Florian Kragulj

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

Available online at www.sciencedirect.com

ScienceDirect

Procedia Computer Science 99 (2016) 195 – 212

Procedia Computer Science

International Conference on Knowledge Management, ICKM 2016, 10-11 October 2016, Vienna, Austria

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

Florian Kragulj [a]*

[a]*WU Vienna University of Economics and Business, Welthandelsplatz 1, 1020 Wien, Austria*

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 trans-disciplinary 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 a specific type of knowledge crucial in the transition from needs to need satisfaction. I argue that this knowledge has to be generated and utilised in organisational learning processes.

Peer-review under responsibility of the Organizing Committee of ICKM 2016

Keywords: organisational learning ; knowledge-based management ; innovation ; needs ; customer needs ; equifinality ; capacity to act

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.

* Corresponding author. Tel.: +43-1-31336-5231.
E-mail address: florian.kragulj@wu.ac.at

Peer-review under responsibility of the Organizing Committee of ICKM 2016
doi:10.1016/j.procs.2016.09.111

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). 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 process*es?*

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, derived from this ontology, I will establish a knowledge perspective on the transition from needs to need satisfaction. 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?

Organisational learning can be seen as an umbrella term for organisational adaptation and knowledge processes. Acknowledging the importance of the ability to learn and adapt in 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."[18]

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. [19] New experiences act as triggers for learning processes in which these experiences are transformed into new knowledge.

However, the fundamental question 'what role do needs play in organisational learning processes?' has not been tackled yet, even though it would shed light on possible drives that cause change.

It has been argued that addressing needs is an effective approach to guide organisational change [20], increase employees' well-being [21] and support decision making. [22] Particularly, it has been shown that the consideration of needs is important for innovation processes and fosters their results.[23,24,4,7,2,8]

One specific potentiality lies in the basic distinction between needs and the means of satisfaction (satisfiers) which can be found throughout the literature (e.g. [25,11,7,26,27,28,29]). 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.[30]

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 [30] '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).[31] 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.[32] Furthermore, Kruglanski et al. [33] 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.[34] However, there are several attempts to classify human needs on different levels and in various realms (for an overview see [35]). Derived from Taylor [36] '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[36] 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 (section 3.2), customer-related fields (design, innovation, consumer research) and needs assessment (section 3.3) as well as philosophy, social politics and economics (section 3.4).

3.2. Needs As Explanatory Drives for Behaviour

Psychological need theories employ the first notion of needs. [16] Although several theories have been proposed (e.g. [37,10,9,38,39,40,41,42,43,44,45,46]), 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.[37,47,48]) or to lacking qualities of experience that all humans thrive for (e.g. [9,49]). There were previous approaches to define needs (e.g.[42,50,43,51,52]), but it was not until the first proposal of Maslow[37] 's theory on human motivation for an evident awareness for human needs raising in economic theories. [53] 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 [54] 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 [37] 's theory on human motivation, Alderfer [38] 's need hierarchy, or Deci [55] ,Deci and Ryan [56],[9],[57] '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. [58,37,10,38,9] Needs are universal and apply to all individuals in any culture at any given point in time. However, this claim was weakened [57] and could only be partially confirmed empirically [59]. 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].

3.3. Needs As Instrumental Claims

The notion of needs as instrumental requisites for meeting a given goal (e.g. customer satisfaction [60]) comprises customer-related and market-related fields, such as innovation and product design [24,5,61,62], consumer research [63,2,64] and marketing (for summaries see [65,61,2,66]). Scholars in these fields agree upon the importance of the 'voice of the customer' [67], i.e. the customer needs, as an essential input for corporate processes [22]. To uncover and address the (often unexpressed) customer needs is a crucial ingredient for a successful and innovative product. [68,69,70,4,2,71] Several approaches to incorporate the 'voice of the customer' into product development and innovation have been proposed (e.g. empathic design [72], user-centered design [61,73,74,75], outcome-driven innovation [8], problem solving [76]; for an overview see [77]).

Commonly, needs are distinguished from solutions. [2,24,78,7] 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. [79,80,7] In this vein, the "needfinding" approach by Patnaik and Becker [7],Faste [70] describes a specific method to uncover customers' needs and has been used in different (large-scale) projects (e.g. [81,82,79,83]). 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. [79]

Similarly, Von Hippel and Von Krogh [76] 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 [61,84,20] (for an overview see [77]). As a consequence, organisations have difficulties in understanding what their customers need. [60,61] 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. [85,80,86,87] 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. [80] For this, Altschuld [80] 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*. [88] A need is essentially instrumental (conditional) and involves necessity for an end (*Pu*): the need for *N* does only exist if *Pu* exists, irrespectively of what *Pu* is, and *Pu* inevitable requires *N*. [89]

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." [89] 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*.[89,90,91] 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.[92]

If the purpose (*Pu*) underlying a need is subject to our disposition, needs are merely conditional/instrumental with respect to a mutable *Pu*. Frankfurt [89] refers to needs derived from such contingent ends as "volitional needs", Reader and Brock [92] call them "contingent needs". Since we can choose on *Pu*, i.e. the agent wants its needs, these instrumental needs are morally [89] 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 [89] refers to these needs as "non-volitional needs", Reader and Brock [92] call them "non-contingent needs". We can conclude that the need statement is existential or morally important[89], 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.[88]

