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Holistic well-being and sustainable organisations – A review and argumentative propositions

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ABSTRACT

This article discusses holistic well-being in a balanced work system theory framework. Holistic well-being is a combination of well-being in both work and non-work domains. Theories of balanced work systems and balanced organisations are retold in light of holistic well-being to show how different individuals in organisations can contribute to achieving desired outcomes at different process levels. Further, this article provides new insights and research challenges to the balanced organisation theory by including a sustainability aspect and by proposing a new concept of balanced value networks.

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sustainability; well-being at
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1. Introduction

Well-being at work is an ambiguous concept, with no uniform definition (European Agency for Safety and Health at Work 2013). In this study, we refer well-being at work as a holistic entity that relates to organisational conditions, workplace safety and personal components as well as to productivity at individual, organisational and societal levels (Dul et al. 2012, Schulte and Vainio 2010). The holistic approach on well-being applied in this article is strongly analogical to the concept of quality of working life which seeks to find means to adapt jobs to fit the qualities of employees (Hoonakker and Korunka 2014). Even though well-being at work is strongly associated to subjective sensations and experience, personal components like health, material wealth and physical, emotional and social well-being include also objective perspectives (Rogers et al. 2012; Schulte and Vainio 2010; Suominen 2015).

Anttonen and Räsänen (2008) highlight the role of well-led organisations, competent employees and work communities and meaningful and rewarding jobs when well-being at work is being characterised. As evidence on the synergistic relationship between well-being at work and work performance has grown, it has also had effect at the organisational level, as organisations have acknowledged well-being at work as an asset and as a strategic value (e.g. Schulte and Vainio 2010; Zwetsloot et al. 2010).

In this article, a systemic process approach to well-being at work is adopted by discussing well-being at work in a balanced work system framework (e.g. Carayon 2009, Smith and Carayon-Sainfort 1989). Work systems are described as entities where individual employees perform specific operational tasks with certain tools and technology within a specific environment or product or service systems where an individual is the consumer, product user or person who receives the service (e.g.

Dul et al. 2012, Smith and Carayon-Sainfort 1989). Due to the human-centric nature of the work systems, they can be considered as sociotechnical systems (Carayon 2009). In its' broad context a sociotechnical system is the synergistic combination of humans, machines, environments, activities, processes and structures that comprise an (Carayon et al. 2015). However, the extent to which work systems are referred to depends on the unit of analysis (Carayon 2009). The unit of analysis of a work system can be rather loose, as, for example, a single individual using a tool as well as work organisation may both be discussed as work systems (EN ISO standard 6385 2004).

In this study, we approach the phenomena by discussing work systems from an individual employee's point of view and by expanding the discussion to complex sociotechnical work systems (organisations) in which individual employees work together. Further we highlight, as pointed out in the literature on both well-being at work and quality of working life, that work and non-work are not separate domains; rather they are highly inter-related (Demerouti et al. 2014; Ford, Heinen, and Langkamer 2007; Geurts and Demerouti 2002). In addition to work-related factors, individual aspects such as personal health, life satisfaction and happiness have been associated with contributing to holistic well-being (Day and Hartling 2017; Straume and Vittersø 2015). The domain of work is essentially clearly defined, whereas non-work may be described as referring to activities and responsibilities within the family domain (Geurts and Demerouti 2002) and further beyond that (i.e., individuals living at home alone). Thus, in this study, we discuss human well-being as a combination of both domains – at work and at non-work (off-the-job or at leisure and free-time) – where non-work represents broadly all activities and responsibilities outside the working hours. It should be noted that trends and practices such as remote work

and working at home may blur the line between the definition of work and non-work (Carayon 2007).

Zink and Fischer (2013) point out how striving for the satisfaction of human needs and common welfare and health is highly consistent with a broader concept of sustainable development and its targets towards societal, economic and ecological development. Further, Zink and Fischer (2013) highlight the need for an overall and systemic understanding and broad stakeholder orientation when implementing larger sustainable development actions. Such a systemic organisation level (i.e. macroergonomics) process development approach includes the possibility – and challenge – to provide concrete work station-specific (i.e. microergonomics) development actions at both workplace and individual levels (Karsh, Waterson, and Holden 2014; Väyrynen et al. 2016).

1.2. Objectives

This conceptual article contributes to the scientific discussion brought up by Zink and Fischer (2013) on how the sustainability paradigm and human factors and ergonomics (HFE) as enablers of well-being interplay and interact. Due to its roots in HFE discipline, the concept of work systems is strongly associated with work. Thus, in this study we focus on balanced life system of economically active people who are employed by work organisations.

