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ORGANIZACIJA

Organizacija (Journal of Management, Informatics and Human Resources) is an interdisciplinary peer-reviewed journal which is open to contributions of high quality, from any perspective relevant to the organizational phenomena.

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- management človeških virov (kot so organizacija in razvoj zaposlenih, vodenje, ustvarjanje vrednosti s pomočjo človeških virov, organizacijski pojavi na delovnem mestu itd.);
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- članki, ki analizirajo organizacijsko uspešnost in prizadevanja za izboljšanje le-te.

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Probabilistic Interpretation of Observer Effect on Entrepreneurial Opportunity

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Background: In quantum mechanics, the observer effect categorically states that observing a phenomenon changes it. This research explores a probabilistic interpretation of entrepreneurial opportunity and explains the observer effect reflecting on Schrödinger's cat thought experiment. This approach addresses opportunity as a "possibility" concept reinterpreting it from multiple observers' perspectives and the cruciality of action to cause wave function collapse to an emergent reality. This paper intends to resolve the epistemological paradox and 'opportunity' war by re-contextualising opportunity as an artefact and positing it as a probability wave with a range of possibilities until alert entrepreneurs act on it.

Method: This conceptual development relies on literature review as a research methodology, using reasoning by analogy for the progress of theory and metaphors for theorisation.

Results: This conceptual narrative strengthens the epistemological foundation focused on possibility and probability (illustrated through wave function) to sharpen the definition of opportunity and action theory. The observer effect in opportunity is underexplored in entrepreneurial scholarship. This study features how the observer effect influences the evolving state of opportunity. Opportunity is affected by other observers and the entrepreneur's imagination, social construction and effort. Each involved agent relates and interacts to give rise to possibilities in opportunities. The interrelations and interdependence are complex, giving rise to superposition with a mixed state with many possibilities.

Conclusions: The contribution of this research is manifold from a theoretical and practical level. It presents a quantum-like model where an 'un-acted' opportunity is in superposition (multiple possibilities emerging simultaneously until it is enacted), expanding on Ramoglou and Tsang's (2016) view on propensity. The interactional effects – interfering and entangling between agents observing the same opportunity generate possibilities. The potentiality and the many-possibilities states in the opportunity artefact hold great promise in entrepreneurial research.

Keywords: *Observer effect, Quantum mechanics; Quantum theory, Wave-particle, Opportunity, Entrepreneurship*

1 Introduction

The mere observation of a phenomenon impacts the phenomenon itself and necessarily changes it (Baclawski, 2018). Cranford (2021: 2571) defined it "as the disturbance of an observed system by the very act of observation). This paper argues that opportunity is presented as a wave of possibilities when unobserved. Upon being observed by multiple observers, the observation interferes with the competitive state and becomes an inevitable reality. The "observation complexifies the situation since the

interaction involves an unavoidable "disturbance" of the thing being observed" (Cranford, 2021: 2571). At the same time, other observers are in varying states of action and seeking to exploit the same opportunity. The reflexivity of agencies (observers and others) is both a cause and effect of indeterminacy, and the creative force of each creates uncertainty but "also animating agentic efforts in the face of the resulting uncertainty" (Alvarez & Porac, 2020, p. 742). "The quantum trajectories can be ascribed a degree of reality in terms of quantum measurement theory" (Wiseman, 1996: 205). The observation of opportunity itself, as a

phenomenon, changes as it is observed. On registering and affirming the opportunity, the entrepreneur transits from the possible to the actual through entrepreneurial action. This explains widespread frustration among researchers that the entrepreneurship field is getting more questions and pieces of puzzles than answers, with no unifying picture emerging (Davidsson, 2003; Gartner, 1988; Koppl & Minniti, 2003).

Entrepreneurs are portrayed as economic agents equipped with skills to recognise opportunities that allow them to peer into an unknowable future (Ramoglou, 2021). Yet, the outcome of any discovery of opportunity is uncertain. It is a paradox “since nobody can know opportunities *ex-ante*” (Ramoglou, 2021: 2). At best, entrepreneurs have opportunity beliefs - not knowing when their ventures can succeed (Ramoglou, 2021). Knight (1921: 353) argued, “in the world as it is, where all human designs and acts are fraught with uncertainty”.

Existing economic paradigms that are strongly influenced by Newtonian physics and its mechanistic approach (Koçaslan, 2014) with concepts featuring determinacy, predictability, divisibility, rationality, the notion of “either-or”, order, reliability and validity, objectivity and impartiality, testability, consistency, independence, entitativity, causality, bivalency, atomism, linearity, proportionality, stability, classification/categorising and reductionism have limitations. They cannot deal with the knowledge problems of entrepreneurship. On the other hand, indeterminism, probability, nonlinearity, complexity, fuzziness, interdependence, inter-relatedness, duality (wave-particle¹), intersubjectivity, nonlocal causes, uncertainty, complementarity, disproportionalities between cause and effect chain, sensitivity to initial conditions (chaos theory), potentiality, unknowability (or knowability in multiple quantum states) (Dulupçu & Okçu, 2000) provide greater interpretive and theoretic representations in entrepreneurship.

This paper introduces quantum referents to model interacting systems between multiple observers and the opportunity artefact. It further argues that the observation of opportunity changes as it is observed. The fundamental concepts introduced are wave/particle duality, the observer effect, and superposition². Finally, the implications of theory and practice are discussed.

2 Literature Review

2.1 Epistemological Problems

Opportunity, as a phenomenon, should be expressed as an artefact, and this viewpoint challenges the existing definitions of how opportunity is formed (Leong, 2021). The dominant views of opportunity are the discovery and creation views. Shane & Venkataraman (2000) concocted a theory of entrepreneurship centring on Kirzner’s (1973) assertion that entrepreneurial opportunities exist as discoverable phenomena (Kirzner, 1973, 1997, 1980). Kirzner’s (1973) opportunity alertness became the predominant theme in entrepreneurial research. Short et al. (2010: 40) emphasised that opportunity is necessary for entrepreneurship and that “without an opportunity, there is no entrepreneurship”. Put differently, without action, there is no entrepreneurship. Liubertè and Dimov (2021: 1) noted that the articulation of “opportunity is an essential part of the denotation and actualisation of the opportunity” by drawing a framework differentiating “between words as content of speech (“opportunity”) and world as its object (opportunity), connected via illocutionary force (e.g. assertion, promise, intention) and used for perlocutionary effect (e.g. persuading, convincing)” (Liubertè & Dimov, 2021: 2).

“Entrepreneurship is a practice of identifying and creating from what is relatively unknown, new or emerging” (Neck et al., 2014: 3). Although the discovery approach has been influential in the extant literature, competing ontological approaches such as creation (Alvarez & Barney, 2005, 2007, 2019) and actualisation (Ramoglou & Tsang, 2015, 2017a, 2017b) are gaining traction to offer alternative views on opportunities. The semantics and linguistic juggernauts are problematic (Dimov, 2020; Ramoglou & McMullen, 2022) as the varied interpretations enormously complicate the definition. Ramoglou (2021) argued that any entrepreneurial foreknowledge is paradoxical and posed the question: how a knowable opportunity can be situated in an unknowable future? The discovery approach presupposes entrepreneurial foreknowledge and assumes that opportunity can be known *ex-ante*. Ramoglou argued that opportunity cannot be known *ex-ante* and asserted that the semantics, expressions and language of opportunity discovery are like a distorting mirror “trapped in illusions of infallible perception” (Ramoglou, 2021: 2).

The other dominant view is the creation approach relying on an iterative, incremental and inductive process for resource utilisation. By using available socio-material

¹ Wave-particle duality is a quantum mechanics concept where every quantum entity may be described as either particle or wave. Couder and Fort (2012: 1) revealed from their experiments that “forms of wave-particle duality exists in classical system with emergence of quantum-like behaviours”

² Superposition describes a quantum system in multiple states at the same time until it is measured. It describes a fuzzy boundary between the classical and quantum worlds where no certainty exists yet (Monroe et al., 1996).

resources on hand, entrepreneurs work on the available means and resources to create new opportunistic ends incrementally and experimentally (Alvarez & Barney, 2007; Foss & Klein, 2020; Shepherd et al., 2021). Effectuation is closely associated with the creation approach. “Core to effectuation is the idea that rather than discover and exploit opportunities that pre-exist in the world, the effectual entrepreneur is one who ‘fabricates’ opportunities from the mundane realities” (Sarasvathy, 2009: xiii), and effectuation lies in the logic of control (Sarasvathy, 2001).

Although some researchers argue that the subjective or socially constructed nature of opportunity makes it impossible to separate opportunity from the individual, others contend that opportunity is an objective construct visible to or created by the knowledgeable or attuned entrepreneur. Either way, a set of weakly held assumptions about the nature and sources of opportunity appear to dominate much of the discussion in the literature (McMullen et al., 2007: 237).

The epistemological tension with this opportunity theorisation raises two provocative questions: (a) why do entrepreneurial opportunities exist and (b) why do some people and not others discover and exploit these opportunities” (Leong, 2021: 2150021-3). The intervening years generated new research streams and dialogues on the nature of the opportunity, particularly the middle-ground definitions (Davidsson, 2015; Foss & Klein, 2020; Ramoglou & Tsang, 2017). Yet, at the core of the recognition and pursuit of opportunity, uncertainty grips entrepreneurs in most instances (Leong, 2021). Knowing that opportunity is the necessary anchor for the actualisation process, the entrepreneurs need an imagined future state while immersed in differing degrees of uncertainty, defined by the opportunity belief (Ramoglou, 2017, 2017, 2021). The force of external circumstances acting on the entrepreneurs is never-ending (Davidsson, 2021) and forms one part of Ramoglou’s “knowable opportunity-ingredients whose knowability varies across contexts” (Ramoglou, 2021: 1). Ramoglou (2021: 2) translated the problem of “opportunity unknowability” to manageable and reducible “epistemological problem of knowable and unknowable Opportunity-Ingredients (OIs)... explain the fact that particular ingredients may be knowable does not make opportunities knowable because the entirety of Opportunity-Ingredients can never be knowable”.

We argue that opportunity is an artefact with perceived potentialities expanding on Ramoglou and Tsang’s (2016: 416) notion of propensity where opportunity exists “akin to

the unactualised propensity of seeds”. Here, we argue that the opportunity has many seeds’ propensities or possibilities. Entrepreneurial opportunity straddles many possibilities, and according to Ramoglou and Tsang (2016: 430), entrepreneurship “stands on the thin line between possibility and actuality and therefore faces unique conceptual difficulties unknown to disciplines studying actualised phenomena with more discernible patterns of causality”.

This paper finally discusses these potentialities as probability waves³.

2.2 Resolving the definitional clumsiness

Davidsson (2021) suggested ditching Shaniyan’s discovery and Alvarez-Barnean creation views since these views constrain future entrepreneurial research. Foss and Klein (2020) called for the abandonment of the opportunity construct since current standpoints and attributes of the opportunity construct obscure its intended meaning. “Opportunities can at best be manifested ex-post, when entrepreneurial outcomes are successful. What entrepreneurship scholars mean by “opportunity” is simply a business idea, plan, or belief, which may or may not turn out as the entrepreneur imagines” (Foss & Klein, 2020: 367). Conceptualising opportunity as an artefact-centred design provides an alternative conceptualisation of opportunity in entrepreneurship research constrained by their current definitions (as discovered and created). Whether the opportunity is discovered as pre-existing causes or created through the ultimate consequences of entrepreneurial action, entrepreneurship scholars generally agree that the basic definition of opportunities is about lucrative market imperfections (Berglund et al., 2020) situated in uncertainty and disequilibrium. Whether opportunities are objective, subjective, or social construction makes it impossible to separate opportunity from the observer. Either way, a set of weakly held assumptions about the nature and sources of opportunity appear to dominate much of the discussion in the literature” (McMullen et al., 2007: 237).

The weakly held assumptions about the properties and nature of the opportunity, including the sources from which it arises, need a reformulated construct. If the opportunity is a visible objective construct recognisable by some and not others, “uncertainty plays no role because they are known as soon as they are discovered” (Ramoglou, 2021: 4). Such linear assumptions are an oversimplification of the opportunity’s construct. Here, we argue

³ Probability wave of a quantum system is characterized by a wave propagating through space in which the square of the magnitude of the wave at any given point in time corresponds to the probability of finding the particle at that point. Researchers debate on the best way to think about quantum mechanics with many competing schools of thought (including the Copenhagen School) and the views are referred to as “interpretations” of quantum theory. All these interpretations rely on the idea of probability in a fundamental way.

that opportunity's state is not situated in one fixed causal relationship with a determined outcome but is presented with possibilities depending on the contexts (and Ramoglou's opportunity ingredients). The interactions between the different known opportunity ingredients concoct other possibilities.

Opportunity's indeterminacy needs addressing since opportunity's subjective or socially constructed nature is contingent on the observer. Short et al. (2010: 40) asserted that "opportunities are one of the key concepts that define the boundary and exchange conditions". The entrepreneur, as the observer, is situated at the boundary and exchange conditions; any exchange or exploitation is based on the interpretation and evaluation of the opportunity. Nonetheless, the fundamental issues of the opportunity construct and its properties remain elusive (Davidsson, 2017; Dimov, 2011; Leong, 2021). Burt (2004) used the imagery of the structural holes⁴ to represent opportunities, with alert entrepreneurs able to broadly see the information discrepancies/dissonance and arbitraging this information to their advantage. Burt stressed that entrepreneurs exploit structural holes that lie between constrained positions (Walker et al., 1997).

Opportunities can only be manifested ex-post when the venture proves successful and is contingent on a true-positive outcome (Foss & Klein, 2020). Therefore, the intervening period from recognition to entrepreneurial action that results in either success or failure must be a belief. This opportunity belief is subject to change at the interface/boundary between the entrepreneur and the environment. Therefore, entrepreneurs constantly scan for lucrative market imperfections to form opportunity beliefs. These beliefs are continually changing and updated when new information is revealed. This information includes competitive counter-actions, imitations, and interactions among heterogeneous stakeholders. Presenting opportunity as an artefact with many possibilities provides interpretative flexibility. "Rarely new ideas or concepts evolve full-blown and are totally ready for use, unless it's a hole-in-one eureka moment, as it requires time and expenditure of efforts to shape the idea to fruition and the process is almost never linear. There are false starts and dead ends, ups and downs and "backing and forthing" as the entrepreneurial pathway unfolds" (Leong, 2021: 23)

The entrepreneur, as an observer, processes the information, or lack of it, in that space and time and has to decide whether to act under uncertainty since any action arising shifts the trajectory from possible to actual. The

observation disturbs the possibility as the observer may become another competitor to pursue that opportunity (Figure 3). Such competitive acts impact the other agents locking in to observe the same opportunity. Other agents' actions affect the possibility state of the opportunity. Thus, we argue that such observations by any agents, including the entrepreneur, influence the opportunity and its various possibility states. The re-contextualisation of opportunity as an artefact provides convenient and interpretive flexibility.

2.3 Re-contextualising opportunity as artefact and possibility object

The role of opportunity in entrepreneurship must be understood in its proper context. This paper suggests re-contextualising opportunity as an artefact and a possibility object. Ramoglou and McMullen (2022) argued that opportunity is a possibility concept situated in the future. The opportunity artefact, when unobserved, is represented by a wave with different potentialities and possibilities. These states are mixed states (or superimpositions). When observation is made, the mixed states collapse into a pure state⁵ (or actual state). In a way, an opportunity is probabilistically framed. Here, this paper asserts that every observation generates a probability distribution with different possibilities rather than defined by a single possibility. With Ramoglou's (2021) knowable opportunity ingredients, entrepreneurs abstract information from all possible sources to understand to form the belief to inform entrepreneurial action. This understanding impacts the degree of believability and motivates action on the opportunity belief.

Opportunity-as-artefact changes over time as information is discovered and entrepreneurs gain experience and knowledge/information—the strength of the initial opportunity formation changes with new and emerging knowledge (Leong, 2021). Eckhardt and Shane (2003: 340) discussed entrepreneurial opportunities manifesting themselves in multiple ways – "by the locus of the changes that generate the opportunity; by the source of the opportunities themselves; and by the initiator of the change". Dimov (2011: 62-63) added:

An opportunity epitomises the symbolic aspect of the interaction between entrepreneurs and their environments. It can be regarded as an evolving blueprint for action, synthesising the entrepreneur's sense of, expectations about,

⁴ Burt's theory suggests that individuals have various advantages from their location in social structures and neighbourhoods. A structural hole represents a gap between individuals who have complementary sources to information that involves "information breadth, timing and arbitrage advantages of network brokers" (Burt, 2021: 384).

⁵ Mixed and pure states refer to a quantum system. A pure state refers to a quantum state with exact information about the quantum system; whereas the mixed state is the combination of probabilities of the information about the quantum system (Zhang et al., 2007).

and aspirations for the future, and can help us understand what the entrepreneur does at every step of the way from within the worldview that the entrepreneur holds.

The entrepreneurs' worldviews influence the way opportunity beliefs are formed. Still, the clarity of the opportunity-as-artefact depends on the observer's interpretation and the observer's interaction with the environment under conditions of uncertainty. It provides interpretative flexibility where prevailing theories on opportunities (Dimov, 2011; Eckhardt & Shane, 2003; Sarason et al., 2006) present theoretically problematic definitions with limited practical use. For example, Berglund et al. (2020: 40) suggested making "opportunities real by treating them as artificial" (Berglund et al., 2020: 40).

2.4 Observer effect

The observer effect is predominantly featured in physics, where observation and uncertainty undergird the fundamental aspects of quantum physics (Baclawski, 2018). The observer effect generally describes circumstances in which the observed entity is affected by the curious observer. For example, Jeraj (2014: 201) noted the interrelationship between curiosity and optimism influencing entrepreneurial action, particularly when entrepreneurs "hold positive expectancies for their future". Jeraj (2014) argued that curious observers with optimism have a higher level of self-efficacy and therefore are likelier to act. In physics, the term describes circumstances in which the mere act of observation changes the observed phenomenon (Thompson, 2016).

Quantum mechanics states that particles can behave like waves, which can become particles depending on the situation. For example, when an observer is watching, the wave collapses to become a particle, and when it is left unobserved, the particle becomes a wave (Figure 1). "In the ambit of the creation-discovery view, it is usually stated that quantum measurements are not just observations, as they can provoke a real change of the state of the measured entity" (Sassoli de Bianchi, 2013: 1). As new information surfaces and becomes available from the environment, the probability distributions also can evolve (Baclawski, 2018). Peljko et al.'s (2016: 172) study noted the interrelationship between entrepreneurial curiosity and innovation, motivating "entrepreneurs to gather information about their business and innovativeness".

Observation can also be either invasive or non-invasive. That "it is always possible to observe the countless entities populating our reality without disturbing them, i.e., without influencing their state and evolution" (Sassoli de Bianchi, 2013: 2) in a non-invasive and non-intrusive way. "The observation of living entities, like when a hunter hides to observe a prey from afar, can possibly involve some very subtle levels of inevitable disturbance that could influence the behaviour of the living entity being observed" (Sassoli de Bianchi, 2013: 20) and in an invasive way that influences their state. In quantum theory terms, any independently existing physical system is situated in a definite state at every moment. "Intuitively, the state of the system is the totality of its observable properties, but the relation of this totality to individual observables is peculiar to quantum mechanics" (Shimony, 1963: 756).

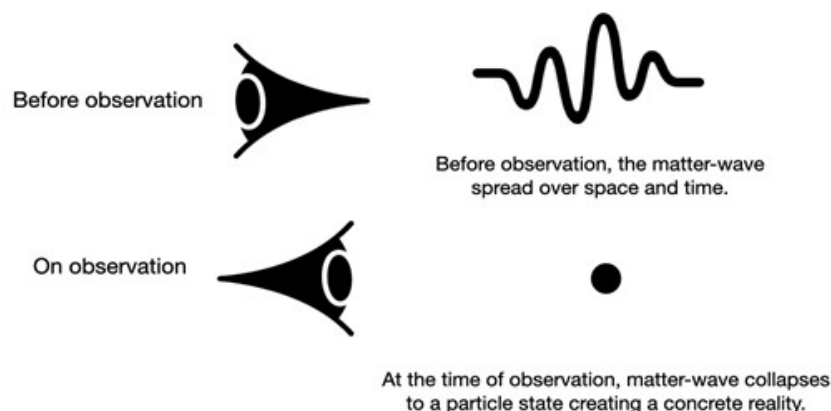


Figure 1: Illustrates the observer effect and the wave-particle duality

Even worse, the uncertainties in the system exist prior to and independent of any measurement, and the uncertainty principle is, therefore, more fundamental than the observer effect. So not only did you change the system being measured/observed, you can't even tell how you changed the system being measured/observed, and you can't avoid it! You can only accept the fact that you changed it (Cranford, 2021: 2571).

We must consider the possible effects and changes the observation may produce when an opportunity is observed. With wave functions, re-conceptualising opportunities as artefacts open new dialogues and orientate future research.