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 [29,25,93] and are called differently in literature: "basic needs"[94], "fundamental needs"[13],"morally important needs"[29], "categorical or absolute needs" [14], "course-of-life needs" [95], or "constitutive needs" [96]. 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 [16,92]), including existence or life [92], agency [29,28], health and autonomy[94], flourishing[97] or the avoidance of harm[14,13,89] as well as autopoietic conditions of living systems[98,99]. 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[90] 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 Economics

Philosophical approaches to needs are typically linked to discourses in politics[93] and economics[27] which deal with the fair allocation of scarce resources and (ecologically) sustainable development [100,25,11,101]. Human need theories give rise to normative concepts, such as quality of life or happiness.[102]

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'. [103,104] Additionally, they aim to structure, rationalise and humanise policy prioritisation and serve as an alternative evaluation framework for economic development.[15,105]

Several alternative theories on normative needs have emerged, which organise final lists of (basic) needs differently: For instance, Hamilton [106,105,91] defines three kinds of needs: (I) vital needs, (II) agency needs, and (III) particular social needs. Alternatively, Bradshaw[107] identifies four distinct need categories: (I) normative needs, (II) comparative needs, (III) expressed needs, and (IV) felt needs. Doyal and Gough [28] 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. [25] ,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." [108]According to Max-Neef et al. [25] ,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." [109]

4. 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 [36] 's conclusion that there is no consensus on the notion of 'needs' (also [34]), even in a particular field different understandings have emerged. Basically, we can outline this heterogeneity by the following dimensions (an extension of [20]):

- 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, needs are explanatory for human behaviour. In general, these 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. [110] 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 [111,112]) 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. [22]). 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) [80,87,86,85] 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.[113,114,115,116,117]

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.[89] 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.[82,84,4]) A need is not an end in itself. It is an "indispensable condition"[118] that depends on what has been called goal, logos, meaning, intention, "further end"[118], "private utility and social valuation"[102], "vocation"[119], 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[110]) or result from a deliberate act (e.g. profit-oriented paradigm), which reflects the differentiation of "true needs" versus "artificial needs" in moral philosophy.[89] 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.[118] 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 [92], autopoiesis [99,98,120], agency [29,28], health and autonomy [94], flourishing [97] or the avoidance of harm [14,13,89]. 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 [89] '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 [89] 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. [121,47,122,123]) 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 [21] 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"[95]. 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[89]'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[124] 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 capable of reducing the built-up tension"[125]. 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[89] 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).[94,29,28,25,11,7,22] 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.[36]).

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 explained in more detail.
There are five main elements on three layers:

- Satisfier 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 [126] (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 [130] 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. [131] 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. [128] While reasoning, individuals assess their preferences and choose among potential satisfiers. [102] 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"[46].
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 [89] or instrumental [36] (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. [89] *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

[1] We previously used the term 'desire' to refer to the agent's mental and motivational state by which it bridges the two spheres. [127,115] However, only few authors [128,1,13] use the term in the same sense and competing theories apply the term inconsistently and incomparably. For example, Frankfurt [89] refers to the conscious motivation for a need, while Wiggins and Dermen [14], Wiggins [129] 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.

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.[20] 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

- Contextual need $N_{cont.}$:
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 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 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 Ca and 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 [24] and a satisfier likewise.
- Preferences 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. [132]
- Purpose 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"[118], "private utility and social valuation"[102], "vocation"[119], 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 [89] 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" [89]).

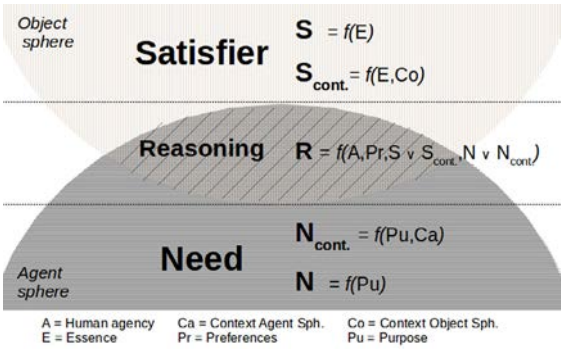

Fig. 1. Ontology of needs and satisfiers.

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, 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.

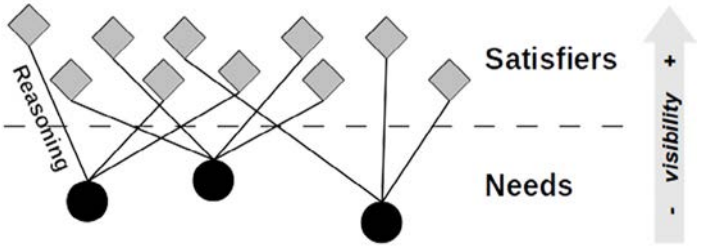

Fig. 2. The principle of equifinality applied to the ontology.

[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.

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. [35]). 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 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. A Knowledge Perspective on Needs

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. And 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 and introduce *need-based solution knowledge* which exploits the potential of equifinality and facilitates the development of (alternative) need-based strategies and solutions.

