.o.)) "logical incrementalism", (strong p. o./weak g. o.) "guided learning", (weak p.o./strong g.o.) "rational planning", (weak p.o./weak g.o.) "emergent strategy".

For the purpose of this paper, we adopt the "guided learning" approach to strategy development, which holds that "one must steer the situation from inner motivation and openness to change, because external goals cannot continuously determine the course to be taken" (Idenberg, 1993). Strategy development is driven by intrinsic motivation rather than external demand. In line with this view, fundamental needs (which are contingent to the substantial purpose of the needful entity) intrinsically inform the learning process, i.e. the strategy development.

From a knowledge-based management perspective, Nonaka argues that knowledge creation is a conversion of tacit and explicit knowledge. He emphasizes that the conversion of knowledge cannot be *controlled,* its emergence can only be *enabled* (Nonaka, Toyama, & Konno, 2000). He argues that management activities should focus on enabling conditions for knowledge creation and, in turn, management decisions should be made with regards to both tacit and explicit knowledge. While the utilization of tacit knowledge is subject of other research (Venkitachalam & Busch, 2012), we want to focus on the role of explicit knowledge. Following Nonaka and other scholars , we argue that explicit knowledge about needs constitutes a capacity to act (Stehr, 2012; Sveiby, 1997, 2001), which is sharable among a group of people, and may foster the collective development of NBS.

4. Method

In this section, we outline the method we use for the experiment and briefly discuss its theoretical underpinnings.

4.1 Personal construct theory and repertory grid technique

In order to address our research question, we use the repertory grid technique (Fransella, Bell, & Bannister, 2004), which is rooted in the personal construct theory (PCT). Developed by Kelly (1955), it follows the tradition of constructivism and humanistic psychology. PCT argues that humans make sense of their world in terms of similarities and differences. It describes how the constructed mental model influences humans' experience and behavior. Accordingly, every (conscious or unconscious) judgement underlies an implicit theory of the world (Fransella et al., 2004). These mental models can be explicated using the repertory grid technique. Repertory grids are used as a tool for knowledge explication and shed light on the meaning-creating process of individuals (Hemmecke, 2012). Repertory grid analysis has been applied in organizational settings (e.g. Brophy, 2003; Rugg et al., 2002) and can be employed on a variety of artefacts, which are perceivable and describable, such as software design (Hassenzahl & Wessler, 2000), cultural differences (Tomico, Karapanos, Levy, Mizutani, & Yamanaka, 2009), brand personality (Heine, 2009), ICT (Fallman & Waterworth, 2010), customer expectations (Baxter, Goffin, & Szwejczewski, 2014), and, as in our case, organizational strategies. Hemmecke (2012) describes repertory grids as a structured methodology with a profound theoretical background (PCT) as viable for knowledge-based management. They proofed to be valuable in converting tacit into explicit knowledge (Hemmecke, 2012; Nonaka et al., 2000).

A repertory grid analysis consists of three parts:

- A set of elements represents the subject of the evaluation. In our case, these elements were created under semi-controlled circumstances (see 5.2).

- A set of constructs reflects the perception of the subjects in terms of bi-polar construct/contrast pairs. These pairs emerge in semi-structured interviews. In a repetitive process of presenting triades of elements to the interviewee construct/contrast, pairs are elicited until no new pairs are named. Variations of this method are described in literature (Hemmecke, 2012).

- A set of ratings of elements on constructs: Each element is located between the two poles of the construct/contrast dimension. This can either be done with single individuals or with a larger number of participants where survey data is being averaged. The outcome allows for simple as well as complex statistical analysis such as cluster analysis.

5. Experiment

To investigate the impact of explicit need knowledge on strategies, we contrasted strategies explicitly addressing the needs in the social system with strategies not explicitly addressing needs. Both were developed by students of our university. In this section, we will outline the experiment and the subsequent analysis.