Our aim is to contribute to the scientific discussion on work and non-work domains and holistic well-being first by supplementing and visualising the work system model framework with non-work elements. Secondly, we aim to bring out the potential incentives for and possible outcomes of a holistic human well-being in the spirit of balanced work systems. Lastly, to contribute to the discussion on mapping and deliberating sustainability values in an organisational and process development context, we conceptualise individuals experiencing well-being as entities who can contribute to balanced organisations' performance and further to organisations' value networks and their performance.

2. Review of key concepts

2.1. Sustainability and sustainable development

Systemic thinking is a prerequisite when discussing sustainable development and HFE at organisational development actions, as, for example Fischer and Zink (2012) have emphasised. Sustainability and sustainable development include – as a triple-bottom line – social, environmental and economic perspectives, which form the basis for durable economic success (Docherty, Kira, and Shani 2008; Zink et al. 2008). Human health as a state of complete physical, mental and social well-being can be associated to each of the three elements of sustainability (Mato-Juhasz, Kiss-Toth, and Szegedi 2016).

The ultimate core of sustainability is in understanding how different kinds of communities can envision and pursue social and natural well-being (Miller et al. 2014). Greater understanding is needed in regard to how organisations should change and how those changes are made to meet the challenges raised by sustainability (Millar, Hind, and Magala 2012). A broad understanding of potential factors influencing the organisation is required when discussing organisational development issues. In a broad, global

context complex megatrends such as globalisation, digitalisation, market dynamics, demographic development, food and energy security, community security and safety, change of values and technological progress have a broad effect at societal, organisational and individual levels (Siemeniuch et al. 2015; Zink 2011).

Dyllick and Hockerts (2002) and Zink and Fischer (2013) highlight that, at an organisational level, sustainability issues can be discussed under the concept of corporate social responsibility, which requires that stakeholders' (broadly, not only shareholders and owners) needs are met without compromising the organisation's ability to meet the needs of future stakeholders as well without destroying natural and social capital. Bolis, Brunoro, and Sznclwar (2014) and Husgafvel et al. (2015) emphasise that social context in general and especially the theme of work and further the content and organisation of work have not been central to the scientific and practical debate on sustainability. On the other hand, similar kinds of aspects might be discussed in organisations under the theme of human resource management (Ehnert et al. 2016). Recently, authors such as Fischer and Zink (2012), Zink and Fischer (2013), Thatcher and Yeow (2016), and Väyrynen et al. (2016) have actively discussed how sustainability and HFE are interconnected and can contribute to sustainable development processes at the organisation and broader value network levels.

2.2. Work system

An obvious self-evident key element in any work system is the human (Smith and Carayon-Sainfort 1989). A work system, in its broad definition, may go beyond normal work and include activities carried out by different users, such as customers, citizens, clients and patients, in various environments and social contexts (e.g., instead of a work organisation) (Dul et al. 2012, Väyrynen, Röning, and Alakärppä 2006).

According to the balanced work system theory, work systems can create psychosocial, cognitive and/or physical stress loads on the human (Carayon 2006, 2009). Individual personality, past experiences and the social situation influence load perception (Smith and Carayon-Sainfort 1989). The human reacts to these loads physiologically and psychologically, and often with a detrimental effect. Carayon and Smith (2000) highlight that perfect work systems, where all stresses and strains are eliminated, are not attainable in reality. Instead, according to the balanced work system theory (e.g. Smith and Carayon-Sainfort 1989; Carayon 2009), work systems should be balanced. In a balanced work system, all the work system elements (human, technology, task, work environment and organisation) are acknowledged and developed continuously. The work system balance can be improved further by enhancing the positive aspects of other elements if negative aspects cannot be improved or totally eliminated (Smith and Carayon 2000).

A work system may be discussed as a system producing different kinds of outputs from, for example, material, energy and know-how inputs (Väyrynen et al. 2016). Both quantitative and qualitative, or tangible and intangible aspects can be identified as the outcomes of a work system. For example, job satisfaction, commitment to work, employee health and safety and well-being, productivity, quality, can be considered desired outcomes. Undesired outcomes can be considered as negative by-products

of the work system. Physiological and psychological discomfort and stresses, incidents, occupational accidents (or home and leisure time accidents at non-work domain) and injuries are examples of such outcomes (Carayon 2009; Karwowski 2005; Väyrynen et al. 2016). Further, unplanned and undesired outcomes could be extended to, for example, production stoppages, substandard product quality and material and environmental damages (Väyrynen et al. 2016).

Work systems have been studied at different organisational contexts. This article includes an empirical study in which work systems are discussed in a social and health care context. Holden et al. (2013, 2017) and Carayon et al. (2014) for instance have recently studied work systems at complex health care contexts. In addition to focusing merely on employees' work systems, they have reached their studies to also cover patients' well-being and safety. Väyrynen, Rönning, and Alakärppä (2006) have studied work systems at tele-healthcare and Kekkonen et al. (2018) have in their macroergonomic study focused on nursing staffs' and support services' work systems and their interactions.