2.5 Understanding uncertainty

“Entrepreneurship is fundamentally action under uncertainty” (Foss & Klein, 2020: 369). Purposeful behaviour under uncertainty is the fundamental assumption undergirding theories of entrepreneurial actions. Simply put, “entrepreneurs operate in uncertain environment” (Townsend et al., 2018: 659). Uncertainty is a persistent struggle for entrepreneurs, and sensemaking is crucial for their venture's ongoing concern. Knight (1921) differentiated risk and uncertainty. Keynes (1921) discussed risks probabilistically. Knight and Keynes both drew the line between risks and uncertainty. Knight's account of how an agent's beliefs and confidence in uncertain events influence their choices (Westgren & Holmes, 2021). According to Knight, the risk is quantifiable uncertainty (Holton, 2004). Westgren and Holmes (2021) examined subjective probabilities and indeterminism to understand degrees of uncertainty. Uncertainties, in a nonequilibrium environment, provide the contexts for opportunities to arise. Alert entrepreneurs perceive, act and profit from purposeful actions. Khalil (1997: 27) drew the distinction:

Two kinds of indeterminism, one arising from the knower's limited skill of computation and the other from the phenomenon's inherent uncertainty. The former kind of indeterminism, characterising market equilibrium dynamics, is heuristically captured by chaos theory and, in economics, by Frank Knight's notion of risk. The latter kind of indeterminism, expressing innovativeness, is analogous to the laws of quantum mechanics and, in economics, Knight's notion of uncertainty.

“Heisenberg's uncertainty principle is a milestone of the twentieth-century physics” (Atkinson & Peijnenburg, 2022), borne of the Copenhagen school⁶, lies on an epis-

temological interpretation where the uncertainty is attributable to the conjoined interactions between the subject and observer. The conjoined interactions generate a certain indeterminism, formulated as Heisenberg's uncertainty principle⁷ (Busch et al., 2007). The uncertainty principle states that “it is impossible to specify a particle's location and momentum simultaneously. As soon as the experimenter finds out the particle's location, the experimenter's tool unpredictably influences the particle's momentum, and vice versa” (Khalil, 1997: 29). “Heisenberg's uncertainty principle is usually taken to express a limitation of operational possibilities imposed by quantum mechanics” (Busch et al., 2007: 1). According to Soros (2013: 316), “Heisenberg's uncertainty principle in quantum mechanics is subject to the laws of probability and statistics, the deep Knightian uncertainties of human affairs associated with the human uncertainty principle are not”. “Heisenberg's uncertainty principle showed that the act of observation impact a quantum system” (Soros, 2013: 318). Khalil (1997: 29) explained the Schrödinger's cat example:

Erwin Schrödinger summarises quantum uncertainty with the famous metaphor of a cat placed in a box with a radioactive substance which can trigger at any moment the release of a lethal poison. In a Newtonian indeterministic world, one can state with certainty the chance (i.e., risk distribution) of whether the cat can be found dead upon opening the box in two hours. That is, in two hours, the cat can be either alive or dead with a certain probability distribution. In a quantum indeterministic world, however, the cat can be in the potential state of being alive and dead. Thus, the uncertain state can be determined only through experience, one of which is the act of opening the box. This finding has led to the subjectivist Copenhagen interpretation that the act of opening the box affect in an uncontrollable manner whether the cat will be found alive or dead view.

Quantum phenomena are not intuitive and do not obey the notion of locality familiar to everyday experiential perception. However, opportunity-as-artefact can be flexibly posited in a locality formed as an entrepreneur's imagination with possibilities. This is consistent with Ramoglou and Gartner's (2022: 7) view that “venture success is ultimately a matter of entrepreneurial imagination and effort”. McMullen (2022) proposed that entrepreneurial innovation can be an endogenous imagination act where the mental models interact in a process that generates an output. Metaphorically, an opportunity artefact is repre-

⁶ The Copenhagen interpretation is a set of views about quantum mechanics, principally attributed to Niels Bohr and Werner Heisenberg. The earliest interpretations of quantum mechanics during the period of 1925–1927 (Paty, 1995).

⁷ Heisenberg uncertainty principle also known as the indeterminacy/ uncertainty principle states that the position and the velocity of an object cannot be simultaneously measure with any precision. The uncertainty principle asserts a fundamental limit on the accuracy with which an object's physical quantity such as position and momentum can be predicted from initial conditions (Busch et al., 2007).

sented as a quantum particle, and if “a quantum particle is taken to exist independently of the observer, it must be conceived as existing as a coherent potential which occupies a locality in an uncertain way” (Khalil, 1997: 29). According to Ramoglou (2021), there is no visual interaction of opportunity with the physical aspects of the world, and when “entrepreneurs talk about discovery or perception of opportunities, they are engaged in a language game of imagination” (Ramoglou, 2021: 8). The locality of the opportunity, a socially constructed artefact, can be situated in the observer’s mind. Alvarez and Porac (2020: 739) claimed that “complexity is a function of the mind and not the world”. McMullen (2022) asserted that entrepreneurs create knowledge⁸ that helps realise profit potential, but they do not create the profit potential itself. What is realistically observable is the abstracted information, such as the market trend, consumers’ habits, and technological development. Courtney et al. (2017) examined the signals and endorsements obtained from multiple information sources to mitigate information asymmetry⁹. “The multiple signalling factors and endorsements¹⁰ interact to influence a project’s likelihood (of success)” (Courtney et al., 2017: 284, emphasis added). The assemblages of information from multiple sources form opportunity beliefs. Soros (2013: 314) further clarified:

Risk is when there are multiple possible future states and the probabilities of those different future states occurring are known. Risk is well described by the laws of probability and statistics. Knightian uncertainty occurs when the probabilities of future states, or even the nature of possible future states is not known.

When Mark Zuckerberg spoke of his vision of the metaverse and transformed his business to pivot into the metaverse, he imagined that the metaverse contains possibilities for alternative interactions between people (Newton, 2021). He peered into the unknowable future with his

ability to recognise and identifies:

1. the metaverse will be the successor to the mobile internet;
2. the spatial distance between people is compressed in the metaverse, and this spurs interaction;
3. the interactions are immersive and can unlock new experiences;
4. the immersive reality will change the way people interact and intermingle.

“Technology that’s built around people and how we actually experience the world and interact with each other. That’s what the metaverse is all about” (Zuckerberg, 2021). Despite the unknowable and uncertainty in today’s context, Mark Zuckerberg persists with his vision to transform social interaction through his platform and innovation.

Opportunity-as-artefact is only meaningful when it stirs entrepreneurial actions. The action occurs in time, inherently making it uncertain (Mises, 1949). “Thus, it seems that one cannot have opportunity without uncertainty, but because the human condition is characterised by the passage of time, there will always be uncertainty, and therefore, some form of opportunity” (McMullen et al., 2007: 15). Under “uncertainty-based theories entrepreneurs do not so much discover profit opportunities as create them, often through their organising efforts” (Alvarez & Barney, 2005: 788). According to Foss and Klein, “uncertainty is central to entrepreneurship and innovation yet absent from opportunity-based approaches” (Foss & Klein, 2020: 366). Opportunity-based approaches (Alvarez et al., 2013; Mole & Mole, 2010; Venkataraman et al., 2012) feature discovery and creation, but what does an entrepreneur discover or create? We argue that entrepreneurs discover information under uncertain conditions, strengthening their opportunity artefact¹¹. The opportunity artefact potentially motivates them to a specific action. Whether it is “price differentials

⁸ Knowledge and information are distinctively different. Knowledge refers to relevant and objective information gained through experience and learning. Knowledge is accrued from combining information and helps draw inferences to develop insights. Information refer to processed data that has been ascribed meaning through relational connections. Information informs and provides answers to problems.

⁹ Information asymmetry refers to imbalance of knowledge of relevant factors and details between negotiating parties (Bergh et al., 2019) where one party has more or better information than another.

¹⁰ Endorsements refer to third party’s expressed views and according to Courtney et al. (2017), third-party endorsements alleviate information gap as prior research has shown that these endorsements through interorganisational relationships serve as signal of quality.

¹¹ Opportunity artefact, opportunity-as-artefact and opportunity belief are used interchangeably in this paper. Artefact refers to an object of interest that can be represented: an aspect of thing, a state of affairs, knowledge stock, information feed or material resource, something observable in the environment that is of concern to the observer. Opportunity artefact, technically, is composed of Ramoglou’s (2021) opportunity ingredient which is the knowable part in the opportunity construct (market demand, competitive reactions, prevailing interest rate, etc.). Ramoglou (2021) explained that particular knowable ingredients do not make opportunities knowable because “the entirety of opportunity ingredients can never be knowable” (p. 2). Opportunity belief refers to the aggregated information abstracted from various sources. The aggregated information motivates and sustains actions. Opportunity belief is grounded with degrees of intentions that guide skilled actions. Fridland (2021) described intentions “as hierarchically organized, where intentions at higher or more abstract levels of description causally influence, structure, and organize intentions lower down in the intentional hierarchy. This kind of top-down causal influence would allow, and in some cases even require, the simultaneity of intentions at different levels of action specification” (p. 489).

(spatially or temporally)” (Foss & Klein, 2020: 368) or Burt’s (2004) structural holes, entrepreneurs interpret the information within the opportunity artefacts to create arbitrage-able opportunities (Foss & Klein, 2020). The alert entrepreneurs scan and recognise these structural holes where the disequilibrium brings arbitrage opportunities. The entrepreneurs seize these opportunities before other actors who may be observers of the same opportunities. Observing the phenomenon impacts the phenomenon itself and necessarily changes it (Baclawski, 2018). This disequilibrium does not last long as all knowledge is effectively parameterised in multi-actor observations. The opportunities arising from the disequilibrium are discovered and exploited. The entrepreneurial discovery, in a way, causes markets to equilibrate.

Alert entrepreneurs explore the prevailing social relationships and material resources in combinatorial ways to generate values and profits under genuine uncertainty (Foss & Klein, 2020). The disequilibrium, visibly observed in the chaotic environment, is constantly changing, with resources, opportunities and relationships dissolving and reforming. The “real world entrepreneurship consists primarily of choosing among combinations of heterogeneous capital assets” (Foss & Klein, 2020: 370) to create possibilities from each combination. The creation involves combination and recombination, dissolving and reforming resources. “When emergence happens, something new and unexpected arises, with outcomes that cannot be predicted even knowing everything about the parts of the system” (Lichtenstein, 2014:1). McMullen (2022) argued that the world determines emergence¹² in an indeterminate way though resources are at entrepreneurs’ disposal. “The origin of emergence is a potentiality” (Lichtenstein, 2014:5). Lichtenstein (2014) viewed the opportunity as emergent with potentiality and possibility.

According to the discovery approach, opportunities are an outcome resulting from conditions and constraints in technology, markets and entrepreneurs. According to the creation approach, opportunities are an emergent process; a viable opportunity is one that becomes increasingly visible through entrepreneurial organising and enactment. An emergence perspective provides a unique integration by viewing opportunities as emergent that are and can be, enacted (Lichtenstein, 2014:7).

Implicit in the emergence perspective is the emergence of potentialities and possibilities instead of an actual fixed state. Opportunity is more of becoming instead of being.

3 Discussion

The act of discovering, creating and evaluating opportunities requires information. “Many entrepreneurship scholars see risk, ambiguity, and uncertainty as different, though relatedly, informational contexts” (Alvarez & Barney, 2019: 12). On quantum terms, the “quantum wave function has a pure information nature” (Haven & Khrennikov, 2017: v).

The act of observation of the opportunity artefact is complex. It invokes cognitive decision-making and call-for-action—any action arising impacts the interdependence of events and stakeholders at multiple social levels. Entrepreneurs operate in a highly interdependent environment where they form organised structures in which the parts and wholes are dynamically interdependent with bewildering entangled complexities (Lawless, 2017). The interdependence of the interwoven parts cannot possibly be understood in its totality¹³. Opportunity artefact represents all these interwoven and interlaced relationships and information encapsulated in the artefact.

The Schrödinger’s cat thought experiment queries the counterintuitive quantum superposition of macroscopic objects. Here, each cat represents an opportunity artefact (quasi-classical object) which in turn is represented by a wave function. As a natural extension, several cats (opportunity artefacts) “can be prepared into coherent quantum superposition states, which is known as multipartite cat states demonstrating quantum entanglement among macroscopically distinct objects” (Wang et al., 2022: 1). This superposition state (or mixed state), is where the opportunity artefact simultaneously occupies several possible states. “In Schrödinger’s thought experiment, a cat would be in a peculiar mixture of being dead and alive” (Wang et al., 2022: 1). Thus, the “wave function incorporates everything there is to know about a particle, summing up its range of all possible positions and movements” (Yam, 1997: 124). Metaphorically, the wave function represents all the possibilities in the artefact. The act of observation necessarily changes the state to reveal the reality – either dead or alive. The action causes the wave function to collapse on observation where only one reality persists. Figure 2 clarifies this point – the revelation of the cat’s state of being alive or dead occurs on observation. The wave function is presented like a three-dimensional Gaussian bell curve that maintains its shape in a mixed state of being

¹² Here, “the world” refers to the market with its unpredictability such as customers’ demands and market trends. When entrepreneurs act in response to what they see of the world (their worldview), their entrepreneurial action is based on an opportunity belief and any emergence (such as successful or not) by turning out to be an actual opportunity for profit is uncertain. Hence, the emergence is a potentiality acting out.

¹³ This description corresponds to Gell-Mann’s idea of the entire fine-grained descriptions is not knowable because of observers’ limited power of observation, cognitive abilities and computations. Ramoglou’s (2021) view is consistent -that particular knowable ingredients do not make opportunities knowable because “the entirety of opportunity ingredients can never be knowable” (p. 2).

dead or alive until observation (or action) is made, where the wave function collapses to an emergent reality.

The experiment is not constructed on any quantum mechanical devices, but the thought experiment adequately demonstrates the variety of subjective interpretations against a backdrop of possibilities. The paradox is this: when the cat is in the sealed container with a radioactive substance (within an hour, the radioactive atom has an even chance of decaying), the decay will trigger a hammer that would smash the vial containing the cyanide. The cat

is situated in a mixed state of being either alive or dead, half alive, or near death. The outcome is uncertain. When the box is sealed, it is in a mixed state with many possibilities. The act of opening the box immediately reveals the actual state – the earlier mixed state of possibilities instantly collapses into a pure state: alive or dead. The act of observation eliminates the notion of superpositions (other possibilities), and a particular state prevails to become a reality.

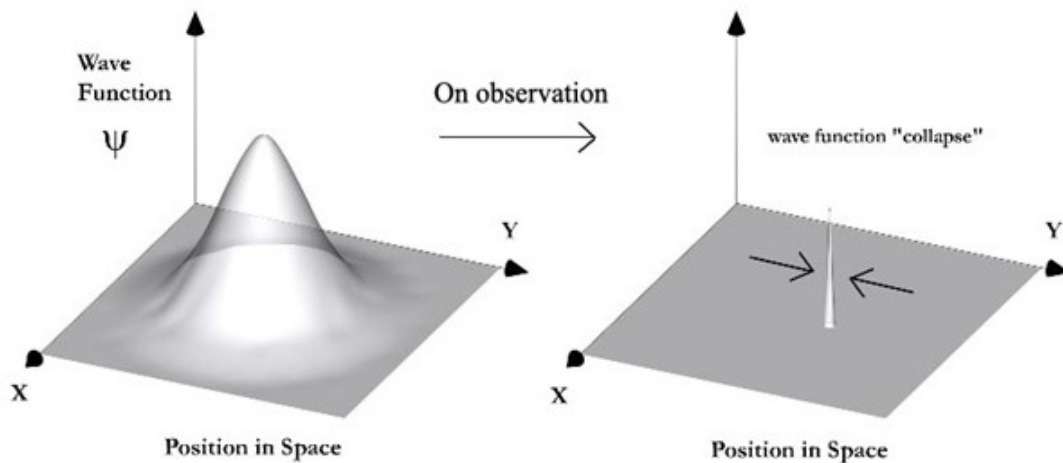


Figure 2: The collapse of wave function phenomenon. Illustration credit attribution to Andrew Friedman, <http://afriedman.org/AndysWebPage/BSJ/CopenhagenManyWorlds.html>

3.1 Rise and collapse of wave functions

The expression of uncertainty as potential states in a probability distribution is also known as Schrödinger's wave function (Khalil, 1997). The wave functions represent the range of possibilities in the opportunities, including the observer's interpretation and the interactions and entangled superposition at the observation point. Murphy summarises and draws the following conclusions (Murphy, 2021: 14):

- The social structure of the market is invisible and can be represented when considering all possible outcomes with its wave-like properties.

- Any interactions with 'the market' or any observation of market interaction, the market wave 'collapses' – just as would any photon being observed. Hence, when measuring with precise methodologies, there is no 'market' to see, as it is a social construct that includes buyer, seller, commodity, et cetera.

- Through the interactivities between markets (social structures) and the stakeholders (buyers, sellers, etc.), with the observer scanning for opportunities, market opportunities are constantly arising and collapsing because of the constant intra-activity of actors and structures.

- The market wave function interferes with other social wave functions, and the interaction effects may be constructive or destructive.

- The market and all the other social structures and the actors (all should be understood in terms of their social wave functions) can become entangled and conjoined one way or another. In such a case of entanglement, a significant change in the state of the market can have nonlocal effects on those actors with which it is entangled.

Using this quantum approach, this paper re-conceptualises opportunity as an artefact with possibilities expressed as a wave with a probability distribution. The entanglement and interference with other social structures like competitors, imitators, suppliers, distributors, and

investors contribute to the possible state actualising. The prevailed wave function is transformed into a certitude expressed in risk distribution (Khalil, 1997). The prevailed wave function is actualised into the observed reality from the earlier state of uncertainty. The rise and fall of the wave functions depend on the flow of abstracted information derived from relatively autonomous or independent sub-totalities or Ramoglou's opportunity ingredients. This more profound type of uncertainty can be mathematically represented by the tools of quantum probability theory. Such information can be modelled with quantum probability using superposition and entanglement of belief states (Haven & Khrennikov, 2017). The observable spike represents a highly likely actualisable opportunity. The rise-to-a-spike is a signal. "The observability of that opportunity in terms of its signal intensity, visibility, frequency, strength and clarity become critical to tilt the balance in favour of purposeful actions. Strong signals are more likely to compel entrepreneurs to enact with such consuming obsession and burning desire to actualise the end goal" (Leong, 2021: 2150021-12). The desire to actualise the end goal compels entrepreneurs to act to shift the trajectory from possible to actual over time.

3.2 Implications of an action framework framed as a wave function

With entrepreneurial action, the mixed state of possibilities collapses into a pure state (either of success or failure); the process of discovery/creation (pre-observation stage) and evaluation situates the entrepreneur in a mixed state of possibilities. Observing Schrödinger's cat (opportunity artefact), one state prevails among the mixed possibilities. The mixed state holds that the wave function describes all possibilities based on the entrepreneurs' knowledge/access to information and socio-material resources. The wave function becomes complex when encoded with much information (Yam, 1997). This wave function contains all the information of a system available to the entrepreneurs, leading to their asymmetric beliefs (Mises, 1949) and hence their choice of actions. Their actions are determined by their prior knowledge and motivation to act. Not all would act on the same knowledge with equal motivation and conviction. Those who act entrepreneurially are presupposed to possess a clearer vision of the future than those who have not acted. The objective reality "is thought to exist in which a market opportunity is there for the taking, but only for those who possess the qualities necessary to discover and exploit it. Thus, entrepreneurial action is seen as something all would engage in if they knew what to do, but, owing to epistemological differences, only some people (the entrepreneurs) "know" what to do" (McMullen & Shepherd, 2006: 137).

Recognizing an opportunity is similar to looking at the

box with Schrödinger's cat (opportunity-as-artefact). A hypothetical wave function emerges (Figure 2) with different possibilities. The act of observation changes the phenomenon being observed. The opportunity-as-artefact is hypothetically represented as a wave function containing all the possibilities. McMullen and Shepherd (2006: 137) qualify these bell curves as hypothetical "because in a natural context, only one point of an individual's response curve is observable". This one point of the response curve refers to the spike seen in Figure 2. Only the act of opening the box will reveal the actual state.

When opportunity-as-artefact is observed, the entrepreneurs rely on their prior knowledge to determine if the opportunity is exploitable. The lure of the opportunity will draw the entrepreneurs in the direction of the opportunity in a 'run-and-tumble' way without a firm strategy. The opportunity-as-artefact will change as new information becomes available and the environment changes. As they tumble along the venture pathway, they have to make sense of the uncertainty by understanding the "technological insights, latitude for strategic change, business model boundaries and local identity embeddedness" (Penttilä et al., 2020: 209). At this point, the entrepreneurs need to grapple with the local focal network including the broader surrounding environment" (Penttilä et al., 2020) and other heterogeneous stakeholders (competitors, imitators, upstream suppliers, downstream distributors, financiers, bankers, etc.) that may be entangled or may interfere with the entrepreneurial process. A critical point emerges at this stage. When evaluated, the opportunity presents sufficient stimulation for the entrepreneurs to act. If the answer is no, entrepreneurial action as an outcome is improbable because of the unwillingness of the entrepreneurs to bear uncertainty because of the amount of perceived uncertainty (McMullen & Shepherd, 2006).

"In the ambit of the creation-discovery view, it is usually stated that quantum measurements are not just observations, as they can provoke a real change of the state of the measured entity" (Sassoli de Bianchi, 2013: 1). The evaluation stage under action-specific uncertainty is a particular measurement by the entrepreneurs that relate to the "intrinsic (stable) properties of the observed entity, or about relational (ephemeral) properties between the observer and observed entities; also, they can be about intermediate properties, neither purely classical, nor purely quantum" (Sassoli de Bianchi, 2013: 1). The intrinsic properties of the observed entity (opportunity-as-artefact) refer to the amount of perceived uncertainty or asymmetric information embedded in it. The manifold interpretations of the opportunity-as-artefact are reflected in the information's intensity, strength, and clarity (Leong, 2021). Those "who do not have the necessary knowledge, information and motivation will not believe that the change represents an opportunity will no longer attend to it" (McMullen & Shepherd, 2006: 141).