5.1 Results from a previous case study: catalogue of validated needs (step-1)

In a previous research project, we generated a catalogue of substantial needs of students of our university, which was the starting point for this experiment. The research question was: "What do students need in their academic environment?" (more details can be found in Kaiser, Kragulj, Grisold, & Walser, 2015; Kaiser, Kragulj, & Grisold, 2016; Kaiser and Kragulj, 2016). Over the past three years we have been developing a method for generating and inferring explicit knowledge about needs in organizations (Kaiser, Fordinal, & Kragulj, 2014; Kragulj, 2014). Applying our method called "Bewextra", we identified the following 14 needs (cf. figure 2):

Individuality	Self-Realization
Community	Consideration
Freedom and Flexibility	Practical Relevance
Quality	Transparency
Efficiency	Convenience
Security	Communication
Sustainability	Appreciation

Figure 2: Identified needs of students (Kaiser, Kragulj, Grisold, & Walser, 2015; Kaiser, Kragulj, & Grisold, 2016; Kaiser & Kragulj, 2016)

5.2 Element elicitation: Strategy development (step-2)

In two experimental groups (group A and group B), we asked students to develop strategies, which we specified as a detailed plan of action how to potentially improve the learning and teaching environment at their university. The narrative results should be concrete enough to be implementable within two years. Even though, participants of the two groups differed slightly in terms of their average study time elapsed and their average age, both groups were comparable, because all participants were experienced undergraduate students from the same study program.

Students were encouraged to work in teams of two or three to develop a concrete strategy. This took about 30 minutes. Different to group A, group B was introduced to the previously identified needs (see 5.1) and a discussion was fostered in order to get students acquainted to them. Afterwards, group B did the same task (strategy development) like group A. In total, 11 strategies were developed. 4 of them were "non-need-based strategies" (N-NBS) (group A), whereas 7 were "need-based strategies" (NBS) (group B). However, one NBS was excluded from the analysis because it did not comply with the task. An overview of the key figures of step-2 is given in table 1.

Table 1: Key figures of step-2

	Group A	Group B
	"Non-need-based strategies"	*"Need-based strategies"*
No. of students	9 (5 male, 4 female)	14 (5 male, 9 female)
No. of teams	4	7
Avg. age	21.5 yrs.	26 yrs.
Avg. study time elapsed	2.5 yrs.	4 yrs.
No. of developed strategies	4	6 (7)
Avg. word count of strategies	126 words	

5.3 Construct elicitation: Judging strategies (step-3)

Based on the 10 strategies, step-3 aimed at elicitating the subjects' mental models of perception using the repertory grid analysis.

5.3.1 Interviews

In order to elicitate constructs from the elements (strategies), we conducted 7 semi-standardized interviews with graduate students (4 female, 3 male; avg. age 24.5 yrs.; avg. study time elapsed 5 yrs.), as described in Fransella et al. (2004). For these interviews, strategies (NBS and N-NBS) were mixed and any hint about their source was removed. Therefore, we adjusted tenses, grammar and writing style while leaving the content unchanged. Based on these elements, interviewees explicated constructs and contrasts, which best described their perception of the strategies.

An interview took around 45 minutes and was structured as follows: After a brief introduction on what the guiding question for creating the strategies was (without hinting at the two different genesis approaches), the interviewee had sufficient time to read through all strategies and ask for clarification afterwards.

Then, we presented randomly generated triads of elements to the interviewee and asked him/her to find a similarity in two of the three elements and label it with an adjective, which is the construct. Subsequently, we used the opposite method (Neimeyer, Bowman, & Saferstein, 2005) and asked the interviewee for the similarity's opposite. This encouraged the interviewee to explicate the contrast. This elicitation procedure was repeated until saturation was reached; this was indicated when previously named construct/contrast pairs were repeated for three times without finding any new pairs. The six interviews resulted in 119 construct/contrast pairs, which showed similarities in terms of content.

5.3.2 Clustering

3 interviewees clustered the construct/contrast pairs according to their similarity in meaning. This reduced the overall number of items, which facilitated the rating in the subsequent step. Utilizing a "haptic approach", all construct/contrast pairs were printed out and spread on a table. We asked the participants to cluster the pairs to find semantically coherent patterns. They were free to move cards around and discuss the emerging sets. This aimed at finding clusters, which were most coherent in themselves and most distinct from other clusters. Next, we asked participants to identify the most salient construct/contrast pair from each cluster, which exemplary represents the cluster as a whole. This procedure, which lasted for around 30 minutes, resulted in 21 dominant construct/contrast pairs (21 clusters). Results are summarized in table 2.

Table 2: Key figures of step-3

	Interviews	**Clustering**
No. of interviewees	7 (3 male, 4 female)	3 (3 male)
Avg. age	24.5 yrs.	23 yrs.
Avg. study time elapsed	5 yrs.	5 yrs.
Outcome	119 construct/contrast pairs	21 clusters (21 dominant construct/contrast pairs)

5.4 Construct rating: online survey (step-4)

Finally, we used an online survey to conduct the construct rating. For every single strategy we asked participants whether it is better represented by the construct on the left or the contrast on the right extreme of the spectrum (the 21 construct/contrast pairs were shown randomly); for this, we used a non-numbered six point semantic differential scale, which allowed for measuring the questionee's attitudes towards the elements. We asked (other) students of the university to participate in the survey. Key figures of the survey are shown in table 3.