3. Explorative study on the contents of the work system elements

3.1. Study setting and material

As empirical material for highlighting the complexity of holistic well-being, an interview study on well-being at work in the social work and health care sector is utilised. Semi-structured interviews were conducted in 2011 in Northern Finland. The material consists of four personnel interviews (two female employees [social worker, nurse] and two specialists [female physician, male health care teacher]) and two focus group interviews in a public organisation (four registered nurses, all female) and in a private enterprise (four social service workers specialised in the care of handicapped people, all female). All interviewees were considered as experienced professionals at their fields of expertise.

Both personal and focus groups interviews were conducted similarly. Thus they are simply referred as interviews later in this article. In the interviews, an illustration of the balanced work system model was shown in the beginning as a stimulus for a discussion on well-being at work. The primary intention of the interviews was to discover how the interviewees see their work systems. All interviews were recorded and later transcribed and anonymised for the researchers' use. The transcribed and anonymised material was saved to a directory to which all members of the research group had access. An axial coding approach (Strauss and Corbin 1998) was utilized to summarise and synthesise the data. In the analysis phase, the researchers grouped the data under the work system model elements. In addition, the researchers identified different themes that did not fit the elements but that were seen to affect personal well-being. The empirical findings of this study are qualitative, interpretative and tentative in nature.

3.2. Holistic well-being in a work system framework

Contents of the work system elements described below respond largely to the earlier literature on the subject. The interviewees emphasised how their own personal characteristics, such as

personal health and professional expertise and skills, affect their ability to successfully perform their work. These characteristics were associated with having an effect on motivation and attitudes towards work. This human-centric view is highlighted in an interview comment by a nurse: 'You completely keep yourself in a good condition. That is, at least when I refer to myself, a thing that helps me in performing my work'. Meaningful and reasonably challenging tasks that have been scheduled and planned carefully were underscored in all interviews. The importance of having well-organised tasks is highlighted by an interview quotation by a social worker: '*If I consider myself, I see that the tasks affect well-being in such a way, that meaningful tasks motivate me*'. In addition, the possibility to personally have an effect on the planning of the work (e.g. schedules, vacations, routes) was highlighted as positively affecting one's well-being at work. This is highlighted in an interview by a nurse: '*...affecting well-being is that we have enough resources and personnel to perform the work that is required... and that we have enough educated workforce*'. Organisational conditions and aspects such as the ability to adapt to changes, proper cooperation and communication practices and clear roles inside the organisation were also highlighted.

As the interviewees work across the social work and health care sectors, the work environments where they perform their work vary from large hospitals to small units and home care. Regardless of the physical location of the work place, the interviewees emphasised good ergonomics, cleanliness and order, safety and comfort as work environment-related aspects affecting their well-being at work. This is emphasised in an interview quotation by a teacher: '*...then of course concerning the work environment, if there is noise and cramped working conditions, that is of course stressful*'. The interviewees daily utilise different information and communication technology tools and devices, medical devices and instruments, and different aids to perform their work. The ergonomics, safety and usability issues of the tools and technologies were highlighted, as emphasised in an interview quotation by a nurse: '*...naturally, lack of a certain basic tool is a thing that causes stress and affect one's well-being at work*'. In addition, product safety (e.g. in handling medicine) issues were underscored.

In all interviews, the interviewees emphasised that their well-being does not depend merely on work-related factors. That is emphasised in an interview quotation by a nurse:

Sense of well-being arises from the people themselves. From there, deeply from inside; how one stands with the work and in general how one stands with the life. That is a very broad thing. I would say that all the things happening in the private life will reflect to one's working life.

All interviews included the perspective that, to discuss one's holistic well-being, non-work aspects should also be acknowledged, as emphasized in an interview quotation by a teacher:

...each person and individual carries his/her personal life at work. This is often forgotten when well-being at work is discussed and well-being is reviewed only from the work community's or workplaces points of view. Nonetheless employees also bring elements from their personal life to work which may have an effect to their work.

A balance between one's working life and non-work time should be achieved. The interviewees pointed out that they should have

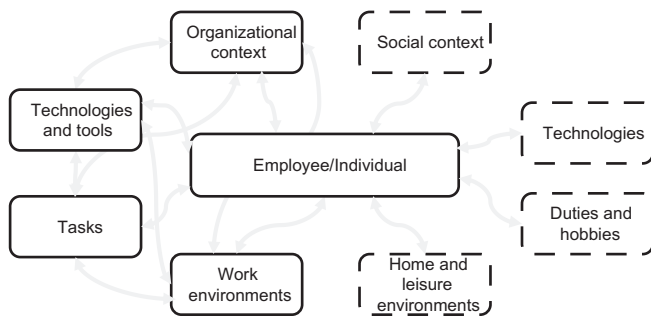


Figure 1. A proposition on conceptualising holistic well-being as a close human-centric micro system.