In order to conceptualise a type of knowledge which is crucial for the transition from the agent sphere to the object sphere (and vice versa), I employ the notion of knowledge as the capacity to act [133,134,135,136,137]. This has several implications. First, due to its focus on potentiality to "set something in motion", it is "a model *for* reality"[133]. Thus, we shape reality by realising this potentiality. Knowledge is the result of action as well as the capability of (and prerequisite for) taking action. [133] However, knowledge is not the action itself (different to Maturana and Varela [99] 's approach). The implementation of this potentiality is open which means that knowledge can manifest itself in several shapes. Newly created knowledge expands our opportunities as it raises our potentiality to act and change (organisational) reality.

Need-based solution knowledge starts with raising awareness for needs and enables agents to take actions towards need satisfaction. Thereby, it may foster the development of need-based innovations (e.g. strategies, products, services etc.), i.e. satisfiers. Made explicit, it becomes more powerful and shareable among a group of people which is a precondition for a mutual understanding and collective action towards need satisfaction.

Need-based solution knowledge is formalised as a capacity to act consisting of three necessary components (see figure 3):

$$\boxed{C = C_I + C_J + C_D}$$

- Capacity to identify needs $\boxed{C_I}$:
  The capacity to identify needs relates to knowledge about the agent's (contextual) needs, which can be identified in organisational learning processes (e.g. Bewextra method proposed by Kaiser et al. [115],Kragulj [127],Kaiser and Kragulj [116]). Mostly people are hardly aware of their needs [138,28,71], "as a consequence, the satisfaction of needs might not be pursued due to lack of knowledge, not lack of urgency." [139] By knowing their needs, agents meet a prerequisite to transform them into demands and need satisfying strategies. Being aware of the necessities (and probably the purpose) pushes the agent towards action. Due to its presuming nature, this is necessarily the starting point of any need-based organisational learning process. It involves knowledge about what is needed (need) and, ultimately, about for what something is needed (purpose); it includes a tacit or explicit understanding of the purpose pursued. Some methods (with different scopes) have been proposed (e.g. [7,115,127,8]) to identify hidden needs. They foster the acquisition of C_I through a shift of awareness on needs.
- Capacity to judge needs and satisfiers $\boxed{C_J}$:
  The capacity to judge needs and satisfiers refers to the necessary knowledge to judge the potentiality of (con-

textual) satisfiers being able to meet the agent's (contextual) 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. [91] It refers to the transition process from the agent sphere to the object sphere (and vice versa). Thus, (contextual) satisfiers are evaluated in terms of their corresponding (contextual) needs and are finally accepted or rejected (non-satisfiers). Thereof we can infer what constitutes an effective satisfier for an agent given its needs (N or $N_{cont.}$), preferences (Pr) and context (Ca and Co).

- Capacity to design satisfiers C_D:
  The capacity to design satisfiers refers to the necessary knowledge to develop (contextual) satisfiers which are basically able to satisfy (contextual) needs. [140] 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" [141]. 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).

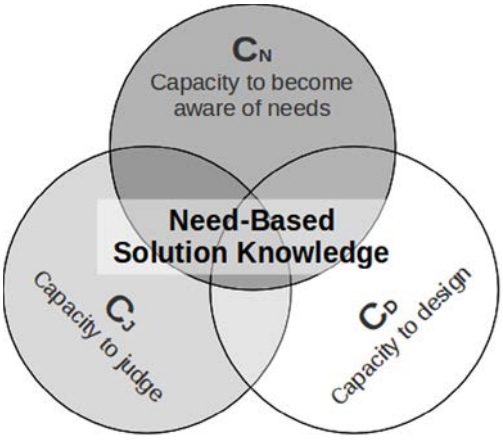

Fig. 3. *Need-based solution knowledge* consisting of three components.

Arguably, all three components of need-based solution knowledge are necessary for achieving need satisfaction, i.e., developing need satisfying solutions and artefacts. Starting with a reflection on the underlying needs (C_I) is a promising point of departure for organisational learning processes, since C_I is a premise for exploiting the principle of equifinality. Combined with C_J and C_D, this potentially leads to organisational innovation.

7. Implications and Conclusion

The aim of this paper was to clarify the concept of need for organisational learning and propose a knowledge perspective on needs. I argued why we should consider need explicitly in organisational learning processes. By means of an ontological framework, I synthesised the three major notions of needs - 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.

Derived from these considerations, I introduced need-based solution knowledge as a specific capacity to act that is crucial in the transition from needs to satisfiers. It 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 a clear understanding of the concept of need and by explicitly implementing the principle of equifinality, existing methods to uncover needs (e.g. [115,127,7]) as well as need-based innovation (e.g. [142,143]) could be advanced. Consequently, organisational learning processes should focus on and promote need-based solution knowledge to enable need-based innovation.