“Opportunities? They are all around us ... There is power lying latent everywhere waiting for the observant eye to discover it” (Marden, 2015: 276).

Leong (2021: 2150021-2) explains that “opportunities can be latent, where the information may not be interpreted to a point where it invokes response and action”. Metaphorically, these are like Schrödinger’s cat boxes all around us, each with its range of latent potentials. The key is to open these boxes. The observation, as an action, changes the phenomena leading to a quantum outcome. “The future offers many potentialities, which we define as alternative states and possible outcomes that could occur but have not yet occurred because to be actualised, they require the enactment of individual, social, and environmental events that are often serendipitous” (Lord et al., 2015: 264). By exploring and observing opportunity-as-artefact as a new physical imaginary, the quantum interpretation invites entrepreneurship scholars to re-conceptual-

ise how tacit assumptions on entrepreneurial opportunities (Berglund & Korsgaard, 2017; Eckhardt & Shane, 2003; McKelvie et al., 2020; Sarason et al., 2006b; Shane, 2003; Shane & Venkataraman, 2000), entrepreneurial process (Dimov, 2011; McMullen & Dimov, 2013) limit our ability to understand the entrepreneurial practices and realities.

The observer effect concludes that an observer changes the object (opportunity as an artefact) as they observe (Figure 3). Furthermore, it suggests that the impact on the changing opportunity artefact (from other observers) changes its quantum state due to other heterogeneous agents’ simultaneous observations. Our approach and methodology centre on this theory of evolving change in the opportunity-quantum artefact (its potentiality increasing or decreasing depending on the degree of exploitation by others), changing perceptions and subsequent interactions through the power of other external observations.

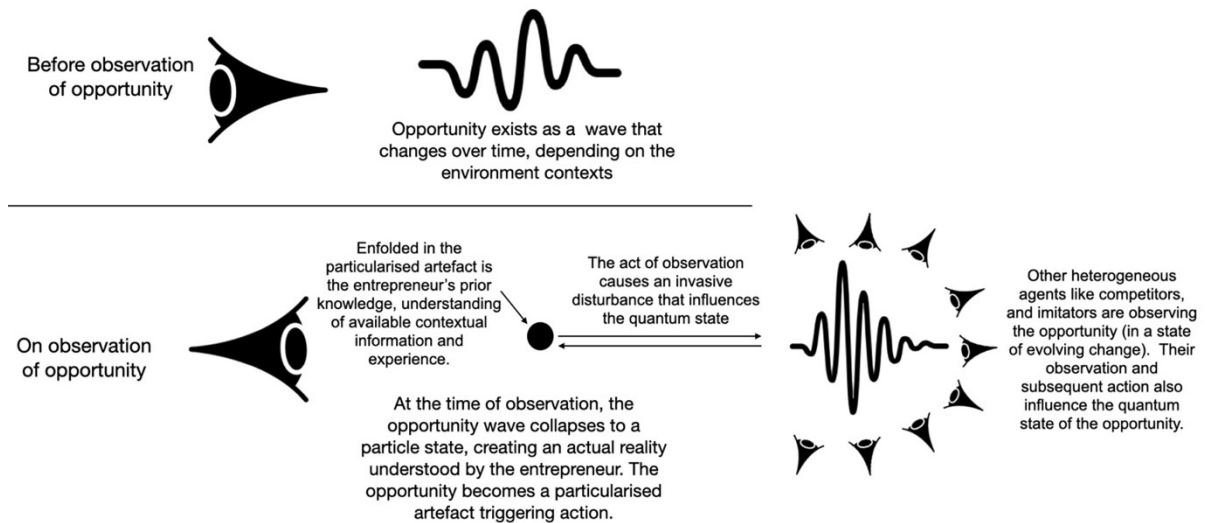


Figure 3: Shows opportunity-as-artefact being a wave-particle duality

3.3 Implications for theory and practice

Quantum physics states that nothing that is observed is unaffected by the observer (Sassoli de Bianchi, 2013). This statement holds an enormous and powerful insight into entrepreneurial practice. It means that subject to the interpretation of entrepreneurs, opportunity-as-artefacts can take many forms. The opportunity appears in varied forms because entrepreneurs create different futures from what they observe based on their understanding and weightage of uncertainty, risks and returns. This implies that individual agents see a different reality (based on prior knowledge and experience and their understanding of the contextual information). Each creates a different future using the re-

sources and network at hand. When entrepreneurs observe an opportunity, the observer effect categorically states that observing the phenomenon necessarily changes it. The inspiration for the new idea in envisaging the opportunity is endogenous to the entrepreneurs. McMullen (2022: 49) argues that this “springs from the marriage of situational need and personal creativity such that a perceived ingenuity gap sparks ingenuity and the innovative reconfiguration of resources used in production”. Innovation is possible when the knowledge is “created through experimentation relying on resources capable of being regenerated by natural capital” (McMullen, 2022: 49). Without knowledge and resources and, most critically, the will to act, nothing transpires, and possibilities are non-existent. With interactions

and combinations, possibilities arise. With entrepreneurial action, the trajectory shifts from possible to probable and actual over time. The actuality is derived from a range of possibilities, but only one reality emerges where the rest collapse. “Opportunity should be viewed as an artefact with perceived potentialities” (Leong, 2021: 2150021-1).

By developing a new quantum perspective on opportunity, opportunistic outcomes are constantly collapsing, and only one actuality will emerge in reality. The re-conceptualisation of opportunity as a quantum wave function can provide a broad framework to understand opportunities and entrepreneurship.

The abstract wave functions are constantly rising and collapsing as entrepreneurs interact with the environment, abstracting, sensemaking and enacting to capitalise on the opportunities. Enactment with an entrepreneurial intensity, defined by Morris, refers to a high degree of strength, force or energy (Morris, 1998) of varying degrees and amounts that may not always end in successfully exploiting the opportunities. The observation effect on opportunity-as-artefact is integrally linked to the final act- entrepreneurial action. Without action, the outcome is suspended in an uncertain quantum state. In Schrödinger’s cat example, the uncertain state can be determined by opening the box. This finding led to the subjectivist Copenhagen interpretation that opening the box affects the uncertainty of whether the cat will be found alive or dead. “Entrepreneurship requires action” (McMullen & Shepherd, 2006: 132). We argue that this quantum-like model provides a promising perspective to explain entrepreneurial phenomena. It can extend scholarly understanding from observation, recognition and evaluation of the opportunity to the final act- entrepreneurial action.

The emerging future comes from interacting artefacts and entities (opportunity, events, heterogeneous actors in the entrepreneurial ecosystem, etc.). The interactional effects – interfering and entangling generate possibilities. Entrepreneurs act on the indeterminate future based on their assessment of the probabilistic situations, relying on their experience and understanding of the contextual information derived from other sources, including the environment.

Lichtenstein’s (2020) generative emergence describes how new entities are created and how new order comes from change and transformation. Lichtenstein’s generative emergence explains the creation phenomenon at all interaction levels. Quantum science describes the complex interactions, entanglements and interferences of the wave functions under such uncertainties; from a different perspective presented by the classical interpretation. The embeddedness of potentiality and the many-possibilities scenarios at each junction, boundary or nexus of interactions, including the individual-opportunity nexus (Shane, 2003), hold great promise in entrepreneurship research. Adopting the metaphors and methods of the quantum theory has

refreshingly new perspectives for entrepreneurial studies.

What matters for the entrepreneur is more than the active role as the observer; the action (taking a conscious bet on a future with many possibilities of other futures) spins off a new trajectory. According to quantum physics, the observer’s relationship with the entrepreneurial event is quantised because of the subsequent action, compared to the classical observer (non-entrepreneur), who is merely a spectator.

4 Conclusion

Discussing entrepreneurship with references to quantum theory is new. Quantum theory is abstract, but it contributes to understanding entrepreneurial practices and entrepreneurs taking chances (playing with dice). It offers tangible suggestions that all things are implicated. An action by a heterogeneous agent, change in the context of material resources or change in technological solutions impact the shape of the wave function instantaneously, raising our awareness that a web of interdependent and interrelated connections constructs the universe around us. Quantum-like descriptions and metaphorical aspects can present an alternative representation of the opportunity construct and paradigm. Finally, re-conceptualising opportunity as an artefact with quantum potential is a new approach to overcoming the profound theoretical puzzle and definitional clumsiness of opportunity. By broadening the scope, opportunity straddles between possibilities due to contextual changes (environment, technology, market, etc.). The mere act of observation changes it. The other possible wave functions collapse to one reality the entrepreneur may pursue if it contains sufficient information (and potentialities) to excite and trigger entrepreneurial action. McMullen and Shepherd (2006) noted that the motivation to act with knowledge must be considered concomitantly when acting entrepreneurially. Without taking action, like opening the box to see the cat, the opportunity artefact remains in a suspended state. Ramoglou & McMullen (2022: 29) argued:

... what can happen is up to the world – the entrepreneur has no say. But whether what can happen will actually happen is up to the agent – the world has no say. Put differently: whether one can achieve A by doing B is determined by the world. But whether, when, or how such possibilities will actualize is entirely a matter of entrepreneurial choice and work.

Quantum mechanics phenomena are deeply mysterious. Its weirdness is hard to understand as it involves unseen forces with significant uncertainties and hidden potentialities. Whatever comes out of it depends on the action taken. Whatever comes out of it comes in response to the entrepreneur’s observation. When we describe opportunity in whatever form, it should be probabilistically denoted

since complexly interacting factors determine emergent events, and probabilistic thinking help identify the most likely outcomes.

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Probabilistična interpretacija učinka opazovalca na podjetniško priložnost

Ozadje: V kvantni mehaniki učinek opazovalca pomeni, da opazovanje nekega pojavale-tega spremeni. Naša raziskava raziskuje verjetnostno interpretacijo podjetniške priložnosti in pojasnjuje učinek opazovalca, ki se odraža v Schrödingerjevem miselnem eksperimentu z mačko v škatli. Ta pristop obravnava priložnost kot koncept »možnosti«, ki jo na novo interpretira z vidika več opazovalcev in ključnega pomena ukrepanja, ki bi povzročilo kolaps valovne funkcije v nastajajočo resničnost. Študija razrešuje razrešiti epistemološki paradoks in vojno 'priložnosti' s ponovnim kontekstualiziranjem priložnosti kot artefakta in postavitevjo »vala verjetnosti« z vrsto možnosti, dokler pozorni podjetniki ne začno konkretno ukrepati.

Metoda: Naša konceptualna študija se opira na pregled literature kot raziskovalno metodologijo, pri čemer uporablja sklepanje po analogiji za razvoj teorije in metafore za teoretiziranje.

Rezultati: Študija krepi epistemološko osnovo, osredotočeno na možnost in verjetnost (ponazorjeno z valovno funkcijo), da izostri definicijo priložnosti in teorije dejanj. Učinek opazovalca v priložnosti je v premalo raziskan akademski podjetniški literaturi. Ta študija prikazuje, kako učinek opazovalca vpliva na razvijajoče se stanje priložnosti. Na priložnost vplivajo drugi opazovalci in podjetnikova domišljija, družbena konstrukcija in trud. Vsak vključen agent se povezuje in sodeluje, da ustvari možnosti in priložnosti. Medsebojni odnosi in soodvisnost so zapleteni, kar povzroča superpozicijo z mešanim stanjem z veliko možnostmi.

Zaključki: Prispevek naše raziskave je večplasten tako na teoretični kot praktični ravni. Predstavlja kvantnemu model, kjer je 'neukrepana' priložnost v superpoziciji (hkrati se pojavi več možnosti, dokler ni ena uveljavljena), pri čemer razširja pogled Ramoglouja in Tsanga (2016) na nagnjenost. Interakcijski učinki – vmešavanje in zapletanje med agenti, ki opazujejo isto priložnost, ustvarjajo možnosti. Stanja potenciala in številnih možnosti v artefaktu priložnosti veliko obetajo v podjetniških raziskavah.

Ključne besede: Učinek opazovalca, Kvantna mehanika, Kvantna teorija, Valovni delec, Priložnost, Podjetništvo

Public Sector Entrepreneurship: Scientific Mapping and Research Agenda

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Background and Purpose: The concept of entrepreneurship within the public sector is one of the most fiercely debated areas of entrepreneurial research. It has been studied across several academic disciplines such as in management, public administration and political economy, among others. However, while academic output has increased, we found no prior studies providing a clear mapping of the field. Therefore, this research sought to comprehensively examine all peer reviewed articles on public sector entrepreneurship.

Methods: Using the Scopus scientific database, our analysis included 133 articles from 1982 to 2022. Following a thorough manual review process, we used VOSviewer to provide a mapping of the field, before identifying research gaps and suggesting directions for future research. Our scientific mapping revealed the leading and emerging thematic clusters in the field.

Results: Our results revealed that the leading themes in public sector entrepreneurship include innovation, entrepreneurship, public sector, governance, reinventing government, and public organisations, while emerging trends include public health entrepreneurship, public health innovation, public choice, sustainability, and entrepreneurial orientation, among others.

Conclusion: Our research provides useful insights to all researchers interested in examining entrepreneurship within the public sector or in non-profit organisations.

Keywords: *Public entrepreneurship, Public innovation, Bibliometrics, Public sector, Scientific mapping, Performance, entrepreneur*

1 Introduction

The term “entrepreneurship” is frequently associated with the private sector, and with small and medium sized enterprises, and start-ups (Kearney et al., 2009). However, the public sector also frequently participates in entrepreneurial action, sometimes providing some of the most important services for the economy.

Research into public entrepreneurship has become pivotal to the contemporary analysis of public administration, and is also frequently examined in the fields of political science, management, economics, sociology, and social

psychology, among others (Hayter et al., 2018; Shockley et al., 2006). At a minimum, public entrepreneurship involves the production, distribution or innovation of goods/ services for the public. This makes it crucial to the lives of billions of people around the world. For example, entrepreneurial initiatives by public entities include the provision of health care services, water services, emergency services, transportation, and recycling/climate initiatives, among others (Carnes et al., 2019; Rastoka et al., 2022). Therefore, this research seeks to examine all published peer reviewed research on public entrepreneurship by analysing the content, thematic clusters, emerging trends, citations, authors, institutions and the links between all of

them. To achieve this, we conducted a search on the Scopus database and uncovered articles going back to 1988. These studies spanned numerous academic fields including energy, sports, agriculture, economics, political science, arts/humanities, engineering, computer science, and medicine, among others. Following the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page et al., 2021), we sifted through each article and provided exhaustive detail into every stage of our analysis, making it easily reproducible. Then, we used a bibliometric system of analysis to provide results.

Our research is different from prior studies for several reasons. First, it provides a timely contribution to the academic debate on the topic by providing a solid background for discussion. Second, to our knowledge, this is the first study providing a bibliometric evaluation of academic research on public sector entrepreneurship. As such, our scientific mapping, including our analysis of thematic clusters and emerging trends, provide enormous benefit to scholars on the topic. Third, this study exceeds the usual bibliometric analysis by including a research agenda offering practical recommendations for future research. Fourth, we deploy a systematised method to screen and analyse our data, ensuring transparency and reproducibility. Finally, our research is structured in the following way.

The next section includes our theoretical background and research questions. Afterwards, we provide our methodology, results, discussion/conclusion, and directions for future research.

2 Literature review

Academic inquisition into public sector entrepreneurship can be traced back to the work of Schumpeter (1942), but it was Ostrom (1965) who pioneered empirical investigation on the topic by examining water producers in the West Coastal Basin of southern California. Another very important study for the development of public sector entrepreneurship was provided by Wagner (1966). He introduced the idea of individuals in government providing public services to achieve political gain. Since then, academic scholarship on the topic has grown exponentially. Public sector entrepreneurship has become one of the most frequently studied areas of entrepreneurship as globalisation and the need for sustainable economic growth have grown.

Public sector entrepreneurship is also simply referred to as public entrepreneurship (Moon et al., 2020), however there is no universally consistent definition of the nature, roles or motivations of the public entrepreneur. For example, Ostrom (1965) defined the public entrepreneur as an agent that creates public benefits by innovating through public organisations, while others have broadly argued that

a public entrepreneur is more concerned with public policy and decision making (Hughes, 1991). Additionally, a public entrepreneur uses public resources to improve productivity and create social value (Osborne et al., 1992; Zampetakis & Moustakis, 2010), they create or improve public organisations (Carnes et al., 2019; Ramamurti, 1986), are involved in generating innovative ideas for public gain (Becker et al., 2019; Roberts, 1992) and are motivated by political gain (Zerbinati & Souitaris, 2005). According to Hayter et al. (2018), public sector entrepreneurship is often characterised by three factors, “actions that are innovative, that transform a status quo social and economic environment, and that are characterized by uncertainty”, while Shockley et al. (2006) offered that public entrepreneurship occurs when a “political actor is alert to and acts on potential profit opportunities, thus moving the system in which the actor is embedded toward equilibrium”.

Meanwhile, studies utilising scientific mapping techniques have risen in popularity in recent decades due to a number of factors including an increase in academic output and a rise in the number of sophisticated analytical tools. A component of bibliometric analysis, scientific mapping provides a rigorous and objective analysis of existing literature (Ellegaard & Wallin, 2015; Zupic & Čater, 2015), and can be useful for examining research content, trends, performance and for providing a direction for future studies, among others (Donthu et al., 2021; Linnenluecke et al., 2020). In entrepreneurial research, scientific mapping has been used to analyse the ethical aspect of entrepreneurship (Vallaster et al., 2019), the development of social entrepreneurship (Rey-Martí et al., 2016), the evolution of entrepreneurship education (Fellnhöfer, 2019), the impact of research on religion and entrepreneurship (Block et al., 2020), an overview of international entrepreneurship (Baier-Fuentes et al., 2018), and the rise of entrepreneurial universities (Forlano et al., 2021), etcetera. Scientific mapping has also been used in most other academic fields including political science, economics/finance, and health/medicine, among others (Castillo-Vergara et al., 2018).

Therefore, inspired by Zupic and Čater (2015) and Ho et al. (2021) we utilised a bibliometric system to answer the following research questions:

RQ1: What are the current and emerging trends in academic research on public sector entrepreneurship?

RQ2: What are the bibliometric variables, citation level and co-citation structure of public sector entrepreneurship?

RQ3: What are the gaps in current research on public sector entrepreneurship?

This study is guided by the bibliometric guideline proposed by Donthu et al. (2021). They provide a structure to make the research system transparent, relevant, reproducible and generalisable. Furthermore, we also loosely followed the reporting principles of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIS-

MA) (Page et al., 2021) – we could not follow 100% of the recommendations as our research is not a systematic review or meta-analysis. The materials for our research were retrieved from the Scopus database on the 16th of June 2022. We decided on Scopus because it offers an extensive and reliable scientific content, and is one of the most widely used sources for conducting bibliometric analyses, meta-analyses and systematic reviews (Linnenluecke et al., 2020; Moher et al., 2015). Other sources include the Web of Sciences, EBSCO and Google Scholar, among others. However, while the Web of Sciences and Scopus are the most reputable indexing agencies in academia, Scopus is often the most recommended for research of this nature and is more inclusive (Baas et al., 2020). Moreover, 99% of all articles indexed in the Web of Sciences database are present in Scopus, while only 34% of articles in Scopus are present in the Web of Sciences (Singh et al., 2021). Accordingly, we conducted multiple stages of screenings using the automatic screening tools on the Scopus database, and by carrying out a comprehensive manual investigation of the abstract, title and keywords of all the articles involved in this study. We provide exhaustive information into every step of our analysis.

3 Methods

Figure 1 shows the workflow we used for our screening process. We used the following keywords to search the Scopus database on the 16th of June 2022: public entrepreneurship and public sector entrepreneurship. However, in order to be as expansive as possible, and to include research streams in emerging countries, an updated search was conducted on the 30th of August 2022

to include the following additional keywords: municipal entrepreneurship, local government entrepreneurship and state entrepreneurship. Our search was filtered to include titles, abstracts and keywords. We conducted at least two dozen trial searches using a combination of words before settling on the aforementioned keywords. The first stage of our search produced 2877 documents. Our data analysis was split into 2 main parts, each involving several stages of screening. The first part involved using the automated tools on Scopus to exclude irrelevant articles. The second part involved a painstaking manual evaluation of all included articles.

For the first part, we decided to excluded all non-journal articles due to variations in the peer review process of conference proceedings, books series and other types of publications. As a result, our first screening was to exclude all books, conference papers, book chapters, editorials, reviews, notes and erratum. This excluded 903 documents (n = 903) and included 1974 relevant documents (Figure 1). Our next screening limited the source of all the articles to only those from journals, leading to the elimination of sources like trade journals, book series. This further eliminated 28 articles (n = 28), leaving 1946 articles. Furthermore, since it is difficult to conduct a thorough manual analysis of articles written in foreign languages, we further selected only articles published in English language (n = 1865) and excluded languages including Spanish, German, Portuguese, Russian, Chinese, Swedish, Ukrainian, and Lithuanian, among others (n = 81). Then we removed 3 duplicate articles (n = 3), and included 1862 articles. All 1862 articles were included in the second part of our analysis.