Table 3: Key figures of step-4

No. of (completed) questionnaires	52	
No. of questionees	32 females 20 males	41 undergraduates 4 graduates 5 PhD students 1 Other enrolment
Avg. age of participants	26 yrs.	
Avg. study time elapsed	3.5 yrs.	

5.5 Data analysis and results

In this section, we outline the data analysis procedure and present the results.

The questionnaire (see 5.4) consisted of 210 questions (10 strategies x 21 construct/contrast pairs), which were answered by 52 questionees and resulted in 10.920 data points. To investigate these data points in one repertory grid table, we averaged all answers for each question.

The resulting repertory grid was analyzed using the R software package *OpenRepGrid* (Heckmann, 2011). To visualize the repertory grid, Bertin (1974) proposes the so-called *Bertinplot*, which shows the average ratings of all 52 questionees on the 10 strategies (cf. figure 3). Strategies are rated in between two extremes (left = 100; right = 600) and their scores are reflected by a color shade. In a brighter cell, the strategy was rated as belonging (rather) to the construct (left extreme) while the darker cell shows strategies that were rated as belonging (rather) to the contrast (right extreme). The poles are grouped in a way that the right hand side reflects positively connoted constructs. For example, strategy 9 (S-9 (N-NBS)) was perceived mainly in terms of the left extreme and, therefore, its visualization is brighter compared to strategy 8 (S-8 (NBS)), which was rather located at the right extreme. However, contrasting the average rating of NBS (M = 421.17, SD = 100.47) and N-NBS (M = 403.38, SD = 115.25), we only found a difference of 4 %. Additionally, we performed a T-test on the averaged values and found no significant difference between the ratings on NBS and N-NBS, $t(208) = 1.18$, $p < .05$.

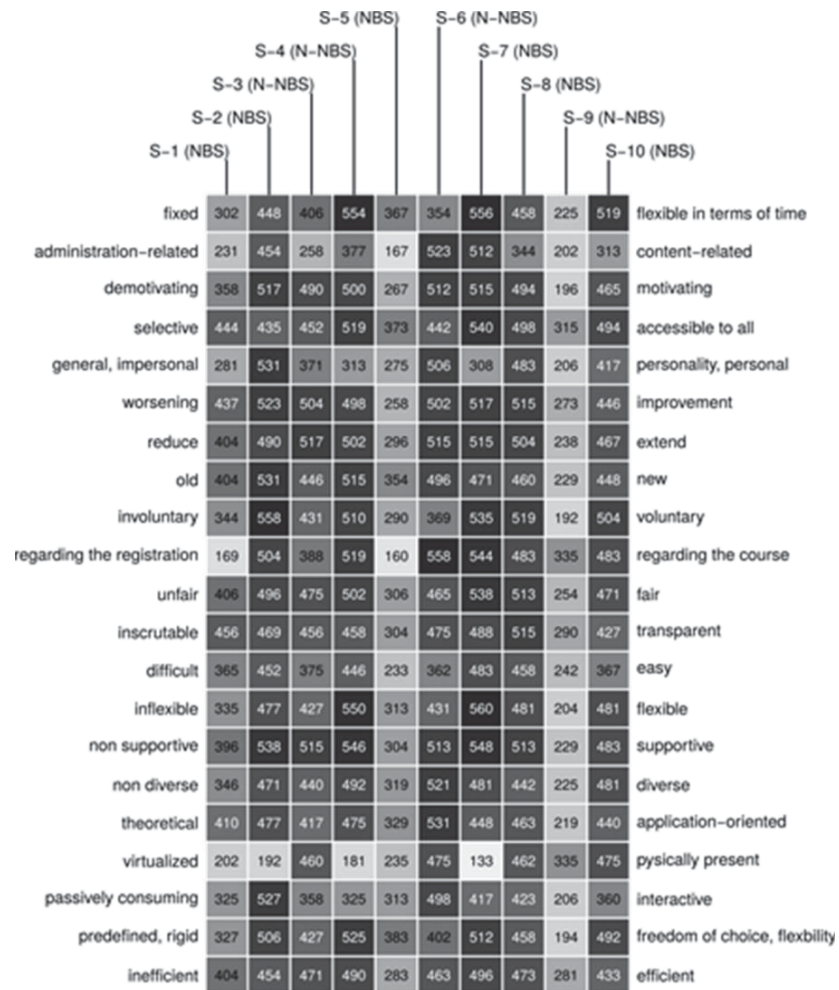|	S-1 (NBS)	S-2 (NBS)	S-3 (N-NBS)	S-4 (N-NBS)	S-5 (NBS)	S-6 (N-NBS)	S-7 (NBS)	S-8 (NBS)	S-9 (N-NBS)	S-10 (NBS)	
fixed	302	448	406	554	367	354	556	458	225	519	flexible in terms of time
administration–related	231	454	258	377	167	523	512	344	202	313	content–related
demotivating	358	517	490	500	267	512	515	494	196	465	motivating
selective	444	435	452	519	373	442	540	498	315	494	accessible to all
general, impersonal	281	531	371	313	275	506	308	483	206	417	personality, personal
worsening	437	523	504	498	258	502	517	515	273	446	improvement
reduce	404	490	517	502	296	515	515	504	238	467	extend
old	404	531	446	515	354	496	471	460	229	448	new
involuntary	344	558	431	510	290	369	535	519	192	504	voluntary
regarding the registration	169	504	388	519	160	558	544	483	335	483	regarding the course
unfair	406	496	475	502	306	465	538	513	254	471	fair
inscrutable	456	469	456	458	304	475	488	515	290	427	transparent
difficult	365	452	375	446	233	362	483	458	242	367	easy
inflexible	335	477	427	550	313	431	560	481	204	481	flexible
non supportive	396	538	515	546	304	513	548	513	229	483	supportive
non diverse	346	471	440	492	319	521	481	442	225	481	diverse
theoretical	410	477	417	475	329	531	448	463	219	440	application–oriented
virtualized	202	192	460	181	235	475	133	462	335	475	pysically present
passively consuming	325	527	358	325	313	498	417	423	206	360	interactive
predefined, rigid	327	506	427	525	383	402	512	458	194	492	freedom of choice, flexbility
inefficient	404	454	471	490	283	463	496	473	281	433	efficient