References

1. McLeod, S.K.. Knowledge of Need. *International Journal of Philosophical Studies* 2011;**19**(2):211–230. doi:10.1080/09672559.2011.561616.
2. Bayus, B.L.. Understanding Customer Needs. In: Shane, S., editor. *Handbook of Technology and Innovation Management*; chap. 3. New York: John Wiley & Sons; 2008, p. 115–142.
3. Altschuld, J.W., Watkins, R.. A Primer on Needs Assessment: More Than 40 Years of Research and Practice. In: Altschuld, J.W., Watkins, R., editors. *New Directions for Evaluation*; 114. New York: John Wiley & Sons; 2014, p. 5–18.
4. Brouwer, M.V.D., Dorst, K.. How deep is deep? a four-layer model of insights into human needs for design innovation. In: Salamanca, J., Desmet, P., Burbano, A., Ludden, G., Maya, J., editors. *Proceedings of the Colors of Care: The 9th International Conference on Design & Emotion*. Bogota. ISBN 9789587740707; 2014, p. 280–287.
5. Ericson, A., Bertoni, M., Larsson, T.. Needs and requirements - how TRIZ may be applied in product-service development. In: *2nd Nordic Conference on Product Lifecycle Management*. Go¨teborg; 2009, .
6. Goffin, K., Koners, U., Baxter, D., van der Hoven, C.. Managing lessons learned and tacit knowledge in new product development. *Research Technology Management* 2010;**53**(4):39–51.
7. Patnaik, D., Becker, R.. Needfinding: The Why and How of Uncovering People's Needs. *Design Management Journal* 1999;**10**(2):37–43. doi:10.1111/j.1948-7169.1999.tb00250.x.
8. Ulwick, A.W.. Turn Customer Input into Innovation. *Harvard Business Review* 2002;(Jan):91–97.
9. Deci, E.L., Ryan, R.M.. The " What " and " Why " of Goal Pursuits : Human Needs and the Self-Determination of Behavior. *Psychological Inquiry* 2000;**11**(4):227–268.
10. Maslow, A.H.. *Motivation and personality*. New York, NY: Harper & Row; 2rd ed.; 1970.
11. Max-Neef, M.. Development and human needs. In: Ekins, P., Max-Neef, M., editors. *Real life Economics*. London: Routledge. ISBN 9780203012796; 1992, p. 197–214.
12. Sheldon, K.M., Elliot, A.J., Kim, Y., Kasser, T.. What Is Satisfying About Satisfying Events ? Testing 10 Candidate Psychological Needs. *Journal of Personality and Social Psychology* 2001;**80**(2):325–339. doi:10.1037//O022-3514.80.2.325.
13. Thomson, G.. Fundamental Needs. *Royal Institute of Philosophy Supplement* 2005;**57**:175–186. doi:10.1017/S1358246105057097.
14. Wiggins, D., Dermen, S.. Needs, need, needing. *Journal of Medical Ethics* 1987;**13**(2):62–68. doi:10.1136/jme.13.2.62.
15. Gasper, D.. Conceptualising human needs and wellbeing. In: Gough, I., MacGregor, J., editors. *Wellbeing in Developing Countries*. Cambridge: Cambridge University Press. ISBN 9780511488986; 2007, p. 47–70. doi:10.1017/CBO9780511488986.003.
16. Gasper, D.. Needs and Basic Needs: A Clarification of Meanings, Levels, and Different Streams of Work; 1996.
17. Gasper, D.. Needs and Human Rights. In: *The Essentials of Human Rights*. London: Hodder & Stoughton; 2005, p. 269–272.
18. Argote, L., Miron-Spektor, E.. Organizational Learning: From Experience to Knowledge. *Organization Science* 2011;**22**(5):1123–1137.
19. Kolb, D.. *Experiential Learning: Experience as the Source of Learning and Development*. 1984. Englewood Cliffs, NJ: Prentice-Hall, Inc.; 1983.
20. Watkins, R., Kavale, J.. Needs: Defining what you are assessing. *New Directions for Evaluation* 2014;**2014**(144):19–31.
21. Jost, P.J.. *Individual Differences between Employees*. Cheltenham: Edward Elgar Publishing; 2014. ISBN 9781781004340.
22. Patnaik, D.. System Logics: Organizing Your Offerings to Solve People's Big Needs. *Design Management Review* 2004;**15**(3):50–57.
23. Holt, K.. Need Assessment in Product Innovation. *International Studies of Management & Organization* 1976;**6**(4):26–44.
24. Ericson, A., Stahlbrost, A.. In Search of Innovation. *International Journal of Technology, Knowledge and Society* 2006;**2**.
25. Max-Neef, M., Elizalde, A., Hopenhayn, M., Sears, R.V.. Development Dialogue. *Development Dialogue* 1989;**1**:140.
26. Braybrooke, D.. The Concept of needs, with a hearthwarming offer of aid to utilitarianism. In: *Necessary Goods. Our responsibilities to meet other's needs*. Rowman & Littlefield; 1998, p. 57–72.
27. Brock, G.. Needs and Global Justice. *Royal Institute of Philosophy Supplement* 2005;**57**:51–72.
28. Doyal, L., Gough, I.. *A Theory of Human Need*. New York: Guilford Press; 1991.
29. Brock, G.. Morally Important Needs. *Philosophia* 1998;**26**(1-2):165–178.
30. Von Bertalanffy, L.. *General system theory: Foundations, development, applications*. New York: Braziller; 1968.
31. Kruglanski, A.W., Chernikova, M., Babush, M., Dugas, M., Schumpe, B.M.. The Architecture of Goal Systems: Multifinality, Equifinality, and Counterfinality in Means-End Relations. In: Elliot, A.J., editor. *Advances in Motivation Science*; chap. 3. San Diego: Academic Press; 2015, p. 69–98.
32. Kruglanski, A.W., Shah, J.Y., Fishbach, A., Friedman, R., Woo Young, C., Sleeth-Keppler, D.. A theory of goal systems. In: Zanna, M.P., editor. *Advances in Experimental Social Psychology*; vol. Volume 34. San Diego: Academic Press. ISBN 0065-2601; 2002, p. 331–378. doi:10.1016/S0065-2601(02)80008-9.
33. Kruglanski, A.W., Pierro, A., Sheveland, A.. How many roads lead to Rome? Equifinality set-size and commitment to goals and means. *European Journal of Social Psychology* 2011;**41**(3):344–352.
34. Culyer, A.. Need - is a consensus possible? *Journal of Medical Ethics* 1998;**24**(2):77–80. doi:10.1136/jme.24.2.77.