For the second part, we thoroughly examined the titles, abstracts and keywords of all included articles, and

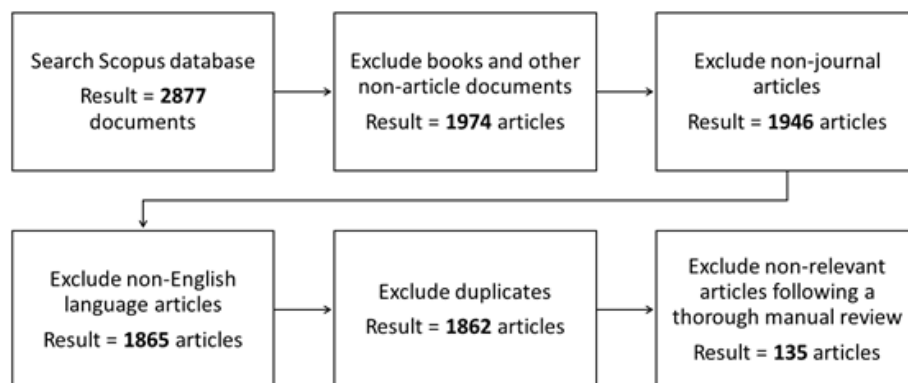


Figure 1: Data selection process. Source: Author's elaboration

in doubtful cases, the full papers were examined. To be included in our analysis, articles must be specifically focussed on assessing entrepreneurship within the public sector and it must be clearly mentioned in the methodology and research objectives of the article. As a result, studies involving public funding agencies such as the Small Business Innovation Research (SBIR) that were primarily focussed on the performance of private firms were excluded. And studies completely focussed on New Public Management (NPM) without assessing entrepreneurship were also excluded. Also, articles on social entrepreneurship, technology transfer, and academic entrepreneurship which were not specific to the public sector were also excluded. Finally, articles on public innovation, which did not specifically examine entrepreneurship were also excluded. Following a meticulous scrutinization of all 1862 articles, we uncovered 11 articles with limited or incomplete information ($n = 11$) and 1716 articles which were either not on public entrepreneurship at all, or did not meet our inclusion criteria ($n = 1716$). Therefore, 135 articles were selected for the analytical part of our research (Figure

1), which was conducted using the VOSviewer software (v.1.6.18) (van Eck & Waltman, 2010) and Microsoft Excel (v. 2019).

4 Results

4.1 Citation analysis

The goal of citation analysis is to analyse the most influential studies in a research area (Donthu et al., 2021). To achieve this, we limited our analysis to only studies with at least 50 citations ($n \geq 50$). This produced 14 articles ($n = 14$).

Our results (Figure 2) show that the most influential study on public sector entrepreneurship is the study by Klein et al. (2010) attempting to theorise the field. Next is Bartlett and Dibben's research examining public sector entrepreneurship within 12 local governments (Bartlett & Dibben, 2002). This was closely followed by another study of Klein et al. (2013) examining strategic entrepreneurship

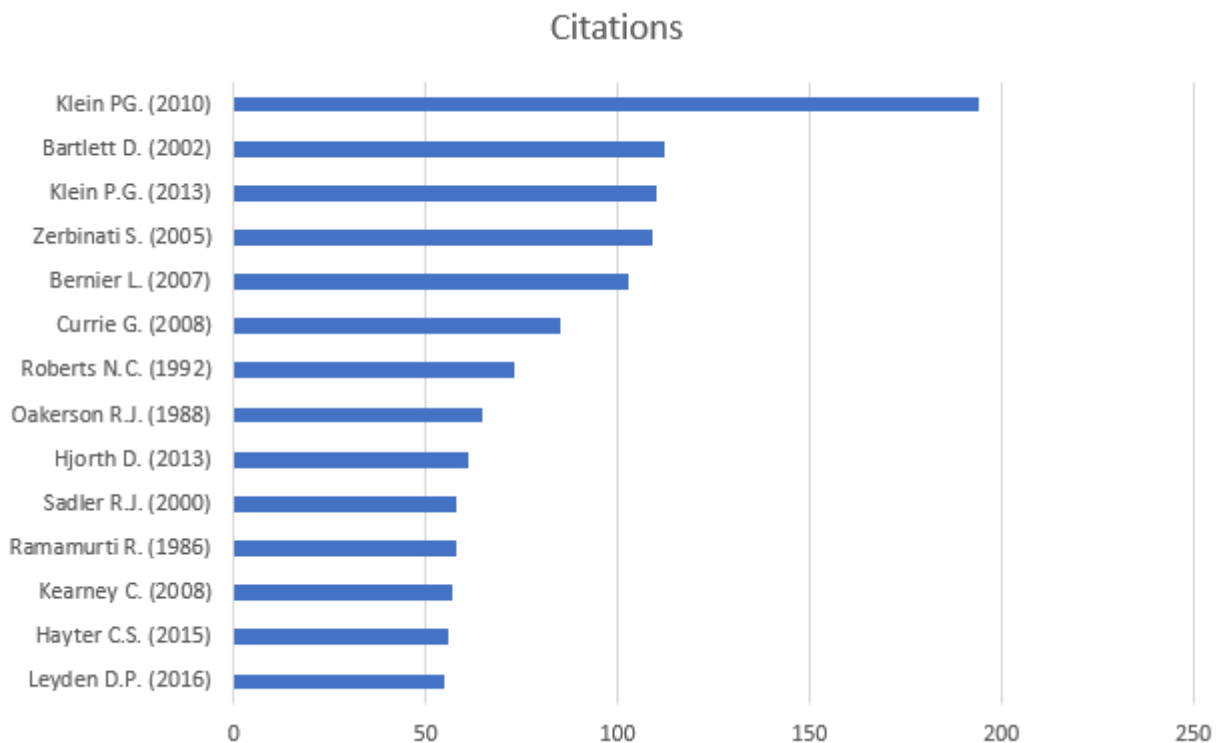


Figure 2: Most influential studies. Source: Author's work

in public sector organisations, and one by Zerbinati and Souitaris (2005) providing a framework for analysing public entrepreneurship in European local governments.

4.2 Co-citation

Co-citation analysis is one of the most notable methods for mapping a scientific field. It analyses the references of published articles to find thematic clusters and similarities based on the number of times they are cited together (Cas-

tillo-Vergara et al., 2018; Donthu et al., 2021; Sweileh et al., 2017). To achieve optimal results, we limited our scope to articles with a minimum number of 4 citations to a cited reference ($n \geq 4$). 49 articles met this limit.

Figure 3 shows the most frequent co-cited references in public entrepreneurship. The co-citations are grouped into various clusters, visible by their colour in figure 3. The first (red cluster) is led by the works of Sadler (2000) and Ramamurti (1986) which both examined the similarities and differences between private sector entrepreneurs and public sector ones. The second cluster show strong co-ci-

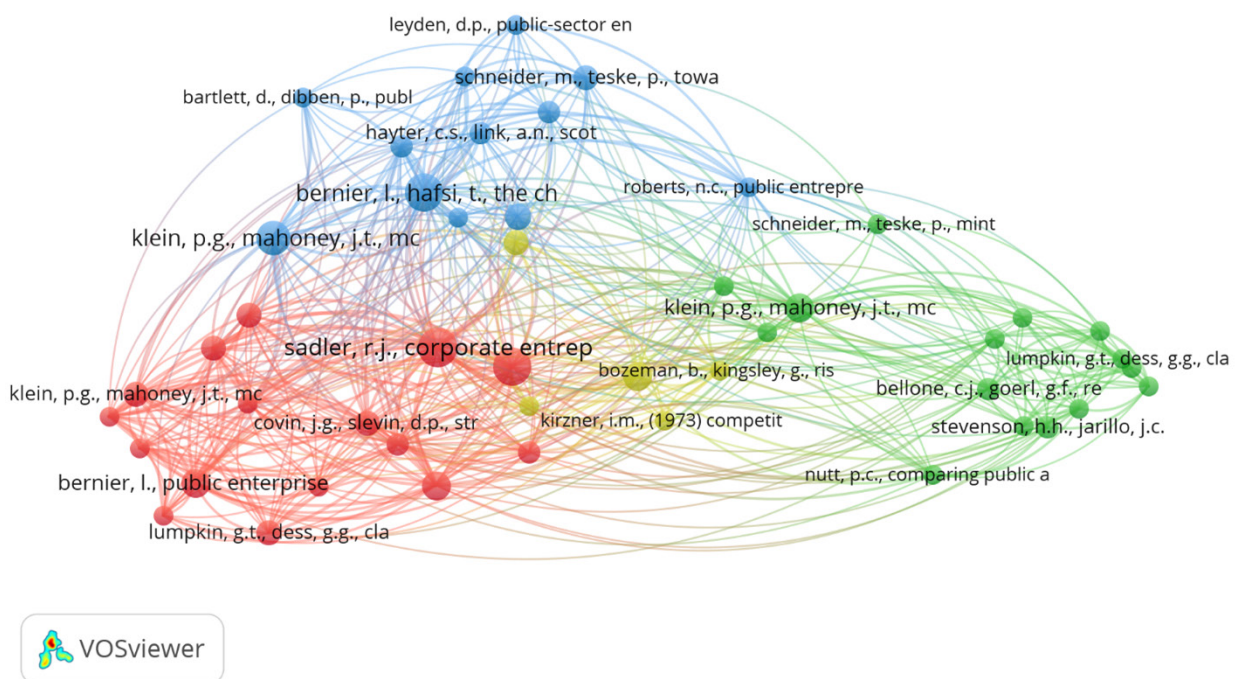


Figure 3: Co-citation. Source: Author's work using VOSviewer

tation links between the study by Bernier and Hafsi (2007), titled: The changing nature of public entrepreneurship, and other studies by Shane Klein (2008), Zerbinati and Souitaris (2005), Hayter et al. (2018).

4.3 Bibliographic coupling

Bibliographic coupling is also an analysis of citation (Zupic & Čater, 2015). However, unlike co-citation, bibliographic coupling presupposes that publications are similar in content if they share similar references/citations (Kessler, 1963; Martyn, 1964; Zupic & Čater, 2015). For

this analysis, we limited our scope to articles with a minimum number of 10 citations ($n \geq 10$). 60 articles met this threshold.

Figure 4 shows the bibliographic coupling of references in public entrepreneurship. The articles with the closest similarity are those by Klein et al. (2010), Leyden (2016), and Ford and Anderson (2019), all in the red cluster. Also, in the red cluster, there are very similar links between Klein et al. (2013), and Cunningham et al. (2016). In the blue cluster, there are close similarities on articles examining public entrepreneurship at the macro/state level. They include studies by Etzkowitz and Gulbrandsen (1999),

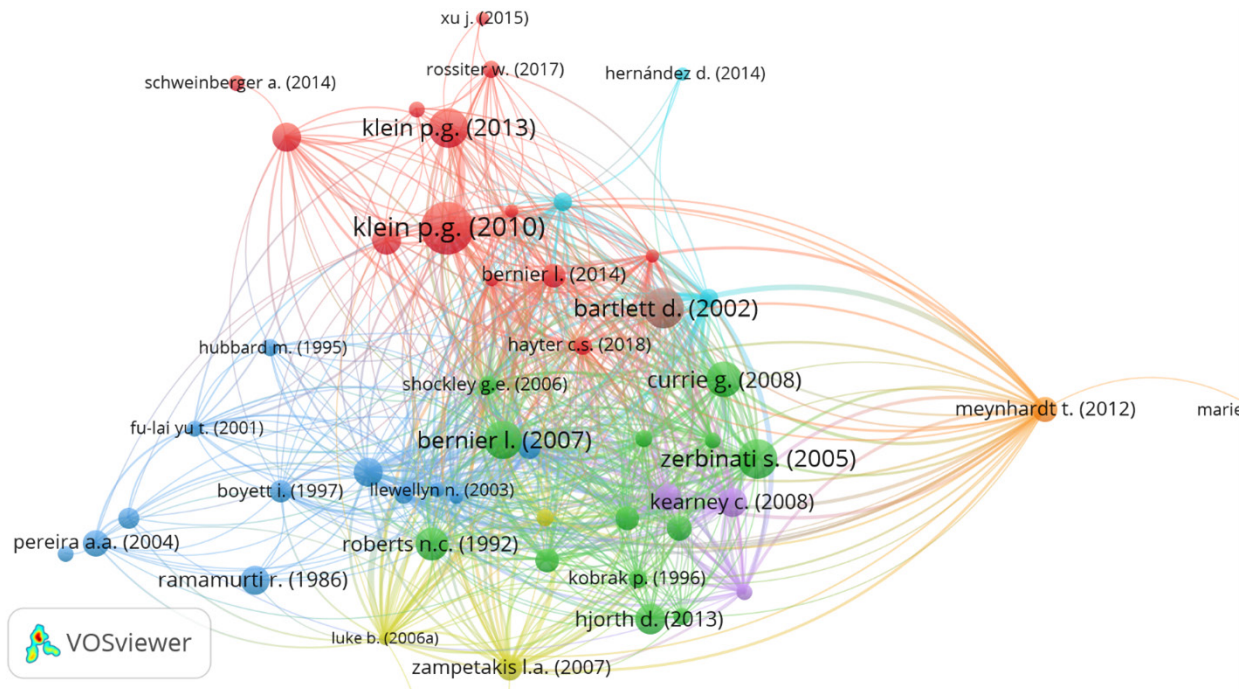


Figure 4: Bibliographic coupling. Source: Author's work using VOSviewer

Pereira (2007), and Sun (2015). Furthermore, in the green cluster, a number of conceptual studies on public entrepreneurship share close similarity links. They include articles by Edwards et al. (2002) on the rhetoric and context of public entrepreneurship, and another by Hjorth (2013) on creating social change with public entrepreneurship.

4.4 Co-word analysis

Co-occurrence analysis analyses the keywords of published articles to find similarities between them. It is excellent for visualising the development of a research field, and for analysing emerging trends and methods (Goyal & Howlett, 2018; Linnenluecke et al., 2020; Nederhof & Wijk, 2006). Therefore, to analyse the most co-occurring words, we limited our analysis to keywords co-occurring at least 2 times ($n \geq 2$). Of the 499 total keywords, only 94 met this threshold ($n = 94$), then we excluded the keywords article and humans.

Figure 5 shows the co-occurrence analysis of academic publications on public sector entrepreneurship. It shows that the most frequent co-occurring keywords include innovation, entrepreneurship, public sector, public entrepreneurship, governance, institutions, public organisations, reinventing government, technology, health services, local government, and public administration, among others (figure 5).

ure 5).

Overlay analysis is used to provide a visual analysis of the trend for a research area (van Eck & Waltman, 2010). In this case, it shows the trend over time of co-occurring keywords. In Figure 6, the overlay analysis is used to provide a visual analysis of the emerging trends in public sector entrepreneurship. Some emerging keyword trends include public health entrepreneurship, public health innovation, public choice, organisational performance, sustainability, state-owned enterprises, and entrepreneurial orientation, among others (figure 6).

4.5 Co-authorship

Co-authorship is used to analyse the level of collaboration between authors, countries, or institutions in a research area (Donthu et al., 2021). We chose to analyse the intellectual collaboration between countries. Only countries with at least 2 published articles were included ($n \geq 2$). This yielded 24 documents ($n = 24$). No citation limits were included in the analysis.

Figure 7 shows that the most dominant countries are the United States and the United Kingdom. Germany, New Zealand, Singapore, Ireland, Canada and Italy are also prominent. It (Figure 7) shows that the strongest collaboration link is between China, Hong Kong, Singapore and

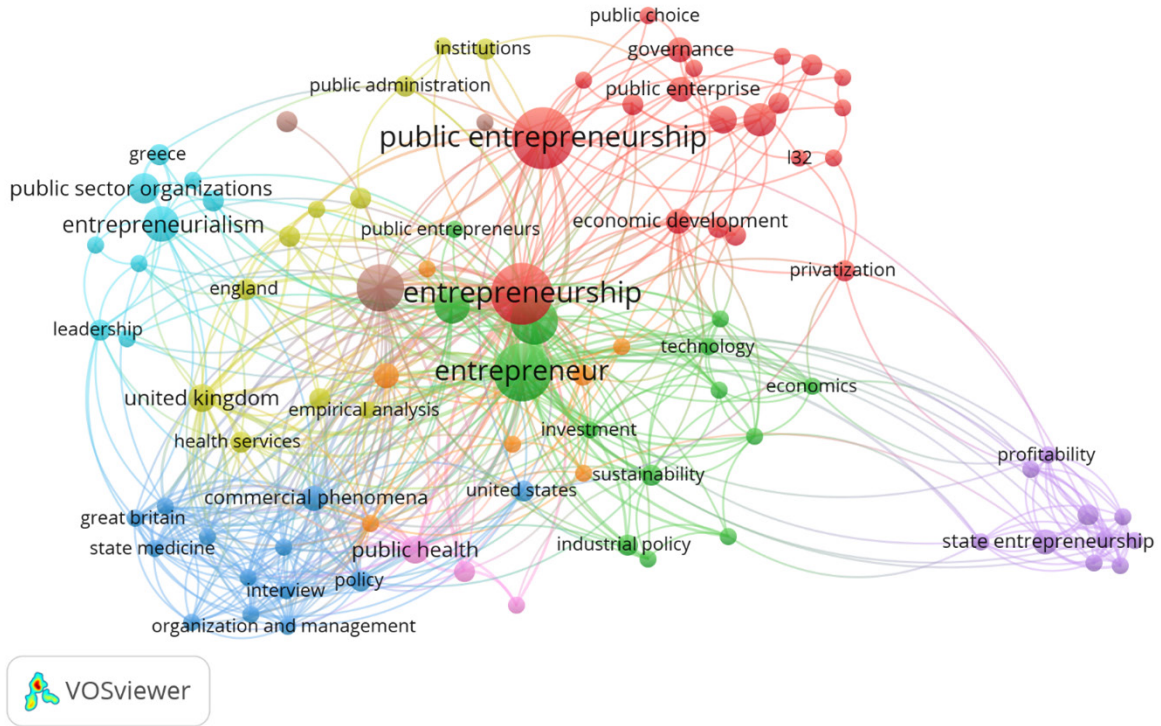


Figure 5: Co-word analysis. Source: Author's work using VOSviewer

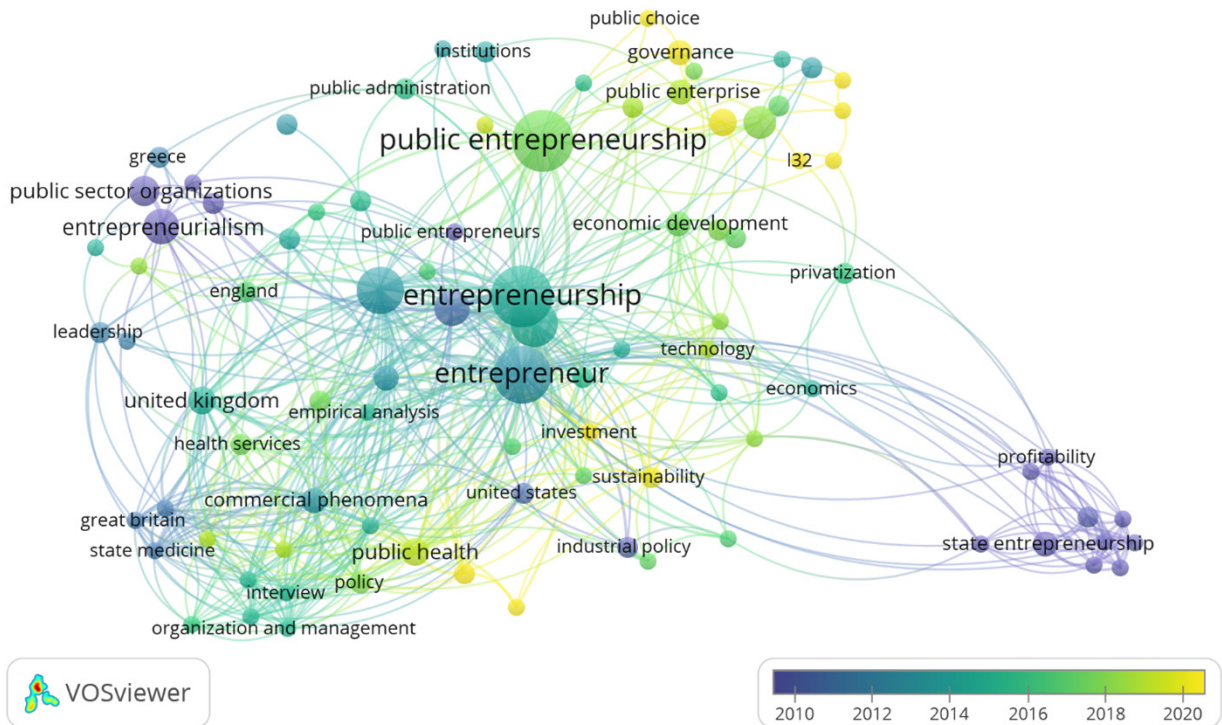


Figure 6: Overlay analysis of co-word. Source: Author's work using VOSviewer

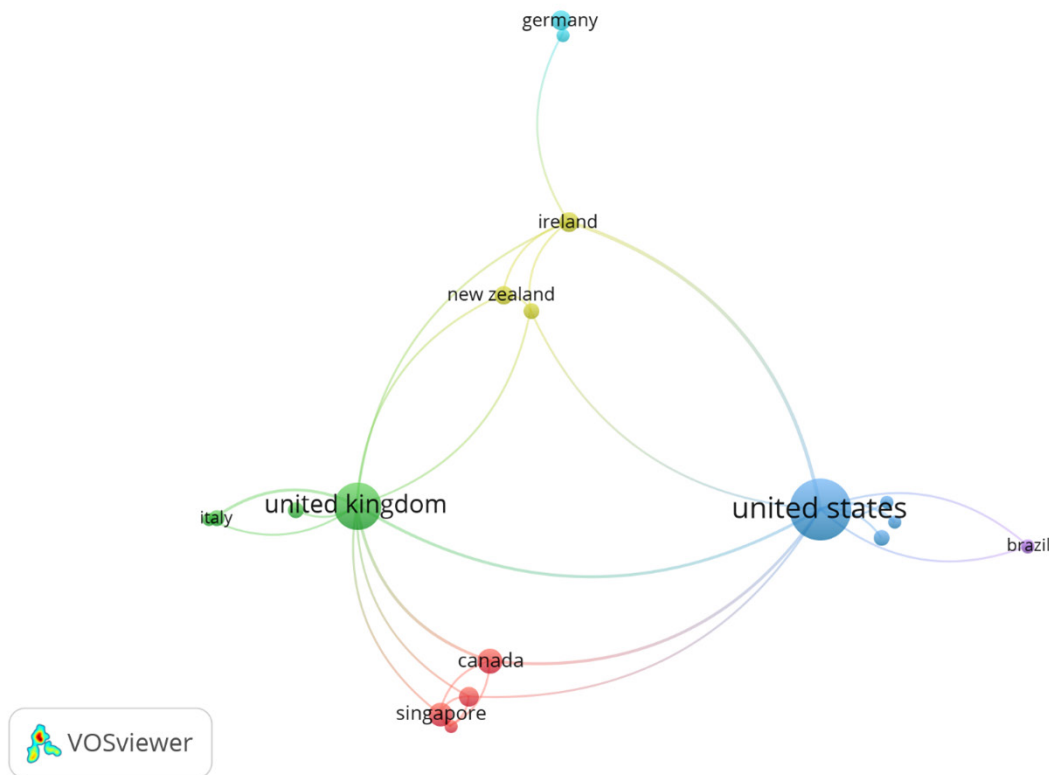


Figure 7: Country co-authorship. Source: Author's work using VOSviewer

Canada (red cluster). Strong collaboration links also exists between the United States, Norway, South Korea and Greece (blue cluster), and between Germany and Switzerland (light blue cluster).