Figure 3: Bertinplot on the average rating of all questionees

We used a Biplot analysis (cf. figure 4) to jointly visualize all elements and constructs and the relative distances between them. The Biplot allows for reading the relative position of an element (indicated as points) on a construct/contrast pair, which are indicated as vectors. For example, S-9 was perceived as unfair, old, inefficient and non-supportive, whereas S-4 and S-7 were perceived as voluntary, flexible and easy.
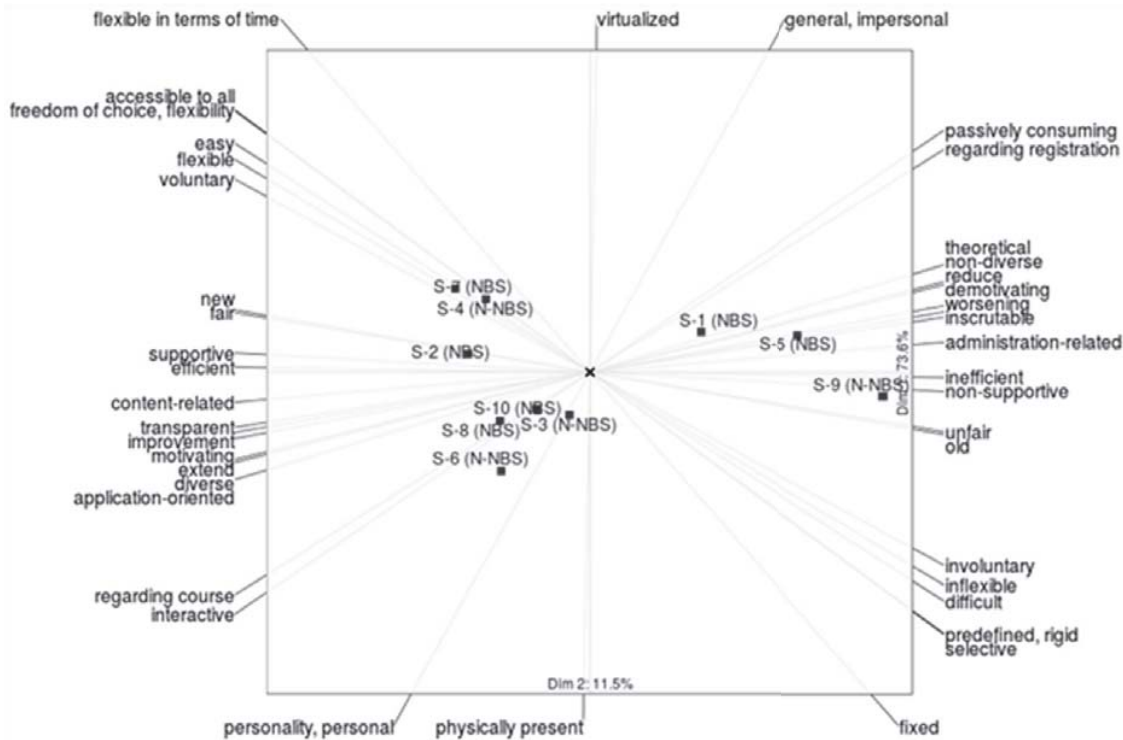
Figure 4: Biplot depicting the relative distances between elements and constructs (row means centering); two element clusters highlighted