35. McGregor, J.A., Camfield, L., Woodcock, A.. Needs, wants and goals: Wellbeing, Quality of Life and public policy. *Applied Research in Quality of Life* 2009;**4**(2):135–154. doi:10.1007/s11482-009-9069-7.
36. Taylor, P.W.. "Need" Statements. *Analysis* 1959;**19**(5):106–111.
37. Maslow, A.H.. A Theory of Human Motivation. *Psychological Review* 1943;**50**(13):370–396.
38. Alderfer, C.P.. An empirical test of a new theory of human needs. *Organizational Behavior and Human Performance* 1969;**4**(2):142–175.
39. Epstein, S.. Cognitive-Experiential Self-Theory of Personality. In: Millon, T., Lerner, M.J., Weiner, I.B., editors. *Handbook of Psychology*. New York: John Wiley & Sons; 2003, p. 1–30.
40. Swann, W.B.. To Be Adored or to Be Known? The Interplay of Self-Enhancement and Self-Verification. In: *Handbook of Motivation and Cognition: Foundations of Social Behaviour Volume 2*. ISBN 0-89862-432-0; 1990, p. 408–448.
41. McDougall, W.. *An introduction to social psychology*. London: Methuen; 1926.
42. Freud, S.. *Beyond the pleasure principle*. London and Vienna: International Psycho-Analytical Press; 1922.
43. Murray H A, . *Explorations in personality*. New York: Oxford University Press; 1938. ISBN 0021-843X, 0096-851X.
44. Reis, H.T., Sheldon, K.M., Gable, S.L., Roscoe, J., Ryan, R.M.. Daily Well-Being: The Role of Autonomy, Competence, and Relatedness. *Personality and Social Psychology Bulletin* 2000;**26**(4):419–435.
45. Baumeister, R.F., Leary, M.R.. The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological bulletin* 1995;**117**(3):497–529. doi:10.1037/0033-2909.117.3.497.
46. Reiss, S.. Multifaceted Nature of Intrinsic Motivation: The Theory of 16 Basic Desires. *Review of General Psychology* 2004;**8**(3):179–193. doi:10.1037/1089-2680.8.3.179.
47. Taormina, R.J., Gao, J.H.. Maslow and the motivation hierarchy: Measuring satisfaction of the needs. *American Journal of Psychology* 2013;**126**(2):155–177. doi:10.5406/amerjpsyc.126.2.0155.
48. Brown, J.S.. *The motivation of behavior*. New York: McGraw-Hill; 1961.
49. Sheldon, K.M., Ryan, R., Reis, H.T.. What Makes for a Good Day? Competence and Autonomy in the Day and in the Person. *Personality and Social Psychology Bulletin* 1996;**22**(12):1270–1279. doi:10.1177/01461672962212007.
50. McDougall, W.. *The energies of men*. New York: Scribner; 1933.
51. Hull, C.. *Principles of behavior: an introduction to behavior theory*. New York: Appleton-Century-Crofts; 1943.
52. Marshall, A.. *Principles of Economics*. London: Macmillan; 1890.
53. Wahba, M.A., Bridwell, L.G.. Maslow's Theory.pdf. *Organizational Behavior and Human Performance* 1976;**15**:212–240.
54. Chung, K.H.. A Markov Chain Model of Human Needs: An Extension of Maslow's Need Theory. *Academy of Management Journal* 1969; **12**(2):223–234. doi:10.2307/254818.
55. Deci, E.L.. *The psychology of self-determination*. Lexington, MA: Heath; 1980.
56. Deci, E.L., Ryan, R.M.. The general causality orientations scale: Self-determination in personality. *Journal of Research in Personality* 1985;**19**(2):109–134. doi:10.1016/0092-6566(85)90023-6.
57. Deci, E.L., Ryan, R.M.. Self-determination theory: A macrotheory of human motivation, development, and health. *Canadian Psychology/Psychologie canadienne* 2008;**49**(3):182–185.doi:10.1037/a0012801.
58. Ryan, R., Deci, E.. Self-determination theory and the facilitation of intrinsic motivation. *The American Psychologist* 2000;**55**(1):68–78. doi:10.1037/0003-066X.55.1.68.
59. Tay, L., Diener, E.. Needs and subjective well-being around the world. *Journal of personality and social psychology* 2011;**101**(2):354–365. doi:10.1037/a0023779.
60. Goffin, K., Lemke, F.. Uncovering your customer's hidden needs. *European Business Forum* 2004;(18):45–47.
61. Hyysalo, S.. Some Problems in the Traditional Approaches to Predicting the Use of a Technology-driven Invention. *Innovation: The European Journal of Social Science Research* 2003;**16**(2):117–137. doi:10.1080/13511610304518.
62. Gkouskos, D., Normark, C.J., Lundgren, S.. What Drivers Really Want: Investigating Dimensions in Automobile User Needs. *International Journal of Design* 2014;**8**(1):59–71.
63. Pincus, J.. The consequences of unmet needs: the evolving role of motivation in consumer research. *Journal of Consumer Behaviour* 2004; **3**(4):375–387. doi:10.1002/cb.149.
64. Kano, N., Seraku, N., Takahashi, F., Tsuji, S.. Attractive Quality and Must-be Quality. *Journal of the Japanese Society for Quality Control* 1984;**14**(2):147–156.
65. Roberts, S.D., Dant, R.P., Lim, C.L.. 'Needs' and 'Wants' in Marketing Literature: Pedagogical Difficulties. In: *Proceedings of the 1990 Academy of Marketing Science (AMS) Annual Conference*. Springer; 1990, p. 264–268.
66. Wagner, E.R., Hansen, E.N.. A method for identifying and assessing key customer group needs. *Industrial Marketing Management* 2004; **33**(7):643–655. doi:10.1016/j.indmarman.2003.10.003.
67. Griffin, A., Hauser, J.R.. The Voice of the Customer. *Marketing Science* 1993;**12**(1):1–27.
68. Von Hippel, E.. User toolkits for innovation. *Journal of Product Innovation Management* 2001;**18**(4):247–257.
69. Preece, J., Rogers, Y., Sharp, H.. *Interaction design: Beyon human-computer interaction*. New York: John Wiley & Sons; 2002.
70. Faste, R.A.. Perceiving Needs. *SAE Technical Paper Series* 1987;doi:10.4271/871534.
71. Goffin, K., Lemke, F., Koners, U.. *Identifying Hidden Needs*. London: Palgrave Macmillan; 2010. ISBN 9780230294486. doi:10.1057/9780230294486.
72. Leonard, D., Rayport, J.F.. Spark Innovation through emphatic design. *Harvard Business Review* 1997;(Nov-Dec):102–113. doi:10.1080/15710882.2011.630472.
73. Kim, J., Park, S., Hassenzahl, M., Eckoldt, K.. The Essence of Enjoyable Experiences: The Human Needs. In: Marcus, A., editor. *Design, User Experience, and Usability. Theory, Methods, Tools and Practice*. Berlin / Heidelberg: Springer-Verlag. ISBN 3642216749; 2011, p. 77–83.
74. Kankainen, A.. UCPCD: User-Centered Product Concept Design. In: *Proceedings of the 2003 conference on Designing for user experiences - DUX '03*. New York, New York, USA: ACM Press; 2003, doi:10.1145/997078.997087.
75. Oulasvirta, A.. Grounding the innovation of future technologies. *Human Technology* 2005;**1**(1):58–75.