5 Discussion and research agenda

This research presents a comprehensive analysis of peer reviewed academic publications on public sector entrepreneurship from 1982-2022 using a scientific mapping approach. First we examined the most impactful studies in public entrepreneurship research, revealing that studies by Klein et al. (2010), Bartlett and Dibben (2002) and Klein et al. (2013) are the most impactful when measured by their citations (Figure 2). We also examined the co-citation structure (Figure 3) and bibliographic coupling (Figure 4). The bibliometric coupling revealed similarities between the following studies: Klein et al. (2010), Leyden (2016), and Ford and Anderson (2019) (Figure 4). Furthermore, results following our co-word analysis show that the dominant themes in public entrepreneurship include innovation, reinventing government, entrepreneurship, public sector,

public entrepreneurship, public organisations, health services, local government, and public administration, among others (Figure 5), while emerging trends include public health entrepreneurship, public health innovation, sustainability, state-owned enterprises, and entrepreneurial orientation, among others (Figure 6).

While academic attention on public sector entrepreneurship has increased, we uncovered a number of important gaps and limitations during our research. The most striking one is that there are few empirical studies on public sector entrepreneurs. A majority of the studies we examined were either conceptual or theoretical, and in some cases involve specific case-studies. This confirms the findings of previous studies (Mohammed et al., 2021). Therefore, we provide detailed research suggestions below.

Methodological gaps and suggestions

A striking challenge in the field of public sector entrepreneurship is the lack of publicly available databases on the subject. This is unlike in private entrepreneurship where databases like the Global Entrepreneurship Monitor (GEM) and the Comparative Entrepreneurship Data for

International Analysis (COMPENDIA) based on OECD statistics provide a vital resource for scholars. Instead, a majority of the examined studies either provided conceptual/theoretical analysis of public sector entrepreneurship or analysed the phenomenon within a public sector unit such as in public university, a local government/council, or in a public institution, mostly based on the small cross-sectional investigations of the researchers. This has posed a number of challenges for the field. First, there are very limited longitudinal studies on public sector entrepreneurship. Scholars have long argued that entrepreneurship is a process which is better captured by examining it over a long period of time (Keupp & Gassmann, 2009; Langley, 2009). Moreover, studies, albeit on private entrepreneurship, have shown the existence of a five year time lag between starting entrepreneurial action and reaping the rewards of entrepreneurship (Fritsch & Mueller, 2004). All of these indicate the necessity for longitudinal studies to accurately analyse entrepreneurship in the public sector. Therefore, this article recommends that future studies not only examine the topic in the short term, but in the long term as well.

In a similar vein, the lack of any database, much less a synchronised/harmonised one, has meant a lack of cohesion in measuring the performance of public sector entrepreneurs. As a result, the field suffers from a lack of sufficient comparative studies. For example, while there are studies on public-private collaborations engagements and differences (Buitelaar et al., 2022; Carbonara & Pellegrino, 2020; Hayter, 2015), there are almost no studies on cross-border comparisons of public sector entrepreneurs, and there are very limited comparative studies between public sector institutions. As such, this paper recommends that future studies consider this direction. The author also recommends that policy makers and/or private institutions establish local and international databases to capture the performance of public sector entrepreneurs.

Research focus gaps and suggestions

The literature on public sector entrepreneurship shows a very diverse focus. Scholars in the field have examined the topic in macro/federal level (Etzkowitz & Gulbrandsen, 1999; Sun, 2015), at the meso/regional or local level (Rodrigues & Franco, 2021), and in public institutions and agencies (Meynhardt & Diefenbach, 2012; Rivera & Landahl, 2019). We also found studies on the public health sector (Jacobson et al., 2015), public water systems (Marie, 2016), and public schools (Yemini et al., 2015), among others. There is also a wide range of concepts such as ethics (Eimicke et al., 2000), innovative behaviour (Zampetakis & Moustakis, 2007), and economic performance (Rossiter & Smith, 2017), among others, most of which are shown in Figures 5 and 6. However, there are some major

limitations. First, there are very few studies exploring the impact of public sector entrepreneurship on environmental sustainability and climate change, even though there is a major focus on the topic in most other fields/sub-fields of entrepreneurship. While sustainability is an emerging topic (figure 6), only few studies have attempted to connect the activities of public entrepreneurs with sustainable development. Furthermore, studies on the impact of gender and diversity are also limited, despite the intense efforts to diversify the public services in countries such as the United States, the United Kingdom and New Zealand (Brannan, 2021; Lomas, 2021; Parker et al., 2022). Therefore, this paper advocates a focus on these issues in the future, as well on the social impact of public sector entrepreneurial action.

Conversely, unlike in private entrepreneurship, there are limited studies on the influence of social, cultural and environmental factors on the public sector entrepreneur. In fact, there are very limited studies on the entrepreneurial journeys of public sector institutional or individual entrepreneurs. While there are studies on the behaviour of public entrepreneurs (Zampetakis & Moustakis, 2007) and their entrepreneurial orientation (Urban, 2021), their journey towards entrepreneurial action has not been sufficiently explored. Wiklund et al. (2011) argued that understanding the journeys that shape entrepreneurial action is crucial for understanding entrepreneurship. Similarly, the influence of political party ideology on the entrepreneurial orientation of public employees has not been sufficiently studied. For example, are public institutions more likely to engage in entrepreneurship during a Labour or Conservative government in the United Kingdom, or under a Democratic or Republican administration in the United States? And in other parts of the world. Moreover, the efficiencies and benefits of public entrepreneurship under different political parties have also been under-explored. The author suggests a focus on these issues in future studies.

Research scope gaps and suggestions

In addition, the overwhelming majority of studies on public sector entrepreneurship have been focussed on developed countries. This is partly expected due to the concentration of authors on in developed countries (figure 7), and due to other factors such as the absence of data in developing countries, and the better performance of academic institutions in developed countries (Merigó & Yang, 2017). Nevertheless, there is an enormous gap in academic research on public sector entrepreneurship in developing countries. While there are few studies on China and Singapore, studies covering other countries in Asia, the African continent and Latin America are significantly

underrepresented. Authorship collaborations with scholars in these countries are also very limited (figure 7). The large population of these countries, as well as the growing importance of their economies to the global system mean that studies on them would provide significant benefits to the academic debate on public sector entrepreneurship.

6 Conclusion and limitation

We sought to scientifically map the field of public sector entrepreneurship. We investigated the thematic clusters in the field and identified the current and emerging trends. Crucially, we also uncovered research gaps and provided directions for future research. Our study is limited by the following factors: First, we only used data from the Scopus scientific database. Second, our scope was limited to only peer reviewed journal articles. Therefore, other contributions such as books, book chapters, conference proceedings and editorials were excluded.

Acknowledgement

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Data availability

Research materials are accessible at the Open Science Framework: https://osf.io/3tjvp/?view_only=de4033024dac46b29b4dff1992c404c

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Podjetništvo javnega sektorja: znanstveno kartiranje in raziskovalna agenda

Ozadje in namen: Koncept podjetništva v javnem sektorju je eno izmed področij podjetniškega raziskovanja, o katerem se največ razpravlja. Študirali so ga v več akademskih disciplinah, kot so med drugim management, javna uprava in politična ekonomija. Čeprav se je akademski rezultat povečal, nismo našli predhodnih študij, ki bi zagotavljale jasen zemljevid področja. Zato je ta raziskava poskušala celovito preučiti ključne raziskovalne članke o podjetništvu v javnem sektorju.

Metode: Uporabili smo podatkovno bazo Scopus in sistematično izbrali 133 člankov o javnem podjetništvu, objavljenih med leti 1982 in 2022. Po temeljitem »ročnem« pregledu smo uporabili VOSviewer, da smo zagotovili preslikavo področja, z namenom ugotoviti vrzeli v raziskavah in predlagati smeri za prihodnje raziskave. Naše znanstveno kartiranje je razkrilo vodilne in nastajajoče tematske sklope na tem področju.

Rezultati: Naši rezultati so razkrili, da vodilne teme v podjetništvu v javnem sektorju vključujejo inovacije, podjetništvo, javni sektor, upravljanje, preoblikovanje vlade in javne organizacije, medtem ko nastajajoči trendi v prvi vrsti vključujejo podjetništvo v javnem zdravju, inovacije v javnem zdravju, javno izbiro, trajnost in podjetniško usmerjenost.

Zaključek: Naša raziskava ponuja koristne vpogledе vsem raziskovalcem, ki jih zanima preučevanje podjetništva v javnem sektorju ali v neprofitnih organizacijah.

Ključne besede: Javno podjetništvo, Javne inovacije, Bibliometrija, Javni sektor, Znanstveno kartiranje, Izvedba, Podjetnik

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Rethinking Group Dynamics in Public Organizations: Starting Point for Behavioral Public Strategy Research

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Purpose: The paper aims to explore group dynamics in the management and administration of the selected public organization. Specific interest is given to two fundamental domains of group dynamics: 1) communication processes and interaction patterns; 2) group cohesion and climate.

Methods: The approach is based on in-depth interviews with public employees representing various departments of a public organization. A total of 34 subjects participated in this study and provided primary data for coding and finding patterns. Both investigator and data triangulation are used to conceptualize group dynamics in the public organization.

Results: Public organizations' employees face hardships in knowledge sharing and tend to misunderstand the agenda between various departments and citizens. The participation of citizens in decision making could be seen as a 'double edged sword' that contributes to the implementation of public projects, but often derails efficient organizational processes. Public organizations struggle with employee turnover, insufficient treatment of employee wellbeing, and unwillingness to pursue personal development.

Conclusion: Understanding and further defining the level of group dynamics among public employees is the first step towards adopting innovation approaches. The paper highlights the implications for public organizations with an overview of the behaviors needed for a smooth strategy process in development planning based on organizational forces that leads to a better understanding of group dynamics.

Keywords: Behavioral public strategy, Group dynamics, Group cohesion, Organizational communication, Organizational climate, Public organization

1 Introduction

In the last decade, the area of behavioral economics has become very popular among scholars. Generally, behavioral economics can be defined as a multidisciplinary field of study, which aims to investigate how people make decisions and judgments (Camerer & Loewenstein, 2004). It builds on the fact that people and institutions often do not behave rationally in their decisions and are affected by social, cognitive, and emotional factors (Kahneman,

2011). We can find its application in many areas, including public policy research (Congdon & Shankar, 2018; Hampton & Adams, 2018). The rise of behavioral economics in public policy is related to Richard Thaler, the 2017 Nobel Laureate in Economics. In the famous book *Nudge*, Thaler and Sunstein (2008) described the benefits of the so-called libertarian paternalism model (nudging people to make better decisions) and specific behavioral interventions from the perspective of the public sector.

One of the current theoretical frameworks that integrates behavioral insights in public policy is behavioral

public strategy. Its area of interest is more specific and narrower from behavioral strategy theory, which ‘merges cognitive and social psychology with strategic management theory and practice’ (Powell et al., 2011; p. 1371). From our perspective, public behavioral strategy is understood as a theoretical concept that belongs to behavioral strategy. However, it is focused solely and uniquely on using behavioral sciences in the public strategy research stream. This concept, first introduced by George (2020), brings together three research streams as behavioral public administration, behavioral public policy, and public strategy. According to the behavioral public strategy, it is important that people (mainly represented by policymakers, managers of departments) involved in the strategic decision making of a municipality are not influenced individually or collectively by various sets of biases and heuristics. Moreover, this strategy underlines that individuals are able to work in diversity teams and do not hesitate to use various tools for mitigating biases. As George (2020) adds, the theoretical focus is on understanding individuals, teams, and tools involved in the strategy processes.

In teams, attention is given to so-called group dynamics within teams of policymakers that influence the quality of strategic decisions made in organizations with democratic leadership towards organizational goals. From a more general point of view, group dynamics is described by Macgowan (2009) as the internal and external forces affecting both processes and results in groups. He primarily refers to communication and interaction, interpersonal attraction and cohesion, social integration (power, influence, control, status), and group development. In this paper, the emphasis is primarily placed on the two domains of group dynamics, comprising communication processes and interaction patterns, together with group cohesion and climate. These elements are considered essential to ensure proper team functioning (Keyton et al., 2010), enhance innovation behavior (Thayer et al., 2018), and achieve organizational growth through public service performance (Friolina et al., 2017).

The rationale for this paper could be summarized in two streams. First, according to Ali et al. (2021), the area of group dynamics is under-researched so far in the literature concerning public sector. This is to some extent evident in the literature concerning the public sector. However, the study by George (2020) highlights the importance of group dynamics in behavioral public strategy research. He addresses specific components or dimensions that should be investigated in a more systematic manner. Hence, this paper follows this gap by emphasizing the fundamental domains of group dynamics, concerning communication processes and interaction patterns, together with group cohesion and climate. We believe these group dynamics are critical for proper management and acceptance of innovation in public organizations.

Additionally, this paper also follows a more general call for exploring human behavior in organizations that is

raised in public administration research (see Wright, 2015), and the level of communication between decision makers (George & Desmidt, 2018). We recognize that the research design for behavioral insights and public sector is overwhelmed by applying experimental methods (Battaglio et al., 2019). According to Bhanot and Linos (2020), there is a need to use nonexperimental methods in behavioral science, including qualitative methodologies, to understand the concerning behaviors. In our case, primary data was collected by interviewing 34 public employees who work in 11 departments involved in strategy processes of public organization. The main aim of the paper was to explore group dynamics with particular interest in domains such as communication processes and interaction patterns, group cohesion, and climate.

The paper is structured as follows. The first section introduces the terms relevant to the research focus; the second section describes the methodology; the third section focuses on the results; the fourth section presents a discussion of the results together with conclusions, limitations, and suggestions for the direction of future research.

2 Theoretical framework

In this section of the paper, we initially define the concept of behavioral public strategy and distinguish it from other research streams. Subsequently, we look closer at the area of group dynamics, with emphasis on the two fundamental domains. Finally, we formulate the research gap that we intend to address in our empirical paper.

2.1 The rise of Behavioral public strategy

Exploring behavioral insights in relation to decision making within the public sector is a relatively new phenomenon. In this context, two main research streams have emerged in recent years, behavioral public policy and behavioral public administration. Regarding the first, scholars are focusing on studying how to nudge citizens and relevant stakeholders to increase their own benefits and the benefit of society as a whole (Oliver, 2013). In practice, these so-called nudges can be used, e.g., to improve tax compliance (Dolan et al., 2012), sustainable transportation (Kormos et al., 2015), or increase retirement savings (Clark et al., 2014). Considering the second, most of the research includes using various experimental methods (e.g. surveys and field experiments) to explain why people in public administration behave as they do and how cognitive biases can systematically affect their decisions (Battaglio et al., 2019). Currently, George (2020) raised the third research stream on which this article is built and is called the behavioral public strategy.

This concept explicitly focuses on strategic decisions that improve public service performance in public organizations and networks by looking at the microfoundations of public strategies. The microfoundations are represented primarily by individuals (heuristics and psychological characteristics), teams (group dynamics and composition), tools (tangible and intangible strategy tools) and underlying public strategy (George, 2020, p. 3). By this definition, the main differences compared to the two research streams earlier (behavioral public policy, behavioral public administration) are seen in looking at behaviors on two levels (individual, team) with the focus on the policymakers (including managers, board members, politicians) involved in strategic decisions of the public organization (municipalities, local authorities). This concept emphasizes the importance of strategic decisions in public organizations and networks. Decisions in this sense are related to strategy formulation, strategy implementation, or continuous strategic learning (Bryson & George, 2020). It is based on the long-term goals and public values that a given organization wants to achieve in the future. However, as George (2020, p. 3) adds, it distinguishes from traditional public strategy research since due to the aim is to use theory from behavioral science to theorize about and test why specific variations in the individuals, teams and tools involved in public strategy influence strategic decisions and, in turn, public service performance’.

2.2 Group dynamics in organizations

As stated above, the public behavioral public strategy attempts to understand the individuals, groups, and tools that underlie the strategies. The emphasis is placed on the area of group dynamics that affects strategic decisions in public organizations. The term group dynamics was first introduced in 1947 by the so-called ‘founder of social psychology’ Kurt Lewin, who described groups as open and complex systems in which internal and external forces affect the behavior of the group. Later, Cartwright and Zander (1968, p. 19) defined group dynamics as ‘a field of inquiry dedicated to advancing knowledge about the nature of groups, the laws of their development, and their interrelations with individuals, other groups, and larger institutions.’ In other words, group dynamics is a system of behaviors and psychological processes occurring within the same group (intragroup dynamics) or between two or more groups (intergroup dynamics).

Current research shows that group dynamics influence various aspects of organizations. For example, Wakefield et al. (2019) claim that group dynamics are integral to stress appraisal (e.g., groups can activate stressors that make us feel unworthy, incapable, and unsupported that negatively affect the level of wellbeing of employees). Furthermore, there are strong relationships between group dynamics and

organizational learning (Pokharel & Choi, 2015) and organizational change, meaning that only ‘working together’ will lead to sustainable innovation and organizational goals. In this regard, Bandura (2000, pp. 75-76) adds that ‘a group’s achievements are the product not only of the shared knowledge and skills of its different members, but also of the interactive, coordination, and synergistic dynamics of their transactions.’ However, empirical studies that explicitly focus on exploring group dynamics in public administration are rather limited. For example, scholars are examining the impact of group dynamics in the context of technology-related changes in local government (Hossain et al., 2013) and virtual team performance in a public organization (Elyousfi, 2021). This paper extends this area of research by exploring the fundamental domains of group dynamics (communication processes and interaction patterns, group cohesion, and climate), which we describe in more detail below.

It is necessary to identify the quality of communication between employees in departments to understand the dynamics of an organization. As Toseland et al. (2004, p. 14) added: ‘communication processes and interaction patterns are fundamental group dynamics. They are the components of social interactions that influence the behavior and attitudes of group members’. Therefore, exploring this essential element of group dynamics is desirable to enhance changes in organizations, including applying behavioral insights that foster strategic decision making. This is also in line with the work of Lewin (1947), who argues that in order to understand group behaviour and to manage change, it is important to identify, plot, and establish the forces that influence change. In its current form, the role of communication is critical considering interaction patterns (Kelvin-Iloafu, 2016). Therefore, communication involves social interactions of exchange of information on the internal and external levels, influencing behavior and attitudes in groups (Zainun & Adnan, 2020) together with their work effectiveness (Michailova & Sidorova, 2011).

As Mitu (2021) argued, communication in public administration is a crucial factor for information flow within the system of administration, where internal (between employees) and external relationships (between departments/organisations/citizens) come into play. Therefore, the group dynamics in communication processes comprises verbal, nonverbal, and virtual interactions between departments and units, along with external relationships within the governance system and citizens. Taking into account the public behavioral strategy, both internal and external communication affect the managerial and operational aspects of interdisciplinary strategic decision making (George, 2020). We assume the quality of internal and external communication processes in the organization is essential to group effectiveness and its dynamics. Therefore, focusing on this domain will provide valuable information and ultimately identify areas for improvement to improve

strategic department decisions.

Furthermore, communication processes can influence how employees stick together in the group, leading to the second fundamental domain of group dynamics relevant to our paper: group cohesion and climate that represent other central concepts in the deeper understanding of group processes and its dynamics (Jones, 2013). Tekleab et al. (2009, p. 174) defined cohesion as ‘the total set of forces keeping group members together’ thus being one of the crucial factors influencing group dynamics and interactions between members over time. As Hargie (2011) argued, groups that have an appropriate level of cohesiveness are characterized by, e.g., having satisfied members who have a high commitment to achieving the purpose/task of the group, are willing to listen to each other, and are more productive. According to Beal et al. (2003), the underlying dimensions of cohesiveness involve interpersonal attraction (sometimes viewed as social cohesion), task commitment (task cohesion), and group pride. In our case, we put the emphasis on task commitment, that is, the degree of ‘motivation towards achieving the organization’s goals and objectives’ (Carless & De Paola, 2000, p. 73). This seems to be a condition to enhance innovation behaviors among employees (Mutonyi et al., 2020b; Van der Voet Steijn, 2021), which fits the concept as a behavioral public strategy.