Non-work issues (boxes with dash line) are added as an expansion to the work system framework.

work but not so much that they need to work overtime constantly. Furthermore, social contexts (e.g., family and other relations) were seen to contribute indirectly to their work performance, as emphasised in an interview quotation by a physician: ‘... the network is large, there are kindergartens, schools, families, parents, children, spouses and then all kinds of other stakeholders affecting’.

The observations and thoughts that the interviewees’ presented on non-work context can be considered more abstract in general when compared with the work system elements at work context. However, a clear connection was seen between work and non-work domains. As a summary of the literature and empirical findings, supported by the broad definition of a work system reaching from employees to product and service users, we posit a visualised concept on holistic well-being as one that covers and connects individuals’ work systems and non-work issues (see Figure 1). In the original work system model the organisational context represents organisational factors such as peer and foreman support, training and work scheduling arrangements and of course leadership and management in general. In our concept, we propose a term social context to be utilised at the non-work domain to represent personal life issues, such as families and relations, community and education. Similarly we propose that there are certain non-work environments that we propose to be called home and leisure environments. In our proposal, we highlight that different kinds of technologies are utilised at non-work environments to perform informal and formal duties and hobbies of a different kind. According to our proposal, we see that these non-work elements can also cause loads and risks to accidents. Thus they could be balanced similarly as in the balanced work system model.

In our concept, the work system elements should be understood broadly as a summary of all separate work systems that the individual may face during the workday. Analogic to this, the home and leisure environment covers all relevant physical non-work activity environments. It should be noted that even though work system elements and their interconnections have been studied and discussed in-depth by various authors (see e.g. Carayon 2009), our material does not point out the actual interconnections between work systems and non-work issues. We highlight that as a future research challenge (RC1).

4. Propositions

4.1. Incentives for holistic well-being at the individual level

Human well-being is a multidimensional concept in which different objective and subjective components have an effect (Rogers et al. 2012). Working life and social systems outside one’s work form a holistic entity in which both spheres interact and influence each other (Barnett 1998; Ford, Heinen, and Langkamer 2007). In order to attain a sustainable work system, different work and non-work induced load and stressor factors and health and accident hazards should be identified and managed. Factors affecting individuals are diverse and may arise from different levels. Thatcher and Yeow (2016) utilised macro-, meso- and micro-levels to show the different levels of sustainable work systems. In this study, we adopt this categorisation. Firstly, we highlight the complexity of macro-level factors that affect humans. Humans are affected both directly and indirectly by broad global and national trends (Barnett 1998; Siegrist 2008; Zink et al. 2008). For instance, globalisation has induced changes in the workforce and recession has induced a need to downsizing, outsourcing and financial cuts at workplaces. The technological progress has provided possibilities to work transformation. Furthermore, macro-level incentives, such as the state of the economy, laws and public policies steer humans.

Meso-level workplace-related incentives such as corporate culture, promotional policies, benefits, flexibility, job security and job conditions affect well-being (Barnett 1998). Holden et al. (2017) for instance have utilised the categorisations of physical, social and organisational contexts to highlight the diversity of meso-level factors that may affect the work systems at the health care sector. In this study organisational contexts are discussed under the traditional work system concept, while we consider the physical and social contexts to cover the non-work level. To make a clear distinction between physical context at work and non-work domains, we discuss the non-work physical context as a home and leisure environment.

Finally, to describe micro-level factors we adopt an idea of sustainable work systems by Docherty, Kira, and Shani (2008) to cover factors that stress the well-being and work-life balance of an individual. Different individual-level incentives such as physical and mental health, education level and experience, balanced work and non-work time, the possibility to express opinions, social relationships and support, stable ecosystems, physical and economic security and material living standards have been identified in the literature as affecting holistic well-being (Powdthavee 2008; Rogers et al. 2012; Ratnayake 2013; Volanen et al. 2004).

In summary, as a compilation of the literature and empirical findings, we posit a conceptualisation that introduces the individual experiencing well-being as a productive unit on whom different incentives at different levels have an effect and as a unit that is able to produce different desired and undesired outputs (Figure 2). We propose, by retelling the balanced work system theory (Smith and Carayon-Sainfort 1989), that the incentives should be acknowledged when the elements of holistic well-being are balanced for the individual to contribute positive desired outputs.