Similar to the Biplot, the cluster analysis describes a set of statistical methods to visualize similarities and distances in larger sets of data. This is achieved by decreasing in-cluster distance and increasing between-cluster distance. We used a hierarchical cluster analysis to investigate whether elements and/or constructs show patterns of similarity. Therefore, we calculated the Euclidean distance and used the *Wards* method as the linkage criterion. We performed a cluster analysis for the construct/contrast-pairs as well as the elements. Since we did not find any observable and stable cluster patterns in construct/contrast pairs (bootstrapped cluster analysis; 500 replications; $p < .05$) we can conclude that the clusters created by the interviewees (see 5.3.2) were stable in terms of in-cluster homogeneity and between-cluster heterogeneity. Examining the cluster analysis of the elements, we identified two clusters on the top level (indicated by two ellipses in figure 4). However, these two clusters as well as all subordinated clusters were mixed and included NBS as well as N-NBS. Since we could neither find a cluster, which only contains NBS, nor one, which only contains N-NBS, we cannot draw a clear distinction between those strategies in terms of their perceived properties.

Answering our research question, we could not find any stable patterns, which indicate distinctive perceptional properties of NBS compared to N-NBS, in our experiment. Therefore, we could argue that needs – whether explicit or not – intuitively influence strategy development under circumstances characterized by few constraints ("as if"-situation).

6. Conclusion and discussion

This study depicts the first empirical evaluation of the impact of explicit need knowledge on strategy development in an experimental setting. Our conclusion is two-fold.

First, there is a clear overlap between needs and the perception of strategies (i.e. constructs; e.g. need for "freedom and flexibility" – construct "flexible/inflexible"; need for "efficiency" – construct "efficient/inefficient"; need for "transparency" – construct "transparent/ inscrutable"), which is in line with the assumption that needs govern our behavior and thus, they can guide strategy development. However, this overlap is also apparent in N-NBS (cf. figure 4). This indicates that needs influence our acting even when we are not explicitly aware of them.

Second, we did not find any solid difference between NBS and N-NBS. Considering the Biplot and the cluster analysis, there are neither properties exclusively found in NBS nor in N-NBS. With regards to our research question, we could not find any properties that are unique to NBS; we cannot conclude that need knowledge has a distinct effect on the outcome of a strategy development process.

These findings may be due to the following circumstances: in both experimental groups, the creation process of the strategies was not affected by restricting conditions (e.g. limited resources, contextual restraints from any superordinate social system, competing viewpoints, etc.; e.g. different stakeholder interests in a community). Participants were free to come up with whatever ideas that came to their minds and had not to find a consensual strategy. The only criterion was feasibility, which was reflected in the participants' personal experiences with the social system. In laboratory settings, where participants must not consider any restrictions, it seems that they intuitively create strategies, which meet non-articulated needs. However, this "intuitive approach" might reach its limitations in "real-world" environments, which may be characterized by scarce resources, competing interests, bounded rationality, and other restrictions. A potential limitation of our study could be the small number of participants; the results must not be seen as representative for the entire social system.

Based on the findings of this preliminary study, we suggest that further research should investigate the potentiality of explicated need knowledge in complex situations, which are characterized by disagreement or even stand-offs on the satisfier level, i.e. mutually exclusive ideas promoted by different stakeholders cancel each other out. We hypothesize that need knowledge, which results from a common understanding of shared needs, could provide the basis to find alternative strategies (satisfiers). One possibility to implement this could be the design of a method to scale the relative importance of needs. Such a prioritization could guide strategy development under "real-world" circumstances.

Acknowledgements

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