Next, an important aspect that has a strong connection with cohesion and group dynamics, in general, is climate (Mullins, 2010). The ‘dominant approach’ conceptualizes the climate as employees’ shared perceptions of organizational events, practices, and procedures’ (Patterson et al., 2005, p. 380). For example, this may include opinions and attitudes towards decision making, norms, established rules, and regulations that prevail in the workplace. As research suggests, climate plays a key role in employee wellbeing (Mullins, 2010), overall organizational effectiveness (Zhang & Liu, 2010), or implementing innovation processes (Mutonyi et al., 2020a). However, we refer to the model presented by Patterson et al. (2005) who divided climate into four quadrants covering human relations, internal processes, open systems, and rational goals. In our case, we are particularly interested in the first one, that is based on the norms and values associated with belonging and cohesion. We assume that belonging and cohesion are attained through training and human resource development. In other words, it emphasizes the importance of wellbeing, growth, and commitment among group members in the organization.

According to empirical findings in the given domains, it can be said that employee performance and their willingness to accept new ideas and changes within the organization often correlate with the quality of communication (Zainun et al., 2020; Fu, 2020; Mitu, 2021), group cohesion (Carless & De Paola, 2000; Van der Voet & Steijn, 2021), and climate (Hassan & Rohrbaugh, 2012; Mutonyi et al., 2020a). However, these studies overwhelmingly

analyzed the quality of the internal processes of the investigated issues quantitatively in the given organizations. We assume that the qualitative approach that takes part on the group level will bring deeper understanding and ultimately valuable insights into team functioning including its dynamics, since the interaction between examined subjects comes into play. In this regard, we also follow the call for methodological diversity (Bhanot & Linos, 2020; Powell et al., 2011) to explore behaviors between group members in the concerned organization. Additionally, to our knowledge, the above scholars did not put an exclusive focus on the sample that we intended to investigate, the strategic decision making team, which is represented by the departments in the local government departments that are involved in the regional municipality strategy process.

Finally, if we should go back to the work of George (2020, p. 6), presenting the concept of public behavioral strategy, he claims that ‘group dynamics focus on interactions within a strategic decision making team.’ For instance, aspects such as trust (Klijn et al., 2010) or conflict (Grissom, 2014) are deeply studied. However, from the work by George (2020) emerged the main research gap that we intend to tackle with our paper. From our perspective, there is no clear explanation for which specific components must be assessed to understand group dynamics in a public organization. Currently, as Ali et al. (2021) added, there is little evidence of studying group dynamics in the public sector, despite their growing importance. Thus, we react to this gap by our empirical paper that aims to explore group dynamics in local government. Furthermore, we investigate two fundamental general domains of group dynamics, namely, communication and interaction patterns together with group cohesion and climate.

3 Methods

3.1 Context

The paper employs a qualitative research method to understand group dynamics in public administration better. The first step was to conduct desk research of available documents dealing with the organizational structures of the public administration office to gain an understanding of the internal and external agenda. We focus primarily on the management of human resources and the environment of the department. Additional documents dealing with resources and motivation were accessed to complement human resources management. This source of information provided an outline for designing interviews as the most used method for data collection in qualitative research studies (Creswell & Poth, 2018). Concerning the context, we assume the Act no. 129/2000 Coll. (Law on Regions) The Czech Republic is divided into 13 regional municipalities and one capital city Prague. Regional mu-

municipalities of the Czech Republic are higher-level territorial self-governing units of the Czech Republic. Every regional municipality is governed by a regional council and a governor. Elections to regional councils occur every four years. Apart from the capital city of Prague, all 13 regional municipalities have comparable competences in the administration of the territory. There are usually between 350 and 700 employees working in the offices of the regional municipalities. In terms of the reliability of the research sample, it can be assumed that most municipalities are dealing with similar problems with respect to research on their group dynamics.

3.2 Data collection

The interviews were designed to explore group dynamics in a detailed and holistic approach, in which the respondents could share their experience, attitudes and opinions. They were conducted in all departments, where two to five employees (depending on the overall number) and the director were interviewed to address group dynamics (Hartley et al., 2015). The rationale behind this composition was to address differences in perception of organizational and managerial experience at regional levels (Scott et al., 2018). The interviews were designed around two fundamental domains of group dynamics, communication processes, and interaction patterns together with group cohesion and climate. In the first dimension, the level of internal and external communication processes was thoroughly investigated. The subsection devoted to internal communication was intended to inquire about challenges and pitfalls concerning the communication of employees with management (vice-versa) as part of intragroup dynamics.

On the contrary, the subsection devoted to external communication was directed to reflect on engagement with citizens, the interaction with other departments, and other public institutions as a part of intergroup dynamics. In the second domain, the questions covered issues related to group cohesion and climate in the organization, division of competences and work roles among department members, relationships in the workplace, and the level of welfare in the departments. The basic structure of the interviews is attached to the empirical study in Appendix I. However, due to the interaction between employees during the interviews, other issues related to the group dynamics are raised that are presented in the results section of the paper. Furthermore, respondents could share their views on challenges in the respective department, along with the main agenda and its behavioral problems. The primary data collected during the interviews were recorded and transcribed to ensure that no information was missing for subsequent qualitative analysis.

3.3 Sample

Respondents were asked to participate in an hour-long session to discuss the above-mentioned topics. The sample consists of 11 departments and 34 participants who are involved in the strategic decision making teams of the regional office (see Table 1 for sample characteristics). Furthermore, all departments participated in interviews to address a variety of behavioral problems related to group dynamics in public administration. The sample was divided into groups to avoid bias towards one type of outcome with a greater diversity of sample respondents. Concerning demographics, respondents in the sample were between 34 and 59 years of age. The respondents were contacted by email to organize face-to-face meetings. More precisely, we contacted the heads of each department to schedule a meeting for interview purposes that occurred at the regional office during January-March 2021. In this case, it was easier to reach the respondents since the research team signed a memorandum of cooperation with representatives of the concerned regional office to participate in the project in which these interviews were conducted.

3.4 Data analysis

The first step of qualitative analysis was to proceed with deductive coding to cover and describe the data using theoretical input (Hartley et al., 2015). This step was supplemented by a pilot test on the first portion of the data to assess their possibilities and to remain open to determine codes to produce a substantive analysis (Creswell & Poth, 2018). Data analysis is based on investigator triangulation to conduct qualitative analysis from multiple perspectives. Different angles and more moderators in the analysis were involved to overcome personal biases and support the validity of qualitative research. The paper is based on qualitative analysis to conceptualize group dynamics. Subsequently, we move from pilot testing to the analytical pathway to grasp the specificity and complexity of organisational behaviour focused on challenges and dynamics.

The second step was devoted to the interpretation of codes to study the meaning that respondents attribute to their experience, attitudes, and opinions. This step relates to the validation to test the initial results concerning codes and groups of respondents. Furthermore, the aim was to find how codes and categories relate to each other in the sense of patterns regarding refutation and use of comprehensive data for constant testing and comparison. Concerning data triangulation, we developed a frequency distribution of codes in the codebook (see Appendix II) to reflect on the occurrences for each category of the data and to increase the validity of the results (Creswell & Poth, 2018). We applied open coding as a first step in the coding

of qualitative data to develop new theoretical prospects by engaging with the data with investigator triangularity. The rationale behind open coding was to allow the authors to compare occurrences in the data continuously.

In the next step, we applied the axial coding to make use of the connections that emerged from open coding. Reading codes repeatedly and grouping them into categories allowed us to create more abstract categories that reflect one or more codes. Thus, the step focused on exploring the occurrence around the central theory of behavioral public

strategy. Axial coding was concluded by refining the codes of the subgroups that include different codes to the final categories. These categories describe the phenomenon of group dynamics in public organizations. As a final step, we calculated Cohen's Kappa statistics to assess intercoder agreement (see Table 2). Cohen's Kappa was selected to address the relative observed agreement between the raters and the hypothetical probability of chance agreement with substantial agreement in the sensitivity codes reaching the value of 0.729 and 85.7% (Warrens, 2015).

Table 1: Sample Characteristics

Group number	Name of the department	Structure of the department	Gender of participants
Group No. 1	Culture and preservation of monuments	Culture, Preservation of cultural heritage	3 females
Group No. 2	Director's office	Management, IT, HRM	4 males
Group No. 3	Finance	Asset management, Controlling, Accounting, Budgeting	3 females, 1 male
Group No. 4	Education, youth and sport	Human resources development, Organisation administration, Education funding and budgeting	1 female, 2 males
Group No. 5	Environment and agriculture	Envi risk assessment, Nature conservation, Environmental protection and energy, Water management, Agriculture	2 females, 2 males
Group No. 6	Healthcare	Administration of healthcare, Management and development	1 female, 2 males
Group No. 7	Investment	Investment planning, Asset management, Public procurement	1 female, 3 males
Group No. 8	Legal	Legislation and law, Citizenship and Misdemeanours, Regional trade licensing	2 females
Group No. 9	Social	Social and legal affairs, Social services, Planning and development	3 females
Group No. 10	Spatial planning	Urban planning, Building regulation	2 females
Group No. 11	Transport and road management	Transport and administrative agencies, Public transport, Road management	1 female, 1 male

Table 2: Intercoder agreement with Cohen's Kappa statistic

Symmetric Measures					
		Value	Asymptotic Standardized Error ^a	Approximate T ^b	Approximate Significance
Measure of Agreement	Kappa	,729	,061	8,923	,000
N of Valid Cases		95			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

Source: own elaboration

4 Results

The findings indicated several behavioral issues that can help better understand the group dynamics in the departments explored. Firstly, we look at specific group behaviors and characteristics related to the domain of group cohesion and climate. Second, the thematic area involving communication processes and interaction patterns in departments is examined. The main findings are summarized in Figure 1.

4.1 Group cohesion and climate

In our case, this domain of group dynamics included three key categories of codes that are further described below. Regarding commitment in departments, the most alarming issues are related to employee turnover, including its causes and quality of work. The main codes describing welfare in departments cover sources of workplace stress, insufficient treatment of workplace stress, and employee wellbeing. With respect to training in departments, significant codes include insufficient skills of new

employees and negative attitudes towards new methods, including personal development. Finally, let us mention that after discussion with the research team we decided to exclude one category of codes (titled process issues including working conditions) from the results presented in this research paper. The rationale behind this decision was rather low linkage to group dynamics domains that included characteristics of identified individual codes among this category. More importantly, they were overwhelmingly related to the specific internal processes and procedures applied in each of the studied departments (e.g., complaints about intranet, unified data storage of information, or confusing and unnecessarily complex internal services).

4.1.1 Commitment in departments

The first defined category represents the degree of motivation towards achieving the organizational goals and objectives. We perceive it as a commitment in the departments. In these terms, we found that most of the studied departments struggle with high employee turnover (fluctuation). This indicates that the closeness of some depart-

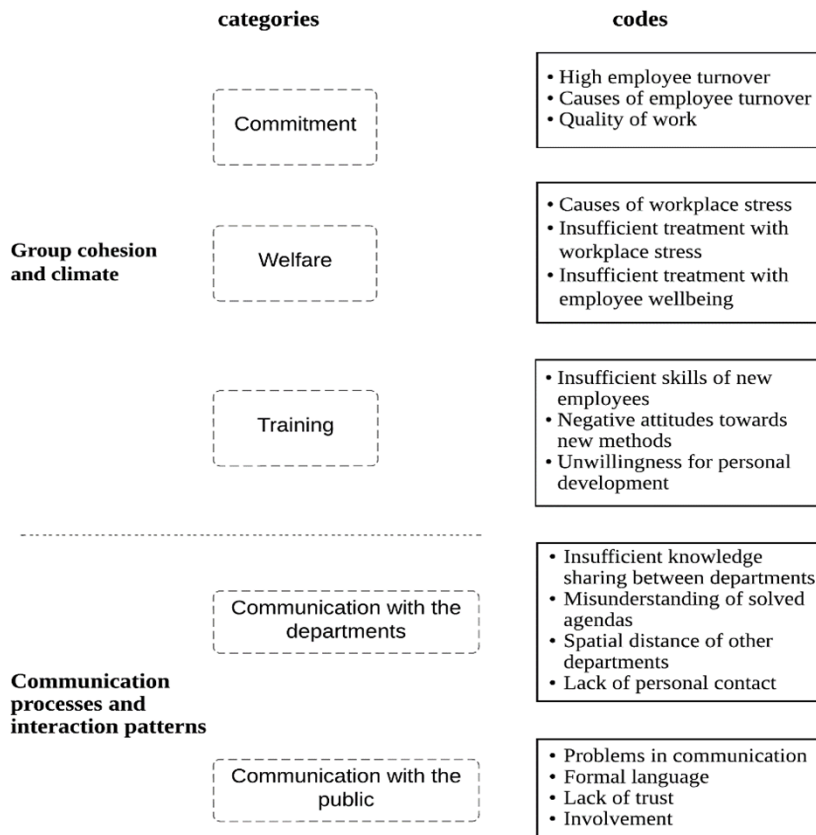


Figure 1: Conceptualization of group dynamics, Source: own elaboration

ment members does not excel. Specifically, such concerns were raised in six groups. According to G2, 'the turnover of the office staff is sometimes up to around 20%.' In this regard, other departments interviewed added that 'the problem is recruiting itself and then keeping newcomers' (G9), which can further lead to 'a loss of established work procedures' (G3). These frequently occurring changes in departments can harm the dynamics of its members and further slow the implementation of innovation approaches. G6 concluded that 'there have been significant changes in staff. The department has been stable for a long time, but then opportunities have opened up elsewhere and people started to look for better jobs.' This brings us to the second code fragment in this category, causes of employee turnover. One of the reasons for the high turnover within the office, as evidenced by the respondents' answers, may be related to the salary conditions in the public sector. For instance, respondents in G3 claimed 'a nonmotivational salary often means that many inexperienced graduates enter the regional office and then go elsewhere.'

Members of G3 added that 'low salaries don't attract and keep college students...' and continued 'we live in a time when there are more job offers and people don't have to try to work hard because they can go elsewhere where work is less bound by the rules.' Moreover, it is obvious that working in the regional office is not for everyone, as the work procedures and conditions are often different from those of private organizations. This is confirmed by other findings from the interviews, e.g., following quote (G9): 'I also perceive the problem in the cumbersome process of public administration and the office cannot keep capable people because such bureaucracy often discourages them.' Finally, in some groups, we indicated concerns related to the contribution and work quality of the younger generation. This is illustrated by the following statements: 'younger employees in particular are less inclined to work overtime' (G6) or 'we are scared that stable employees with a unique qualification will leave and the younger generation will not be able to do such work from our perspective' (G10) and 'the standard of work is declining a bit, the personal responsibility and consistency of younger colleagues are also lacking' (G4). On the groups other hand, two of the interviewed (G1, G7) specifically said that they have no issues with either fluctuation or the quality of work provided by the group members. Even so above-mentioned facts show that due to various reasons, members of these departments are not very consistent and committed to the work agenda.

4.1.2 Welfare in departments

The second category is related to employee welfare, the extent to which the organization values and cares for employees. From the interviews, we observed that work-

ing as a public servant can be seen as a stressful profession. In this sense, making important group decisions that are not related to the strategy processes could be affected by the stress factor. Therefore, it is important to provide active support to mitigate this element. By the analysis, we define the main code in this regard, sources of workplace stress. These are mainly related to the work duties, as the respondents in G9 suggested that 'the stress in the department is obvious because deadlines are really tight and need to be met, especially at certain stages of the year.'

Furthermore, the factor that includes citizens is also strong in this case. This is demonstrated by these statements in the interviews with G6 and G11: 'the psychological pressure on the department's members is especially evident with acting to clients (citizens) who complain to us, so our public officials must be sufficiently armored,' and 'colleagues feel stressed by pressure from the public and others.' Next, some departments raised complaints about a large number of overtime hours: 'most department members have overtime hours, severely disrupts their wellbeing and work-life balance (G9).'

However, it seems that these facts are not well reflected in regional management, for example, by integrating a specific system or treatment for stress management. This is evidenced not only by our observations but also by the responses gathered via interviews (G9): 'Stress is not considered by management to be a factor worthy of special reward or other benefit.' Moreover, respondents in G1 added: 'we would appreciate the opportunity to go out of office for two days, for example, in order to strengthen relations between individual members of the department and get to know each other better outside the workplace.' The respondents were rather cautious with their words on this topic. Lastly, we did not determine any specific measures that would be used to determine the satisfaction level of department members (for example, regular one-on-one meetings, surveys, suggestion box, etc.). We add that the lack of such tools and activities to foster the welfare of employees can, in practice, lead to increasing conflicts in the departments and ultimately damage the group dynamics. From the gathered findings, we conclude that the public organization has shortcomings in the level of care for its members.

4.1.3 Training in the departments

The third identified category is described as a concern for the development of employee skills. Regarding group members, it is important that they have the appropriate skills and are willing to work on their self-development. This provides additional background to foster interactions within strategic decision making teams. In these terms, the interviews revealed that department members widely complained about the skills and expertise of new employees in

the regional office. For instance, this is documented by G5: 'Working in a department requires long-term experience, when a graduate who could potentially carry out an activity comes, he lacks experience.' Furthermore, respondents in G3 and G9 added that 'new people lack expertise' and 'most positions need someone who already has work experience, and people right after school often lack this.' The attitudes towards new methods and personal development are then defined as one of the decisive factors.

The results suggest that employees must be open-minded to implement innovative approaches and concepts within the behavioral public strategy. This is often an issue in practice, for the reason that work processes within public administration are often obsolete and slow. Employees habitually stay in their status quo. Currently, some of the departments interviewed lack this sense, as G8 claimed: 'we would like to change people's attitudes towards introducing new methods, currently a negative setting prevails here instead of focusing on finding a solution.' This information was also confirmed by the HR department (G2) who concluded that 'employees do not work appropriately with some new tools within the office (e.g., the file service) - they see it as a necessary evil rather than a potential for simplification...' and continued 'we also record a very low interest in participating in training focused on soft skills – the objection is that it is time consuming. Our vision is that employees themselves will show an interest in developing skills and relationships within departments.' Finally, it can be said that members of the studied groups do not have much motivation to work on themselves and constantly develop their knowledge of current trends.

4.2 Communication processes and interaction patterns

Communication processes and interaction were identified as a second domain of group dynamics that contains two key categories of codes described in more detail within this section. The most pressing issue in the case of communication between departments is reflected in the lack of sufficient knowledge sharing and limiting the group dynamics of the knowledge flow between employees. Efficient knowledge flow is important, especially for newcomers, as most departments struggle with higher employee turnover. Additionally, the results suggest that this issue could also contribute to misunderstanding the agenda of other departments (losing track of the competencies). Taking into account communication with citizens, significant codes include the participation of the public in decision making processes and the misunderstanding of competences, which affect group dynamics related to communication processes.

4.2.1 Communication with departments

The first category reflects the communication patterns in an organization that are essential to support strategic decision making and smart governance with different perspectives/expertise – we perceive it as a communication with the departments. In this case, the results suggest that most departments are facing the challenge of efficient knowledge sharing. This indicates that departments do not actively participate in the flow of knowledge that would support strategic decision making considering the variety of expertise and tacit knowledge. According to the G7, we highlight 'Knowledge sharing is not working in the organization, we are struggling with that because the agenda is voluminous and the number of projects is increasing.' This concern was voiced by seven groups. Knowledge sharing could be considered a key in terms of dynamics, especially in the case of passing knowledge in an inter-department manner. The results indicate that intra-department knowledge sharing is considered as a vital part of communication within the department through meetings and workshops concerning interaction patterns. However, knowledge sharing requires open-minded leadership that encourages participation among employees.

According to G12, 'There are weak links between the head of department and the employees, resulting in interaction with each individually.' We perceive it as an issue concerning the importance of personal contact and communication with the departments and their heads. Additionally, this issue often contributes to the second code fragment in this category, misunderstanding of solved agendas from other departments. According to G5 'Others treat us as a service, they don't look at us the same way as other departments. Unlike others, we cannot go out for two days for social activities like team building. The office cannot function without us.' The results suggest that misunderstandings like these could affect the quality of internal communication, which becomes bureaucratic and burdensome. This alarming issue might create a certain tension and misinformation flow through departments and put self-interest above the organisational goal concerning strategic decision making. The tension could be increasing with the spatial distance of departments that are often located in different premises, which we believe derail mutual interaction. This is reinforced by other findings of the interviews, e.g. the quote 'Fairly important departments on our agenda are located in different buildings and it is always a problem to cooperate.' We assume that spatial distance and lack of personal contact could add up to the barriers of communication processes and prevent sustainable interaction patterns.

4.2.2 Communication with the public

The second category concerning communication processes and interaction patterns is a communication with the public, the extent to which the organization communicates, and includes citizens in decision making. Concerning this category, we defined the main code, problems in communication with the public. According to G9, 'We often receive negative feedback on the incomprehensibility of communication to the public, but we must follow the official procedure.' This issue might be related to a previously defined misunderstanding of competence, which makes it difficult to communicate with the public in an efficient way, e.g., preventing complaints. Additionally, G10 added 'Sometimes we have to deal with requests completely irrelevant to our agenda. Finding new forms of communication and compromise with citizens in such situations would greatly help. 'These issues can affect the dynamics between the organization and citizens, leading to a lack of trust and motivation to interact. However, the local government must follow laws and regulations that prevent the development of a specific communication framework. This leads to another main code in this regard, the formal language of communication.