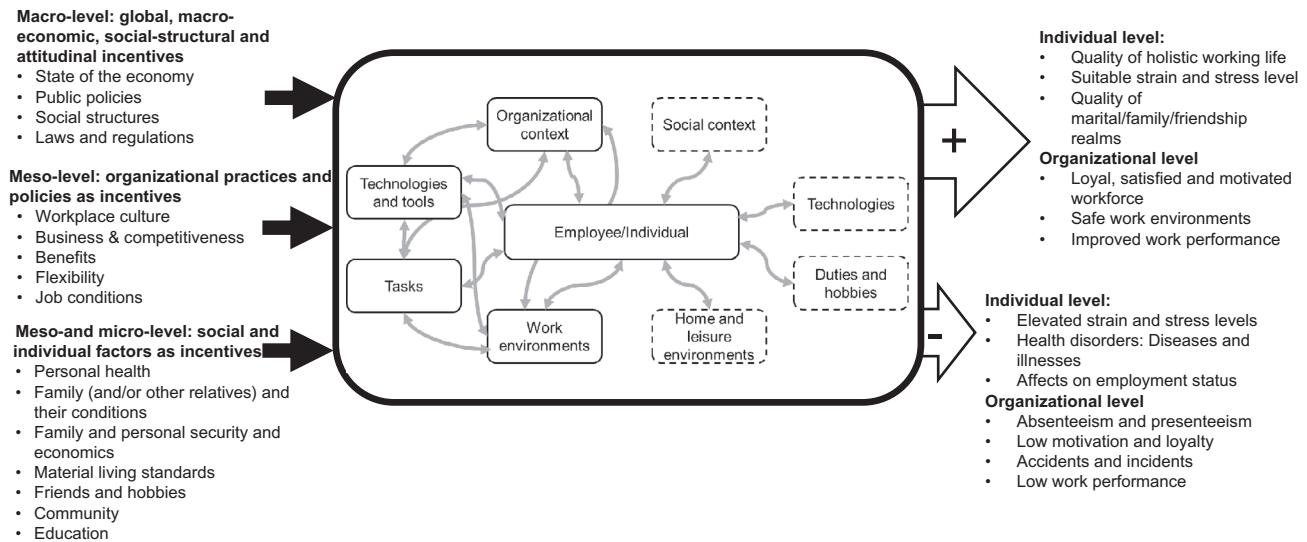


Figure 2. An illustration of the individual's holistic framework for well-being, supplemented with examples of potential incentives and outputs. The framework emphasises human as a centric actor that can contribute to maximising positive outputs and minimising negative outputs.

Table 1. Perspectives on work transformation (based on Demerouti et al. (2014) and possible challenges concerning the future work systems.

Perspectives on work transformation	Possible implications	Possible challenges to work systems
Timing of the work	More autonomy on working hours	<ul style="list-style-type: none"> • Organisational challenges on controlling the working hours • Challenges on ensuring that the tasks are performed as scheduled
Place of the work	Work is performed at different work environments, e.g. offices with no fixed workspaces, at home, during commuting	<ul style="list-style-type: none"> • Organisational challenges on ensuring the connections and interplay between different actors • Ensuring safe work environments, technologies and tools
New technologies	New communication technologies Automatisation and robotisation	<ul style="list-style-type: none"> • Ensuring that tasks are understood and performed safely • Ensuring employee's skills and capability to utilise new technology • Ensuring safety at human-robot interactions

As a future research challenge (RC2) we highlight the need to study the holistic framework for well-being at different work domain perspectives. Various different perspectives on work transformation and new ways for working have been proposed and discussed (e.g. Demerouti et al. 2014). Table 1 introduces an overview of some key elements of a changing world of work complemented with a discussion about possible work system implications and future challenges to be further studied.

4.2. Organisations and employees' well-being

Organisations continuously face complex and shifting challenges at operational and strategic levels when they are trying to maintain and improve their competitiveness and reach their strategic goals (Galbraith 1995; Ireland and Hitt 2005). Apart from monetary incentives, ethical values such as humanitarianism, sustainability and corporate responsibility might guide organisations in their strategic decision-making processes (Brauer 1994; Väyrynen et al. 2016). In addition to and completing organisations' own ethical guidelines and strategic visions and national and local regulations impose standards on organisations' operations (Kaplan and Norton 2004).

Sustainability and sustainable development can be discussed under the HFE and organisation-level sociotechnical work system frameworks, as proposed by Zink (2011) and Zink and Fischer (2013). For example Davis et al. (2014) have highlighted and visualised the complexity and challenges of broad sociotechnical

systems. Work systems may refer to and be discussed as singular entities or as a combination of singular work systems – that is, a broader sociotechnical system of systems and their interconnections – from, for example, singular production sites to organisations and to shared workplaces such as industrial plants, construction sites and hospitals, where different employers and stakeholders act together (e.g. Kekkonen et al. 2018; Kleiner and Hendrick 2008; Kubek, Fischer, and Zink 2015).