76. Von Hippel, E., Von Krogh, G.. Identifying Viable NeedSolution Pairs: Problem Solving Without Problem Formulation. *Organization Science* 2016;**27**(1):207–221.
77. Yang, C.C.. An analytical methodology for identifying the latent needs of customers. *Total Quality Management* 2013;**24**(12):1332–1346. doi:10.1080/14783363.2013.809944.
78. Patnaik, D.. Needs + Solutions = Innovation. *Businessweek* 2005;.
79. Holst, M., Stahlbrost, A.. Enriching the Process of Appreciating Needs with Storytelling. *International Journal of Technology, Knowledge and Society* 2006;**2**(4):61–68.
80. Altschuld, J.W.. Emerging Dimensions of Needs Assessment. *Performance Improvement* 2004;**43**(1):10–15. doi:10.1002/pfi.4140430104.
81. Bergström, M., Ericson, Å., Larsson, M., Nergård, H., Larsson, T., Renström, B.. Needs As a Basis for Design Rationale. In: *International Design Conference - Design 2008*. Dubrovnik; 2008, p. 281–288.
82. Ericson, Å., Larsson, A., Larsson, T., Larsson, M.. Need driven product development in team-based projects. In: *International Conference on Engineering Design, ICED'07*. ISBN 1904670024; 2007, p. 1–11.
83. Stahlbrost, A., Bergvall-Kareborn, B.. Unveiling the Mysterious Needs of Users. In: *Proceedings of the 30th Information Systems Research Seminar in Scandinavia IRIS 2007*. 2007, p. 1–17.
84. Ericson, A., Mu¨ller, P., Larsson, T.C., Stark, R.. Product-service systems - from customer needs to requirements in early development phases. In: *Proceedings of the 1st CIRP Industrial Product-Service Systems (IPS2) Conference*. 2009, .
85. Witkin, B.R.. *Assessing Needs in Educational and Social Programs*. San Francisco: Jossey-Bass; 1984.
86. McKillip, J.. *Needs analysis: Tools for the human services and education*. Newbury Park: Sage; 1987.
87. Lee, Y.F., Altschuld, J.W., White, J.L.. Problems in needs assessment data: Discrepancy analysis. *Evaluation and Program Planning* 2007;**30**(3):258–266. doi:10.1016/j.evalprogplan.2007.05.005.
88. Thomson, G.. *Needs*. London: Routledge; 1987.
89. Frankfurt, H.G.. Necessity and Desire. *Philosophy and Phenomenological Research* 1984;**45**(1):1. doi:10.2307/2107323.
90. Schuppert, F.. Distinguishing basic needs and fundamental interests. *Critical Review of International Social and Political Philosophy* 2013; **16**(1):24–44. doi:10.1080/13698230.2011.583532.
91. Hamilton, L.. Human Needs and Political Judgment. In: Zurn, C., De Bruin, B., editors. *New Waves in Political Philosophy*. London: Palgrave Macmillan; 2009, p. 40–62.
92. Reader, S., Brock, G.. Needs, Moral Demands and Moral Theory. *Utilitas* 2004;**16**(3):251–266. doi:10.1017/S0953820804001165.
93. Piercy-Smith, J.. *Needs assessments in public policy*. Open University Press; 1995.
94. Braybrooke, D.. *Meeting needs*. Princeton: Princeton University Press; 1987. ISBN 0691022593 pbk\r0691077274.
95. Wolf, C.. Theories of Justice: Human Needs. *Encyclopedia of Applied Ethics* 1998;**4**:335–345.
96. Miller, S.. Need, Care and Obligation. *Royal Institute of Philosophy Supplement* 2005;**57**:137–160. doi:10.1017/S1358246105057073.
97. Alkire, S.. Dimensions of human development. *World Development* 2002;**30**(2):181–205. doi:10.1016/S0305-750X(01)00109-7.
98. Varela, F.G., Maturana, H.R., Uribe, R.. Autopoiesis: The organization of living systems, its characterization and a model. *BioSystems* 1974;**5**(4):187–196. doi:10.1016/0303-2647(74)90031-8.