Four groups interviewed emphasized that they are blamed for the formal language of communication, which is often not understood by citizens. The formal language and misunderstandings often result in ignoring/not paying attention to legislation among citizens. This affects dynamics in a negative way as citizens take a passive role, and it undermines mutual trust. Another issue concerning the communication with the public implied by the respondents is that not all formal objections and complaints could be addressed 100%. According to G7, 'The public reacts to some of our activities with distrust and formal objections to our services'. We assume that this puts the organization in a difficult position to maintain efficient communication processes with the public concerning negative interaction patterns, mainly complaints, even though the organization is taking care of the agenda in a systematic manner. Finally, in some groups we indicated aspects related to the involvement of the public in decision making process regarding too much input often cripples the whole process. The issue of crippling processes occurs due to numerous stages of decision making when the public can intervene and cause re-evaluation of the process repeatedly (e.g., land use).

On the other hand, respondents emphasized that public participation in decision making regarding strategies and projects is beneficial and systematic for multilevel governance. Citizen participation in the development and implementation of public projects was identified as a crucial aspect of the interaction patterns between the local government and the public. This interaction is built on com-

munication processes that require interactive communication platforms to gather intelligence for strategic decision making.

5 Discussion and concluding remarks

The purpose of this paper was to explore group dynamics in the local government. We investigated two fundamental domains of group dynamics, including communication processes and interaction patterns, together with group cohesion and climate. A deeper understanding of these domains is crucial to foster interactions within a strategic decision making team and to advance the application of innovation methods, including public behavioral strategy. This is supported by findings from other scholars who suggest that the quality of internal and external communication processes (Zainun et al., 2020; Fu, 2020; Mitu, 2021), group cohesion (Van der Voet & Steijn, 2021) and climate (Hassan & Rohrbaugh, 2012; Mutonyi et al., 2020a). These processes are key to accepting changes and developing innovation behaviors within the organization. To address the defined research goal, we chose the qualitative approach in order to gain a deeper understanding of the given issues and follow the methodological diversity (Bhanot & Linos, 2020; Powell et al., 2011).

This paper addresses the knowledge gap mentioned by Ali et al. (2021), who noted a lack of research on the area of group dynamics in the public sector. Based on interviews with variety of groups, we define five categories that have the potential to significantly influence group dynamics and ultimately the public behavioral public strategy of the entire organization. As for domain group cohesion and climate, the codes were related to categories involving commitment, welfare, and training in departments. In this sense, the interviewed groups are mainly struggling with high employee turnover, inadequate treatment of workplace stress, including employee wellbeing, and unwillingness towards personal development. It should be noted that the implementation of changes is smoother when group members stick together and are committed to organizational goals (Mutonyi et al., 2020b; Van der Voet & Steijn, 2021). Furthermore, changes are easier to implement when group members are satisfied in their work environment (Chen et al., 2016; Thayer et al., 2018).

The domain communication processes and interaction patterns emphasizes communication with departments, and communication with the citizens. This domain includes critical codes such as insufficient knowledge sharing, misunderstanding agenda, lack of participation, mutual trust, lack of contact, and spatial distance. In the case of interaction patterns, we identified involvement and trust are seen as a 'double-edged sword' that provides both pros in project planning and implementation. In contrast, the

participation of multiple stakeholders can disrupt decision making processes (formal complaints and objections). Importantly, long-term ignorance of communication processes can negatively influence behavior in groups (Zainun & Adnan, 2020). Ignoring the quality of communication often spoils work effectiveness (Michailova & Sidorova, 2011) and ultimately adversely affects strategic decision making in the organization.

In terms of theoretical implications, our paper extends the work by George (2020) related to behavioral public strategy research. Previous work did not clarify in detail what dimensions should be prioritized when approaching the phenomenon of group dynamics in a public organization. Thus, we fill this gap with our empirical paper. We claim that exploring group dynamics in a public organization environment should focus on studying its fundamental domains, including communication processes, group cohesion, and climate. Moreover, we suggest that specific attention within the explored domains of group dynamics to the listed issues that we identified through interviews with public employees involved in strategic decision making teams.

Regarding the implications for practice in human resource management, the results shed light on organizational forces together with weak points in group dynamics concerning communication, cohesion, and climate. In practice, our findings mainly suggest that there is a need to improve the level of commitment, motivation in personal development, interactions between departments/citizens, and general care for employees. Specifically, these findings are very beneficial to the human resources department of a given regional municipality and could be considered in development and strategy plans. If the public organization wants to move forward applying behavioral insights in strategic decision making processes, the presented findings should be reflected by relevant stakeholders in multilevel governance (local/regional/national organizations and their links).

The findings are limited to public organisations at the local level. Nevertheless, the topic of group dynamics is rather under the radar among public administration research streams and therefore requires increased attention from investigators. Furthermore, the empirical paper presents the findings that cover a public organization in a single geographical area. The results presented cannot be used to generalize to all public organizations. However, as Stake (1995, p. 85) adds, 'people can learn much that is general from a single case'. Another limitation could be seen in the methodology adopted. The interviews were conducted on a group level and not individual, which could generate other behavioral problems among the departments examined. However, given the main thematic focus, it was a necessary step to achieve the goal we developed.

This paper presents the first but crucial step to explore group dynamics in public organizations as one of the key

microfoundations underlying behavioral public strategy. Further research should focus on examining the remaining aspects that underline behavioral public strategies, namely individuals (uncovering heuristics and psychological characteristics of policymakers involved in strategic decision making). That also includes examining tools in terms of their influence on behavior change with measuring the impact of tangible and intangible strategy tools on mitigating cognitive biases. Additionally, the gathered insights could be further analysed and studied for their causes (e.g., what psychological factors are behind behavior, how it affects organizational decisions). That could be tackled by field experiments, including identified behaviors in the organization to achieve a desirable behavioral change (e.g., increase the level of knowledge sharing, welfare, or propensity to self-development).

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Ponovno razmišljanje o skupinski dinamiki v javnih organizacijah: izhodišče za raziskave vedenjske javne strategije

Namen: Cilj študije je raziskati skupinsko dinamiko pri upravljanju in vodenju izbranih javnih organizacij, še posebej dve temeljni domeni skupinske dinamike: (1) komunikacijske procese in vzorce interakcij in (2) povezanost/kohezijo skupin in klimo.

Metode: Temeljne podatke smo zbrali s poglobljenimi intervjuji z javnimi uslužbenci iz različnih oddelkov javnih organizacij. Skupno je sodelovalo skupno 34 oseb, ki so zagotovile primarne podatke za kodiranje in iskanje vzorcev. Uporabili smo triangulacijo pogledov raziskovalcev in triangulacija podatkov za konceptualizacijo skupinske dinamike v javni organizaciji.

Rezultati: Zaposleni v javnih organizacijah se soočajo s težavami pri izmenjavi znanja in so nagnjeni k napačnemu razumevanju agende med različnimi oddelki in državljani. Sodelovanje državljanov pri odločanju bi lahko razumeli kot »dvorezen meč«, ki prispeva k uresničevanju javnih projektov, a pogosto iztira učinkovite organizacijske procese. Javne organizacije se spopadajo z fluktuacijo zaposlenih, nezadostno obravnavo dobrega počutja zaposlenih in nepripravljenostjo na osebni razvoj.

Zaključek: Razumevanje in nadaljnja opredelitev ravni skupinske dinamike med javnimi uslužbenci je prvi korak k sprejemanju inovativnih pristopov. Prispevek poudarja posledice za javne organizacije z analizo vedenj, potrebnih za nemoten strateški proces pri načrtovanju razvoja, ki temelji na organizacijskih silah in vodi k boljšemu razumevanju skupinske dinamike.

Ključne besede: *Skupinska dinamika, Skupinska kohezija, Organizacijsko komuniciranje, Organizacijska klima, Javna organizacija*

Appendix 1: Interview protocol

Basic design of the semi-structured interview deployed in the study – interview protocol

1) Group cohesion and climate

- Can you introduce the main competences of your department?
- Can you briefly tell us about your role and your role with this group (department)/ function in it?
- Do you consider the current functioning of your department and division of tasks to be ideal?
- What do you consider to be the biggest problems and challenges in implementing your department's agenda?
- How would you describe relationships between the members in your department?
- What is the fluctuation in your department? What do you think its causes are?
- Are there any specific activities that influence the satisfaction of the group members? How do you take care of group members well-being?
- Is there any specific tool to measure or evaluate satisfaction in your department?

2) Communication processes and interaction patterns

- How is the communication between the group members (employees of your department)
- How would you describe the quality of communication processes in your department and with other departments involved in strategy processes?
- Which positive/negative factors you see when interacting with group members?
- Do you use any communication tool / software in your department?
- Do you hold regular meetings? What is the time range of the meeting? Are meetings meaningful, will they fulfill their purpose?
- Is there any communication with external subjects (citizens, organizations) at your department? How does your department communicate with the public / with citizens? How do you communicate the results of your work externally? Do you deal with complaints from citizens? If so, what they concern?

Appendix 2: Codebook

Explored domain of group dynamics in the departments	Description	Category of codes	Description	Individual codes included in the category	Frequencies (the number of statements included in the category)
Group cohesion and climate	Cohesion refers to the closeness of the group and the quality of the relationship between group members. Climate is defined as the employee's perception of organizational features, like decision making, norms and established rules including working conditions.	Commitment	The extent of motivation towards achieving the organization's goals and objectives.	High employee turnover	17
				Causes of employee turnover	
				Quality of work	
		Welfare	The extent to which the organization values and cares for employees.	Causes of workplace stress	15
				Insufficient treatment with workplace stress	
				Insufficient treatment with employee wellbeing	
		Training	A concern with developing employee skills.	Insufficient skills of new employees	14
				Negative attitudes towards new methods	
				Unwillingness towards personal development	
Communication processes and interaction patterns	Social interactions of exchanging information in internal and external levels.	Communication with the departments	Interactions between departments in the regional office.	Insufficient knowledge sharing between departments	24
				Misunderstanding of solved agendas	
				Spatial distance of other departments	
				Lack of personal contact	
		Communication with the public	Interactions between department and citizens.	Problems in communication	17
				Formal language	
				Lack of trust	
				Involvement	

A Model of Organizational Change Process

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Purpose/Goal: The article focuses on organization development process based on functioning of change motors; therefore, the author focuses on accomplishing three objectives. The first objective involves adding to the four change motors described by A. H. Van de Ven & M. S. Poole the fifth one, actually the balancing development motor. The second objective deals with devising a five change motor model based on motor interaction during the life cycle of an organization. The model represents the stages of change motor functioning, description of their interaction and combination of different stages of this functioning. The third objective implies developing and describing the method of the analysis of change motor interaction.

Method: Lewin's field theory, punctuated equilibrium theory, and complexity theory common aspects were identified using the method of comparative analysis and the method of synthesis, which allowed describing balancing development as a change motor.

Results: The five change motor model was developed using the method of metaphors and the method of conceptual modeling.

Conclusion: The results presented in the article can provide more thorough understanding of the development process of an organization since they contribute to the explanation of how an organization declines in its life cycle due to the functioning of its change motors and how this decline can be overcome by implementing a transformational change. The use of the five change motor model presented in this article will provide insight into the development process of an organization as well as contribute to its further theoretical and empirical research.

Keywords: *Development process, Change process, Change motor, Management theory, Organization theory*

1 Introduction

At present the issues of organizational change and development processes are becoming increasingly relevant since external environment is changing extremely fast (Tetenbaum, 1998; Kondalkar, 2009; Rothwell & Sullivan, 2010) and requires organizations to be flexible (Korman, 2020), creative (Balažic Peček & Ovsenik, 2018) and able to constantly adjust their activities (Mitki et al., 2018) and to introduce transformational changes (Burnes, 2009; Cummings & Worley, 2009; Waddock, 2020). In such circumstances, one of the major factors of successful devel-

opment of an organization is understanding the essence of change process in all its complexity, which is demonstrated by four change motors represented in the outstanding study by Van de Ven and Poole (1995).

Van de Ven and Poole (1995) consider development to be a process of changes, which can be both progressive and regressive. They interpret the process as four change motors: a life cycle motor (the metaphor of organic growth), a teleological motor (the metaphor of purposeful cooperation), a dialectical motor (the metaphor of opposition, conflict), and an evolutionary motor (the metaphor of competitive survival) (Van de Ven & Poole, 1995).

On the basis of the above-mentioned interpretation of the development by Van de Ven and Poole, in this article the author attempts to accomplish three objectives in order to describe the development process of an organization. In the beginning of the article, meeting the first objective, the author added the fifth change motor to the four ones proposed by Van de Ven and Poole (1995), namely the balancing development motor. The second objective deals with devising and describing the five change motor model that implies their constant interaction throughout the life cycle of an organization. The description of this model is presented in the second part of the article. The third objective implied developing and describing the method of the analysis of change motor interaction and is given in the third part of the article.

The results of this study may be useful due to the following reasons. First, the description of the balancing development motor could help to explain why and how organizations decline (e.g., Mintzberg, 1984; Levy, 1986; Weitzel & Jonsson, 1989) in the course of their life cycle (Greiner, 1972; Adizes, 1979; Jawahar & McLaughlin, 2001; Lester & Parnell, 2008) and how they can overcome it by implementing a transformational change (e.g., Cummings & Worley, 2009; Anderson & Ackerman Anderson, 2010). Second, the use of the five change motor model contributes to deeper understanding of the organization development process since this model describes the impact and interaction of change motors specific for different stages of organization development. Third, the method of the analysis of change motor interaction involves devising a development chart of an organization as well as the associated items of the analysis, which allows gaining information that is necessary for introducing progressive changes in an organization.

The logic of the balancing development motor is explained using Lewin's field theory (Lewin, 1947, 1948), punctuated equilibrium theory (Tushman & Romanelli, 1985; Gould, 1989; Gersick, 1991), and complexity theory (e.g., Lewis, 1994; Brown & Eisenhardt, 1997; Griffin et al., 1998) as an offshoot of chaos theory (e.g., Lorenz, 1993; Kiel & Elliott, 1996; Wheatley, 2006). The above-mentioned theories contain the following common aspects: (1) the existence of interaction between two kinds of forces, that is forces that impede changes and forces that induce them (Lewin, 1947, 1948; Tushman & Romanelli, 1985; Lewis, 1994; Brown & Eisenhardt, 1997; Tetenbaum, 1998); (2) the existence of some basis of order which, on the one hand, requires adjustment to carry out radical changes while, on the other hand, contributes to the conservation of the set order. Now let us dwell on the first aspect, while the second one will be thoroughly examined later.

Thus, a special feature of all the referred to theories is that they emphasize the interaction of two kinds of forces which in this study will be labeled as order forces and disorder forces. The interaction of these forces is constant,

order forces being based on organizational inertia and disorder forces being based on entropy. Order forces foster conservation of the current order in an organization, while disorder forces lead to the change of the current order and introduction of a new one. The interaction of order forces and disorder forces within the logic of balancing development motor functioning will be considered below in greater detail.

Lewin's field theory, punctuated equilibrium theory, and complexity theory common aspects were identified using the method of comparative analysis and the method of synthesis, which allowed describing balancing development as a change motor. Then, the five change motor model was developed using the method of metaphors and the method of conceptual modeling.

2 Balancing Development as the Fifth Change Motor

2.1 Entropy as Generating Force of Balancing Development

In this paper, the generating force of the fifth change motor is considered as entropy that gradually increases in accordance with entropy increment law (Georgescu Roegen, 1971; Kirwan, 2000). The concept of entropy can mean a measure of unavailability of energy (Kirwan, 2000), a degree of the system's inability to change (Wheatley, 2006), a degree of uncertainty (Shannon & Weaver, 1964), and a measure of disorder (Angrist & Hepler, 1967). As the result of entropy increment an organization can get more and more disorganized, so it has to fight entropy all the time (Brown & Harvey, 2006) in order to impede disorganization and survive. An organization struggles for survival as an open system (Brown & Harvey, 2006), which requires constant balancing between order and disorder (e.g., Brown & Eisenhardt, 1997; Tetenbaum, 1998) by means of balanced interaction of order forces and disorder forces. Therefore, the fifth motor was called the balancing development one.

On the one hand, this balancing development is brought about by organization inertia that can both contribute to conservation of efficient organizational routines (e.g., Nelson & Winter, 1982; Kelly & Amburgey, 1991; Feldman, 2000) or impede adjustment of an organization to changes in its external environment (Hannan & Freeman, 1977, 1984; Miller, 1993; Barron et al., 1994). On the other hand, balancing development involves obtaining and using the external environment resources, adjustment to external environment changes (Kondalkar, 2009; Ganji Bidmeshk et al., 2021), which is invariably accompanied by emerging entropy (Kirwan, 2000). Thus, entropy can be generated in order to promote functioning of an organization, though rapidly increasing entropy can result in or-

ganization's decline caused by its disorganization and lack of energy for further functioning. As Georgescu Roegen (1971) said, "life, at least in the form it exists on this planet, is compatible only with a moderate entropy".

Moreover, it should be mentioned that constant balancing between order and disorder is based on the implementation of changes that can be either supported or opposed to by the organization's internal and external environment (e.g., Paton & McCalman, 2008; Cameron & Green, 2012; Huczynski & Buchanan, 2013; Srivastava & Agrawal, 2020).

Thus, two groups of agents can be distinguished both in the internal and external environment of an organization: (1) agents that are considered to be the order forces fostering conservation of the current order in the organization, (2) agents that are considered to be the disorder forces that foster change of the current order and introduction of a new one. Depending on the circumstances, the same agents may function as order forces or disorder forces. The dominance of one of the groups of agents mentioned above can cause the growth of organization's entropy since in this case: (1) the use of its energy may be dysfunctional (Beckhard, 2006), (2) its resources may be used irrationally (Kondalkar, 2009), (3) its communication problems (Ford & Ford, 1995; Morrison & Milliken, 2000; Brown & Harvey, 2006; Harris & Nelson, 2008) may result in increasing uncertainty (Clampitt & Williams, 2004; Hargie et al., 2004; Mowles, 2015). Lack of attention of the organization's management to these circumstances can cause an ever-growing entropy and, thus, steadily increasing uncertainty, disorder, the inability of the organization to change. As a result, these conditions put the mere existence of the organization in danger and can lead to its decline if the organization does not react on the dissatisfaction with its functioning on the part of its internal as well as external environment (Mintzberg, 1984; Levy, 1986; Weitzel & Jonsson, 1989).

Hence, entropy should be seen as the generating force lying at the basis of the fifth change motor. In case it is excessive, it can cause the decline of the organization, while on the other hand its generation itself can promote the organization's progressive changes. The positive or negative influence of the fifth change motor on an organization is determined by the ability of the organization's management to balance between order and disorder taking advantage of order forces based on organizational inertia and disorder forces based on entropy.

It should be noted that both order and disorder forces can have positive or negative influence on an organization. The nature of this influence will be determined by how well the order and disorder force balance corresponds to the particular stage of the organization development within its life cycle. The five change motor model presented in this article may help to describe the conditions characteristic of this or that degree of balance between order and disorder forces.

2.2 Deep Structure as the Basis of Order

In the context of the fast changing external environment (Tetenbaum, 1998; Kondalkar, 2009; Rothwell & Sullivan, 2010), organizations must be able to carry out transformational change (e.g., Burnes, 2009; Cummings & Worley, 2009; Anderson & Ackerman Anderson, 2010). Therefore, special attention should be drawn to the organizational change process, the relevance of this issue being proven by a fairly large number of studies devoted to the types of organizational changes (e.g., Golembiewski et al., 1976; Levy, 1986; Porras & Singh, 1986; Anderson & Ackerman Anderson, 2010).

Whatever of the above-mentioned classifications is used, it becomes evident that there is a close relationship between different types of change and some order basis whose adjustment can bring about a radical change in the organization. All in all, it is the emphasis on some order basis that represents the second common aspect of Lewin's field theory (1948), punctuated equilibrium theory (Tushman & Romanelli, 1985; Gersick, 1991), and complexity theory (Lewis, 1994; Eisenhardt & Brown, 1998; Mitleton Kelly, 2003).

The author of this article does not claim to introduce a new term for definition of the above-mentioned order basis or to elaborate its components since there are numerous interpretations of the basis, which has been mentioned above. Nevertheless, the mere existence of this order basis is the most important factor that can explain the logic of functioning of the balancing development motor and disclose the content of the five change motor model of an organization. Thereby, from now onwards let us use the term deep structure that was introduced by Gersick (1991) as the most general one for the analysis of incremental and radical changes and for the definition of the order basis. "Deep structure is the set of fundamental "choices" a system has made of (1) the basic parts into which its units will be organized and (2) the basic activity patterns that will maintain its existence" (Gersick, 1991).

One can better understand the process of radical change connected with the deep structure if trialectics is used as the logic of organization change (Ford & Ford, 1994). Using trialectics, let us consider a new deep structure that succeeds the degraded current deep structure as an attractive material manifestation point (Ford & Ford, 1994). Degradation of the current deep structure manifests itself in becoming less efficient, not being able to provide the change of the organization as response to dissatisfaction with its functioning on the part of its internal and external environment and can eventually result in the organization's decline (Mintzberg, 1984; Levy, 1986; Weitzel & Jonsson, 1989). According to trialectics, such conditions result in disequilibrium. This disequilibrium can cause replacement of the current deep structure by a new one which is regarded by the members of the organization as

a more attractive one, considering its survival potential.