According to Carayon and Smith (2000), an organisation can be described as a collection of work systems that are interconnected and can be balanced. Thus, the balanced work system theory can be expanded to the balanced organisation theory (Carayon and Smith 2000). Balanced organisation theory is in a sense analogous to other traditional organisational development approaches, though slightly different, as the balanced work system theory underscores employee performance, stress and health- and safety-related issues as potential outcomes of the organisation's processes, not merely business-related outcomes such as production and productivity (Carayon and Smith 2000).

In order to attain managerial interest, the possible outputs of a balanced organisation should be concretised in a simplified form. Personnel, i.e. individuals within their own work-specific work systems should be acknowledged as keen elements of any organisation (Galbraith 1995). By balancing their work systems, positive outputs at different levels can be achieved. This study summarises examples of possible incentives and outputs from the human point of view in the light of the balanced organisation

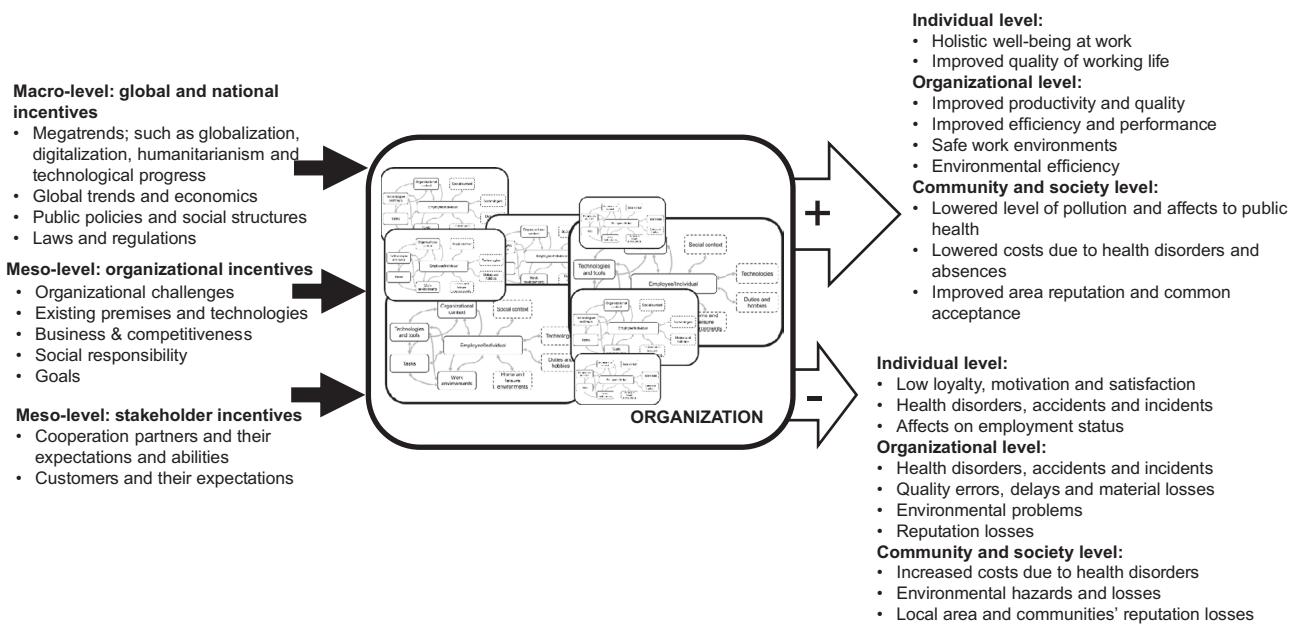


Figure 3. Balanced organisation in a holistic well-being framework, supplemented with examples of potential incentives and outcomes at different levels.

theory. Balanced organisation theory emphasises that high quality workforce is a requirement for high quality products and services (Carayon and Haims 2003). The incentives for the organisation are dependent on global and national macro-level incentives and meso-level strategic choices and actions (Figure 3).

Balancing the system of systems – that is, separate work systems and their connections inside the organisation – can have an effect on desired outputs. Balanced organisations contribute to safer and healthier work environments, more optimal physical and mental loads, and thus to different benefits at individual, organisational, and societal levels. Economic benefits at different levels are attained directly due to, for example, a decreased number of occupational diseases and accidents (both at work and non-work) and working days lost and decreased insurance premiums and indirectly due to, for example, better job satisfaction and increased involvement in and commitment to work.