99. Maturana, H.R., Varela, F.J.. *The tree of knowledge: the biological roots of human understanding*. Boston: Shambhala; 1987.
100. Wiggins, D.. An Idea we Cannot do Without: What difference will it make (eg. to moral, political and environmental philosophy) to recognize and put to use a substantial conception of need? *Royal Institute of Philosophy Supplement* 2005;**57**:25–50.
101. Max-Neef, M.. The world on a collision course and the need for a new economy. *Ambio* 2010;**39**(3):200–210. doi:10.1007/s13280-010-0028-1.
102. Gomes, O.. The hierarchy of human needs and their social valuation. *International Journal of Social Economics* 2011;**38**(3):237–259. doi:10.1108/03068291111105183.
103. Freeman, K.B.. Human needs and utility maximization. *International Journal of Social Economics* 2011;**38**(3):224–236. doi:10.1108/03068291111105174.
104. Kamenetzky, M.. The economics of the satisfaction of needs. *Human Systems Management* 1981;**2**:101–111.
105. Hamilton, L.. The Context and Argument of The Political Philosophy of Needs. *South African Journal of Philosophy* 2006;**25**(3):224–232.
106. Hamilton, L.. Power, domination and human needs. *Thesis Eleven* 2013;**119**(1):47–62. doi:10.1177/0725513613511308.
107. Bradshaw, J.. A taxonomy of social need. In: McLachlan, G., editor. *Problems and progress in medical care*. London: Oxford University Press. ISBN 9781907265228; 1972, p. 69–82.
108. Jolibert, C., Max-Neef, M., Rauschmayer, F., Paavola, J.. Should We Care About the Needs of Non-humans? Needs Assessment: A Tool for Environmental Conflict Resolution and Sustainable Organization of Living Beings. *Environmental Policy and Governance* 2011; **21**(4):259–269. doi:10.1002/eet.578.
109. Cruz, I., Stahel, A., Max-Neef, M.. Towards a systemic development approach: Building on the Human-Scale Development paradigm. *Ecological Economics* 2009;**68**(7):2021–2030. doi:10.1016/j.ecolecon.2009.02.004.
110. Kesebir, S., Graham, J., Oishi, S.. A Theory of Human Needs Should Be Human-Centered, Not Animal-Centered: Commentary on Kenrick et al. (2010). *Perspectives on Psychological Science* 2010;**5**(2010):315–319. doi:10.1177/1745691610369470.
111. Oishi, S., Diener, E.F., Lucas, R.E., Suh, E.M.. Cross-Cultural Variations in Predictors of Life Satisfaction: Perspectives from Needs and Values. *Personality and Social Psychology Bulletin* 1999;**25**(8):980–990. doi:10.1177/01461672992511006.
112. Yang, K.S.. Beyond Maslow's culture-bound linear theory: a preliminary statement of the double-Y model of basic human needs. In: Murphy-Berman, V., Berman, J.J., editors. *Nebraska Symposium on Motivation. Nebraska Symposium on Motivation*; vol. 49. Lincoln: University of Nebraska Press. ISBN 0803213336; 2003, p. 175–255.
113. Kaiser, A., Kragulj, F., Grisold, T., Walser, R.. Extending the Organizational Learning Process in Order to Enable Innovative Ideas. In: *Proceedings of the 16th European Conference on Knowledge Management (ECKM-2015)*. Reading, UK: Academic Conferences and Publishing International Limited; 2015, p. 391–398.
114. Kaiser, A., Kragulj, F., Grisold, T., Walser, R.J.. Identifying Hidden Needs by Enhancing Organizational Learning. In: *Proceedings of the 12th International Conference on Intellectual Capital, Knowledge Management & Organisational Learning (ICICKM-2015)*. Reading,

UK: Academic Conferences and Publishing International Limited; 2015, p. 117–124.
115. Kaiser, A., Fordinal, B., Kragulj, F.. Creation of Need Knowledge in Organizations: An Abductive Framework. In: *47th Hawaii International Conference on System Sciences*. IEEE. ISBN 978-1-4799-2504-9; 2014, p. 3499–3508. doi:10.1109/HICSS.2014.436.
116. Kaiser, A., Kragulj, F.. Bewextra: Creating and Inferring Explicit Knowledge of Needs. *Futures Studies* 2016;(accepted for publication).
117. Kaiser, A., Kragulj, F., Grisold, T.. Identifying human needs in organizations to develop sustainable intellectual capital Reflections on Best Practices. In: *Proceedings of the 8th European Conference on Intellectual Capital (ECIC-2016)*. Sonning Common, UK: Academic Conferences and Publishing International Limited; 2016, .
118. Goodin, R.E.. The Priority of Needs. *Philosophy and Phenomenological Research* 1985;**45**(4):615–625.
119. Kaiser, A., Fordinal, B.. Creating a ba for generating self-transcending knowledge. *Journal of Knowledge Management* 2010;**14**(6):928–942. doi:10.1108/13673271011084943.
120. Von Krogh, G., Roos, J.. *Organizational Epistemology*. New York: St. Martin's Press; 1995.
121. Uysal, A., Lin, H.L., Knee, C.R.. The role of need satisfaction in self-concealment and well-being. *Personality and social psychology bulletin* 2010;**36**(2):187–199. doi:10.1177/0146167209354518.
122. Wei, M., Shaffer, P.A., Young, S.K., Zakalik, R.A.. Adult Attachment, Shame, Depression, and Loneliness: The Mediation Role of Basic Psychological Needs Satisfaction. *Journal of Counseling Psychology* 2005;**52**(4):591–601. doi:10.1037/0022-0167.52.4.591.
123. Sheldon, K.M., Gunz, A.. Psychological needs as basic motives, not just experiential requirements. *Journal of Personality* 2009;**77**(5):1467–1492. doi:10.1111/j.1467-6494.2009.00589.x.
124. James, W.. The Moral Philosopher and the Moral life. *International Journal of Ethics* 1891;**1**(3):330–354.
125. Reeve, J.. *Understanding Motivation and Emotion*. Fort Worth, TX: Harcourt; 3 ed.; 2001. ISBN 0470392231.
126. Marx, K.. *Capital*. Moscow: Foreign Languages Publishing House; 1961.
127. Kragulj, F.. *Creating Knowledge of Need: A Methodological Framework for its Abductive Inference*. Master thesis; University of Vienna; 2014.
128. Stampe, D.. Need. *Australasian Journal of Philosophy* 1988;**66**(2):129–160. doi:10.1080/00048408812343251.
129. Wiggins, D.. *Needs, Values, Truth*. Oxford: Clarendon Press; 3 ed.; 1998.
130. Norman, D.A.. *The Design of Everyday Things*. New York: Basic Books; 2002.
131. Withagen, R., De Poel, H.J., Araujo, D., Pepping, G.J.. Affordances can invite behavior: Reconsidering the relationship between affordances and agency. *New Ideas in Psychology* 2012;**30**(1):250–258.
132. Lichtenstein, S., Slovic, P.. *The construction of preferences*. New York: Cambridge University Press; 2006.
133. Stehr, N., Grundmann, R.. How does knowledge relate to political action? *Innovation: The European Journal of Social Science Research* 2012;**25**(1):29–44. doi:10.1080/13511610.2012.655572.
134. Sveiby, K.E.. *The New Organisational Wealth: Managing and Measuring Knowledge Based Assets*. San Francisco, CA: Berrett-Koehler Publishers; 1997. ISBN 978-1576750148.
135. Sveiby, K.. A knowledge-based theory of the firm to guide in strategy formulation. *Journal of Intellectual Capital* 2001;**2**(4):344–358. doi:10.1108/14691930110409651.
136. Stehr, N., Grundmann, R.. *Experts: the knowledge and power of expertise*. New York: Routledge; 2011.
137. Nonaka, I., Von Krogh, G.. Tacit Knowledge and Knowledge Conversion: Controversy and Advancement in Organizational Knowledge Creation Theory. *Organization Science* 2009;**20**(3):635–652.
138. Mele, A.R.. *Effective Intentions: The Power of Conscious Will*. Oxford: Oxford University Press; 2009. ISBN 9780199869909. doi:10.1093/acprof:oso/9780195384260.001.0001.
139. Korolev, A.. Needs/Wants Dichotomy and Regime Responsiveness. *Critical Review* 2015;**27**(1):23–48. doi:10.1080/08913811.2014.993886.
140. Verganti, R.. Design, meanings, and radical innovation: A metamodel and a research agenda. *Journal of Product Innovation Management* 2008;**25**(5):436–456. doi:10.1111/j.1540-5885.2008.00313.x.
141. Simon, H.A.. *The Sciences of the Artificial*. Cambridge, MA: MIT Press; 3rd ed.; 1996.
142. Keinonen, T.. User-centered design and fundamental need. In: *Proceedings of the 5th Nordic conference on Human-computer interaction building bridges - NordiCHI '08*. Lund, Sweden; 2008, p. 211–220.
143. Keinonen, T.. User Need - A Fuzzy Link Between Design and Use. In: *International Association of Societies of Design Research Conferences, Rigor and Relevance in Design*. 2009, .