A balanced organisation contributes to environmental and quality performance, such as taking actions aimed at minimising material and environmental losses. In addition to the organisation's own performance, environmental hazards and losses may have a broader effect at the community and society level due to, for example, increases in pollution levels and possible subsequent public health problems. Further, non-balanced organisations producing different kinds of undesired outputs may contribute to a local community's acceptance and further to area reputation factors (e.g. Lyytimäki and Peltonen 2016; Väyrynen et al. 2016). As a future research challenge (RC3) we emphasise the need to monetarily quantify the inputs and outputs of a balanced work organisation.

4.3. Organisations and their value networks

In addition to identifying organisation-specific meso- and meta-levels, inter-organisational meso-level (see Thatcher and Yeow 2016) should be identified. Organisations operate in interconnected business relationships, where different intra- and

inter-organisational stakeholders form value networks (Gadde, Huemer, and Håkansson 2003). Often, for example industrial plants and construction sites can be considered as shared workplaces, where different employers and other stakeholders in the value network act together. Organisations and other members in their value networks may have different expectations of work systems, their balance and further of sustainable development goals (Väyrynen et al. 2016). Zink and Fischer (2013) encourage whole value networks to be considered as a way to trigger new innovative and sustainable approaches. In a health care context, such complex networks could be considered consisting for instance of health care personnel and support services and reaching to patients and their families and other relations.

Different branches can learn from each other. As an example of a meso-level inter-organisational value network from Finland, global process industry actors have adopted sustainable development actions into their strategies. As a practical example, an integrated health, safety, environment and quality (HSEQ) assessment procedure (AP) has been developed and applied into use by eleven large purchasing companies in their network, reaching to their supplying companies and contractors that act at their sites (see Väyrynen et al. 2016). According to the HSEQ AP, the purchasing companies jointly assess, using commonly agreed upon criteria, their contractors' HSEQ performance and use these results as one criterion in ensuring the level of HSEQ performance in their supplying network. Nearly 20 years of networking and research in this area has provided various results that support the role of networking and the utilisation of holistic HSEQ assessments in improved supplying network HSEQ performance at the value network level. Various guidelines and incentives towards sustainability are meanwhile provided to supplying companies that in other way cannot learn and implement them in practice (see Väyrynen et al. 2016). HSEQ AP, as a holistic tool could be tailored to other branches use. Hospitals for instance, could be considered similarly as shared workplaces where different stakeholders and professions, such as personnel, support

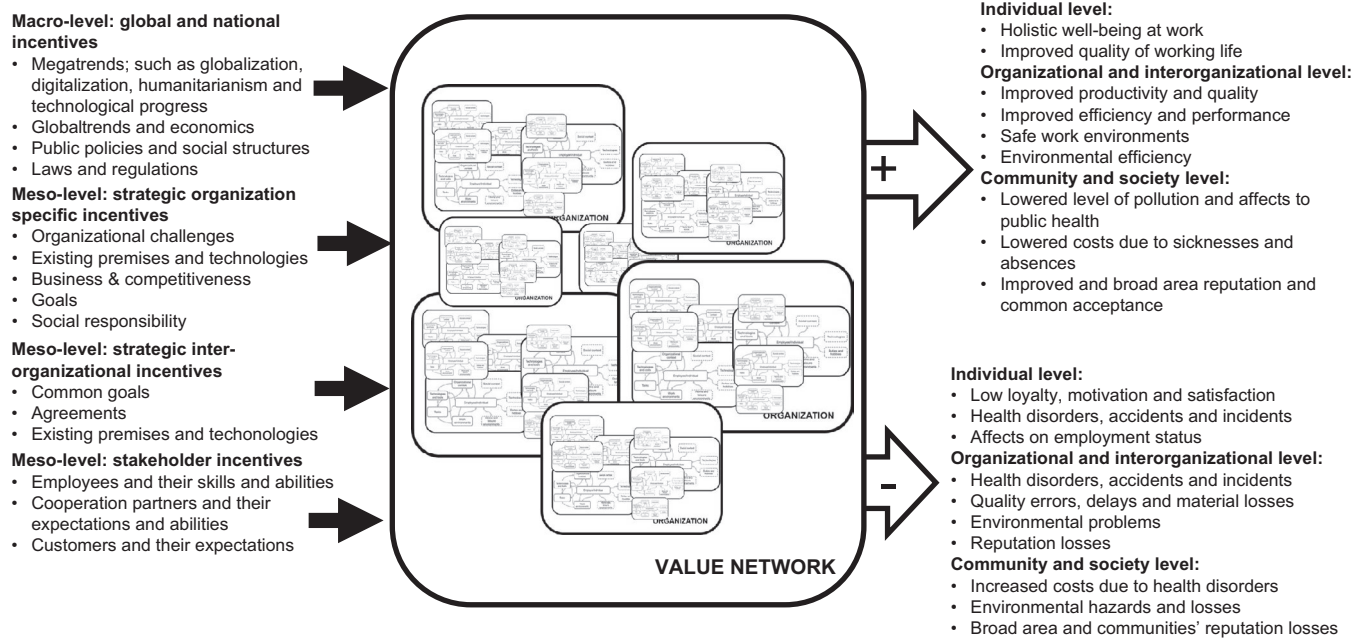


Figure 4. Illustration of value networks and examples of potential incentives and outcomes at different levels.

services, patients and their relations interact. Similarly as in the industrial HSEQ approach different stakeholders' interaction and performance could be evaluated and developed within the tool.

As a result, we propose that meso-level inter-organisational value networks are driven by many incentives similar to those driving singular organisations. In addition, inter-organisational strategic goals and agreements affect value network performance (Figure 4). The outcomes may be realised at different levels, starting from the individual and singular organisation level and expanding to the value network, community and society levels.

We propose a new concept of balanced value networks, based on balanced work system and balanced organisation theories, to be studied further. Our proposal supports the views by Carayon and Haims (2003) and Carayon, Kianfar et al. (2015) who propose to extend studies from balanced organisations to the interactions and interfaces between organisations and further to the community quality.

We propose that integrated management systems, covering HSEQ performance monitoring and development actions in value networks, provide an area and a challenge for future research (RC4) in the balanced value network context. As an assumption, we propose, analogical to balanced organisation theory, that balanced value networks can contribute broadly to safer and healthier work environments and thus to benefits at individual, organisational and societal levels. Furthermore, we propose that balanced networks can contribute to economic, environmental and societal development when, for example, minimising material and environmental losses and continuous discussion and cooperation with local communities and other stakeholders are acknowledged as strategic goals that are commonly agreed upon in the value network.

5. Concluding remarks

HFE as a scientific and design-oriented discipline can contribute to broad and complex challenges related to sustainable

development, as highlighted by Thatcher and Yeow (2016) and Siemieniuch et al. (2015). Discussing work system and sustainability issues in the same context in an attempt to determine how they can be integrated provides an interesting avenue for future research in different fields. In accordance with its primary intention, this conceptual study offers a framework within which these interrelations can be studied.

Sustainable work systems must be able to function in their environments and achieve their economic and operational objectives (Zink 2014). Humans form the central component in any work system. To be able to balance and optimise work systems, a HFE approach to human-specific characteristics should be applied. HFE and systems thinking can be referred to resilience engineering theory (e.g. Bergström, van Winsen, and Henriqson 2015) as they both seek to find ways to move away from human error thinking towards understanding errors as outputs of organisational processes.

As emphasised by Ahram and Karwowski (2013), variables such as nonlinearity, complexity, dynamic behaviour and biological factors and properties such as fatigue, mood and emotions all affect humans and their abilities to act in work systems. We underscore that such variables are associated to both work and non-work domains. Further, as highlighted by Ahram and Karwowski (2013), human variables should not only be considered negatively oriented, as characteristics such as flexibility and adaptability promote humans' abilities to adapt to existing circumstances. Thus, we honour the original concepts of balanced work systems and balanced organisations that centralise humans as a key element.

This article makes an effort towards gaining new insight into understanding the connections between the components of holistic well-being, sustainability and balanced work system theory. We acknowledge the limitations by the small and social and health-centric empiric material in this study. Our empirical material collected in 2011 highlighted the variety of different

work and non-work factors affecting the personnel at social and health care sector. For example, Juvani et al. (2016) and Karhula et al. (2018) have recently shown how similar kinds of challenges and problems related to holistic well-being still exist in the Finnish social and health care sector. In addition, similar interpretations can be drawn from the Finnish accident statistics. Statistics by Workers' Compensation Center in Finland (2018) show that the amount of occupational accidents in the private social and health care sector has doubled from 2005 to 2016. At the same period, the amount of occupational accidents has remained the same level in the municipality sector. Based on the publications above and our empirical findings we can conclude that the cultural change concerning holistic well-being has been rather slow and efforts for improvements are still largely needed.

On the basis of a literature review and our empirical findings, we propose four new aspects and research challenges. Firstly, we start by visualising the traditional work system theory to include non-work aspects to be able to discuss holistic well-being now (RC1) and in the future concerning possibilities to work transformation (RC2). Secondly, we discuss how holistic well-being contributes to work performance and motivation, leading further to desired and undesired outcomes. Thirdly, we add a balanced work organisation theory to describe and quantify how holistic well-being contributes to an organisation's performance (RC3). Fourthly, we propose a new concept of balanced value networks, in the light of balanced organisation theory, to be studied further (RC4).

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