The deep structure continues to exist until equilibrium is reached, which in trialectics is understood as the moment when “the circulation of energy between apparent opposites” (Ford & Ford, 1994) is maintained. Within the balancing development motor, these opposites are represented by the order forces based on organizational inertia and disorder forces based on entropy. Dominance of one of these opposites results in disequilibrium, which is expressed in the disruption of energy circulation (Ford & Ford, 1994).

Functioning of the balancing development motor is a cycle that consists of periods of equilibrium based on the deep structure used, degradation of the current deep structure, disequilibrium, and formation of a new deep structure or dissolution of the organization (see Figure 1). Entropy is the generating force of this cycle. At some point, its increase, in accordance with entropy increment law (Georgescu Roegen, 1971; Kirwan, 2000), makes an organization balance between order and disorder, but eventually it is bound to take an organization from the period of equilibrium to the period of disequilibrium.

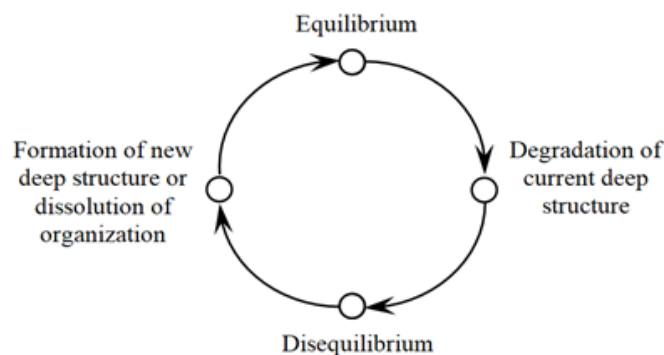


Figure 1: Logic of Balancing Development Motor Functioning

As the result of entropy increases, an organization can reach a bifurcation point (Prigogine & Stengers, 1984; Wheatley, 2006) that causes either the formation of a new deep structure of the organization or its dissolution. The deep structure is the basis of order. On the one hand, the formation of the deep structure permits to restore the equilibrium. On the other hand, degradation of the deep structure causes disequilibrium.

Thus, balancing development should be seen as a process of changes whose implementation enables energy circulation between order forces and disorder forces, that is their balanced interaction. While this energy circulation is taking place, the organization manages to balance between order and disorder. Accumulation of energy within order or disorder forces can mean disruption of its circulation between them, i.e. disequilibrium, which can result in transformational change or dissolution of the organization.

In this article, the continuous interaction of the five change motors is described to explain how an organization is approaching the key point at which its transformational change, allowing it to survive the decline or dissolution (Weitzel & Jonsson, 1989), can take place.

2.3 Combination of Episodic and Continuous Changes

Depending on our focus when studying the process of organizational changes, we can regard them as episodic or continuous (Weick & Quinn, 1999). Episodic or continuous changes imply the use of two different models the comparative analysis of which was done by Marshak (1993). Implementation of episodic changes is based on Lewin's three-step model (1947): (1) unfreeze, (2) move, (3) freeze. Continuous changes occur in a different sequence: (1) freeze, (2) rebalance, (3) unfreeze (Marshak, 1993; Weick & Quinn, 1999). The basis of continuous changes is a model, denoted by Marshak (1993) with a general term “The Confucian model of change”. This model assumes changes to be continuous and cyclic. To illustrate this point, Marshak uses the five agents (elements) cycle typical of Chinese philosophy and medicine, the cycle depicting the sequence in which these agents generate each other (Chan, 1963; Tierra & Tierra, 1998; Jiuzhang & Lei, 2010; Maciocia, 2015). These five agents are Wood,

Fire, Earth, Metal, and Water and in Chinese philosophy they become the focus of attention not only of metaphysics but of public administration and politics as well (Chan, 1963; Graham, 1986, 1989; Fung, 2009).

The development process of an organization should be examined regarding the combination of episodic and continuous changes since this approach will contribute to a more thorough understanding of the essence of this process. If the problems of the organization are connected with its strong inertia, then it is necessary to understand the logic of implementation of episodic changes. If the management of an organization aims at its continuous adjustment to the changes of the external environment, it is crucial to determine the logic of implementation of constant changes (Weick & Quinn, 1999). Therefore, this article considers the combination of continuous and episodic changes on the basis of interaction of five change motors.

For this purpose it seems viable to use the classification of the types of organizational change given in the work of Anderson and Ackerman Anderson (2010). Using this classification, developmental change is considered as the continuous one, transformational change as the episodic one, while transitional change is seen as a type of change that is in between continuous and episodic changes.

Hence, this study proposes a model of five change motors of an organization. This model can help to describe the conditions of interaction of change motors most characteristic for different types of organizational change including transformational change. This enables an organization to overcome the stage of decline and to survive (e.g., Cummings & Worley, 2009; Anderson & Ackerman Anderson, 2010). Besides, the above-mentioned model allows determining conditions of change motor interaction in which different logics of change (formal logic, dialectics, and tri-lectics) (Ford & Ford, 1994) should be used.

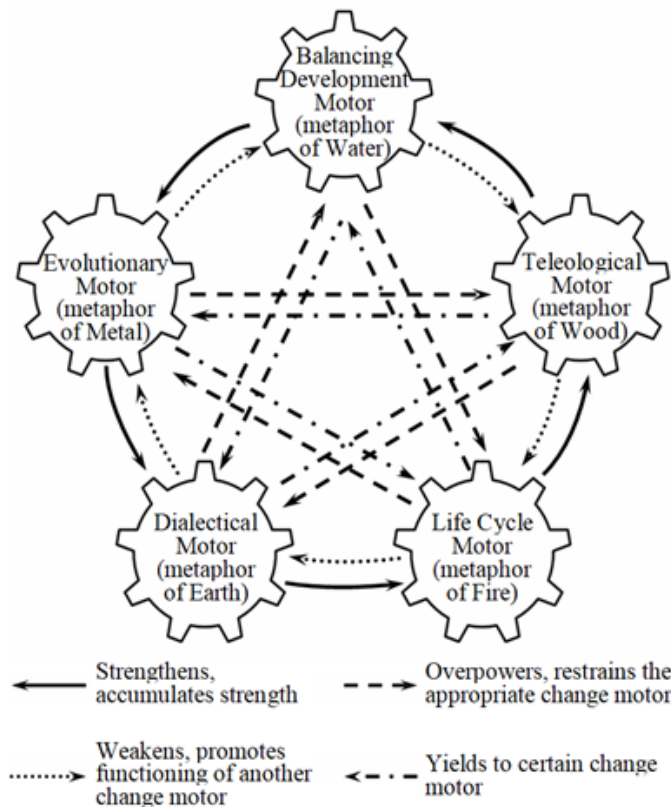


Figure 2: Five Change Motor Model

3 Description of the five change motor model of an organization

3.1 Metaphors of Five Change Motors

By developing Van de Ven's and Poole's conception of four change motors (1995) as well as ideas of cyclicity of changes (Chan, 1963; Graham, 1989; Marshak, 1993; Mou, 2009), this study proposes a model of five change motors of an organization. Firstly, this model implies the addition of the fifth change motor, the balancing development motor, whose generating force is entropy, to four change motors. Secondly, to provide a detailed description of the content of each change motor in this five

motor model, the author uses metaphors of agents (Wood, Fire, Earth, Metal, Water) (see Table 1 below), which are paid special attention to in Chinese philosophy regarding public administration and politics (Chan, 1963; Graham, 1986, 1989; Fung, 2009). Thirdly, the author uses interaction logic of these five agents (Chan, 1963; Graham, 1989; Jiuzhang & Lei, 2010; Maciocia, 2015) to describe the process of functioning and interaction of the five change motors. The five change motor model is given in Figure 2.

One of the main ideas of five agent interaction is that they repeatedly generate and change each other in a certain cyclic sequence: "Wood produces Fire, Fire produces Earth, Earth produces Metal, Metal produces Water, and Water produces Wood" (Chan, 1963). The characteristics of the metaphors of five agents are given below in Table 1.

Table 1: Metaphors of Five Change Motors

Motor of Change	Metaphor	Metaphor Characteristics
Teleological motor	Wood	The forces of spring, beginning of development, impetus, driving force, birth. The nature of Wood is "to be crooked and straight" (Chan, 1963). "Wood is the beginning of the cycle of the Five Agents" (Chan, 1963).
Life cycle motor	Fire	The forces of summer, vital force in something or somebody, development, realization. The nature of Fire is "to burn and ascend" (Chan, 1963).
Dialectical motor	Earth	Earth is characterized by its assistance to the other four agents and its "power to transform" (Chan, 1963). Earth occupies the central position among the five agents, from which the other four agents are drawn through binary oppositions. The nature of Earth is "to provide for sowing and reaping" (Chan, 1963).
Evolutionary motor	Metal	The forces of autumn, harvesting, rigidity, severity, rightness, drawing boundaries, punishment for crime, end of development, destruction. The nature of Metal is "to yield and to be modified" (Chan, 1963).
Balancing development motor	Water	The forces of winter, preservation, storage of something or somebody, accumulation of energy, transition of energy, circulation of vital force. Wisdom, purification, deliverance from evil, moral transformation. Risk of development end, decline. Water can nourish the flesh while flowing downwards and humidifying since that is its nature, but it can get turbid, inactive and flow upwards since earth can dam water. Water is the end of the cycle of the five agents.

Metaphor of Wood. In this article the metaphor of Wood is used to describe the teleological motor because it represents the development beginning, impetus, driving force (Chan, 1963; Graham, 1989; Wilhelm & Wilhelm, 1995), and birth (Chan, 1963; Graham, 1989). As “wood is the beginning of the cycle of the Five Agents” (Chan, 1963), so does the functioning of an organization begin with formulating a goal. Wood can be “crooked and straight” (Chan, 1963). As straightening of a crooked wood, when we speak about a person, can mean ethical development (Shun, 2003b) and correction of human nature in the right direction under external influence (Chan, 1963; Graham, 1989), the goals of an organization can be adjusted and specified in the cause of its development (Van de Ven & Poole, 1995).

Metaphor of Fire. Here, the metaphor of Fire is used to describe the life cycle motor. If fire dies away, the vital force disappears, hence fire can mean presence of this force in something or somebody (Chan, 1963), development, realization (Chan, 1963; Graham, 1989), which complies with the essence of an organization’s progress through its life cycle from the initial phase to the final one (Van de Ven & Poole, 1995).

Metaphor of Earth. Metaphor of Earth allows revealing the sense of the dialectical motor because it is connected to the emergence of oppositions. Of all the five agents, Earth is the central one (Chan, 1963) from which other four agents are drawn through binary oppositions (Graham, 1989). Besides, as Earth is characterized by its assistance to other four agents (Chan, 1963; Yu Lan, 1966) and its “power to transform” (Chan, 1963), the dialectical motor is characterized by the development of synthesis that represents a new construction (Van de Ven & Poole, 1995).

Metaphor of Metal. Metal is regarded as a metaphor of the evolutionary motor. This metaphor features severity, rightness, setting boundaries, punishment for crime (Graham, 1989), the end of development (Chan, 1963; Yu Lan, 1966), destruction (Chan, 1963; Wilhelm & Wilhelm, 1995), and also harvesting (Graham, 1989; Wilhelm & Wilhelm, 1995). This fits the logic of choosing or denying something (Hannan & Freeman, 1977) as well as retention within the framework of the evolutionary motor (Van de Ven & Poole, 1995).

On the one hand, the nature of Metal, which is “to yield and to be modified” (Chan, 1963) corresponds to the processes of variation and selection within the framework of the evolutionary motor (Van de Ven & Poole, 1995). On the other hand, the metaphor of Metal features rigidity (Graham, 1989) corresponding to organizational inertia that can hinder adaptation of the organization to changes in its external environment (Hannan & Freeman, 1977, 1984; Miller, 1993; Barron et al., 1994).

Metaphor of Water. In this study the metaphor of Water is used to describe the balancing development motor. Water features transition of energy and circulation of vital

force (Wilhelm & Wilhelm, 1995). It can nourish the flesh (Graham, 1989; Ames, 2003) while flowing downwards and humidifying, since that is its nature (Chan, 1963). In the same way, the balancing development motor means circulation of energy between order and disorder forces, which maintains the current deep structure of the organization. However, water can get turbid (Chan, 1963), inactive (Wilhelm & Wilhelm, 1995) while flowing, or it can flow upwards since earth may dam water (Graham, 1989), circulation of energy between order and disorder forces can be disrupted.

Water is characterized by preservation and storage of something or somebody (Chan, 1963; Graham, 1989), accumulation of energy (Wilhelm & Wilhelm, 1995), which corresponds to accumulation of energy by order or disorder forces and stopping its circulation between them. Accumulation of energy can result in a radical change (Wilhelm & Wilhelm, 1995).

Furthermore, the metaphor of Water is characterized by wisdom which determines the rules of conduct (Graham, 1989), helps to tell right from wrong (Chan, 1963; Fu, 2003), solve moral problems (Cua, 2003b), deal with dilemmas and difficulties of human life (Cua, 2003a), ensure proper governance (Graham, 1989). These aspects of Water metaphor correspond to the deep structure treated in the balancing development motor as the basis of order. As Water presupposes purification (Chan, 1963; Ames, 2003), deliverance from evils (Chan, 1963; Shun, 2003a), moral transformation (Graham, 1989; An, 2003), start of development on the new basis after difficulties have been overcome (Wilhelm & Wilhelm, 1995), so does the balancing development motor presuppose revision of the current deep structure. Purification of still water by sedimentation means disposal of destructive ideas and emotions, thus creating the backbone of social order and transformational changes (Shun, 2003a).

However, Water can also mean danger, end of development, decline that can be prevented by constant development based on understanding of the essential and dismissal of the inessential (Wilhelm & Wilhelm, 1995). This aspect of Water metaphor illustrates that any success is temporary and, one should keep it in mind, can give way to failure (Liu, 2003).

In addition, this aspect is used to show that deep inertia of the organization results in its untimely adjustment to changes of the external environment (Miller, 1993; Barron et al., 1994), which may threaten its existence. The metaphor of Water can furthermore imply danger because accumulation of Water as vital force accompanies the end of the life cycle of something or somebody. Then this vital force is used anew for the beginning of another life cycle (Wilhelm & Wilhelm, 1995).

3.2 Interaction of Five Change Motors

The logic used in this article to describe interaction of five change motors is the logic of interaction of five agents – Wood, Fire, Earth, Metal, and Water (Chan, 1963; Graham, 1989; Jiuzhang & Lei, 2010; Maciocia, 2015). In accordance with this logic, different change motors dominate at different time periods since every change motor, by analogy with each of the five agents, actualizes the following four functions (see Figure 2 above): (1) “S”, “s” — strengthens, accumulates strength, (2) “W”, “w” — weakens, promotes functioning of another change motor, (3) “O”, “o” — overpowers, restrains the appropriate change motor, (4) “Y”, “y” — yields to a certain change motor.

Using the logic of interaction of five agents to describe the functioning of five change motors, let us distinguish the following main stages in the functioning of each change motor: beginning, growth, prosperity, slowdown, and decline (see Figure 3). The impact force dynamics of each change motor on an organization can be represented as a chart including several graphs (see Figure 3) in accordance with which the impact force changes in the interval between 0 and 100%.

It should be noted that the graphs above could be more or less extended along the time axis, but to simplify the example, let us use the same duration for the different stages

of impact force changes of the motors mentioned. Still, it does not prevent us from using these graphs to analyze the interaction of the five change motors of an organization since they visually demonstrate the logic of their interaction and allow distinguishing certain key phases. The main phases of each change motor functioning are shown on the example of the teleological motor (see Figure 3 above).

Beginning. At the first phase (s – – Y) as the change motor starts, the force of its impact is increasing, though not intensively. Therefore, the strengthening function is denoted by small letter “s”. Functions W and O in this case are not brought into effect as this change motor does not yet have a sufficient influence on change process but is still gaining force.

Growth. The next four phases (S – – Y, S – o y, S w O –, S W O –) pertain to the stage when the influence of the change motor on the organization grows. At this stage S function is implemented to its full extent, which determines fast growth of the force with which the change motor acts on the development of the organization. Gradually, the teleological motor we are studying stops yielding to the evolutionary motor (function Y is first denoted by a capital letter, then by a small letter and finally totally vanishes). On the contrary, the significance of the function of restraint, that is suppression of the appropriate change motor (in this case the dialectical motor), grows but does not

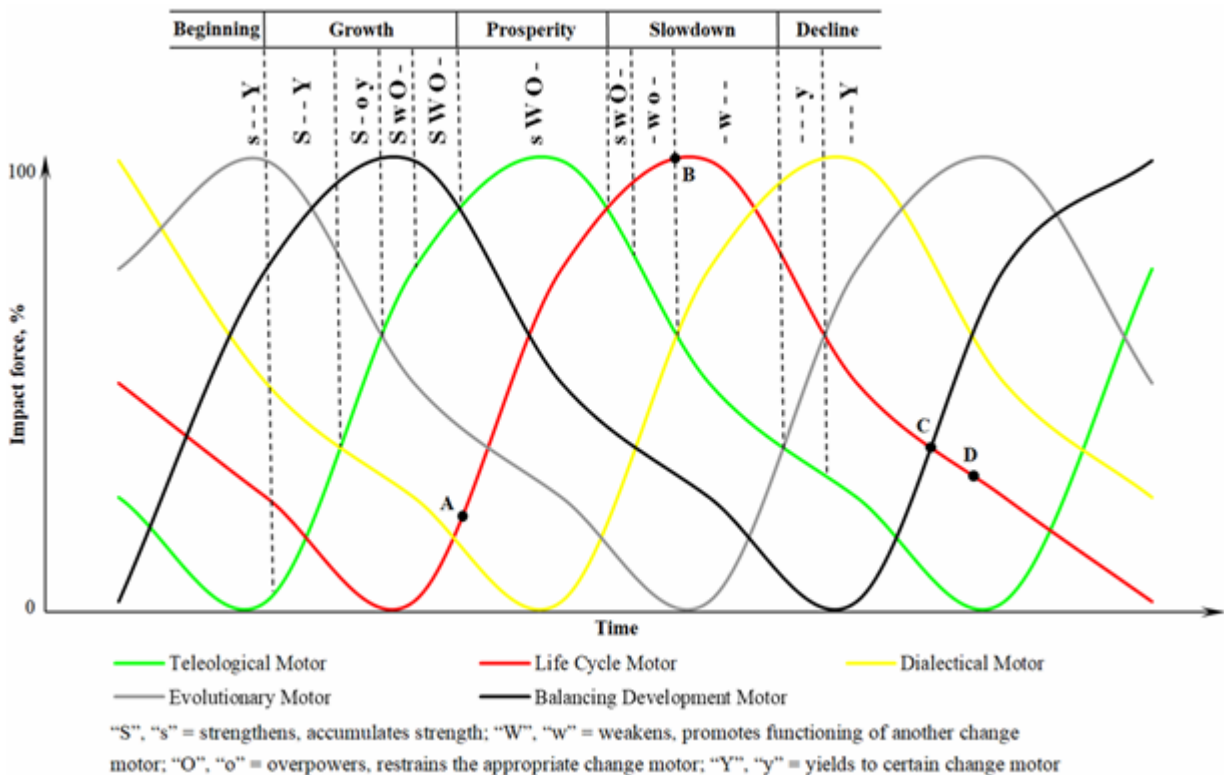


Figure 3: Impact Dynamics of Change Motors

reach its maximum yet. Besides, at this stage W function starts being implemented, which contributes to functioning and increase of the impact force of the life cycle motor.

Prosperity. At prosperity stage which corresponds to the sixth phase of the functioning of the change motor shown in Figure 3 as “s W O –”, S function is very low because the force impact of the studied change motor gradually reaches its maximum while the balancing development motor which contributes to teleological motor functioning is at the stage of slowdown. The functions of restraining and weakening are implemented by the teleological motor to their full extent.

Slowdown. Slowdown stage makes up the seventh, eighth, and ninth phases of the functioning of the change motor (i.e., s w O –, – w o –, – w – –). At this stage the teleological motor gradually stops to derive its strength at the expense of the balancing development motor, which starts to be dominated by the dialectical motor. Moreover, eventually W function starts to decay since the life cycle motor enters the stage of prosperity while the impact force of the evolutionary motor that overpowers the teleological motor starts increasing at the stages of beginning and growth. Domination of the teleological motor over the dialectical one decreases and finally vanishes. Nevertheless, Y function is not yet performed at this stage.

Decline. Decline stage makes up phases “– – – y” and “– – – Y”. At this stage, the change motor studied performs only the function of subordination to the corresponding change motor. At “– – – Y” phase this function is expressed to its maximum. Then this phase is followed by “s – – Y” phase, i.e. the beginning of the change motor starts anew.

Thus, this study defines the main functions performed by each change motor in the process of interaction with other change motors. Implementation of these functions provides for continuity of the organization change process until the organization succeeds in restarting the life cycle motor by implementing transformational change, which implies creation of a new deep structure and recovering the equilibrium. Recovering the equilibrium means revival of energy circulation between order and disorder forces, i.e. their balanced interaction.

In addition to the main stages and phases of change motor functioning in an organization, certain points in Figure 3 are marked by letters “A”, “B”, “C”, “D” to identify the sections of change motor interaction. These sections demonstrate the most characteristic conditions at which developmental change, transitional change, transformational change (Anderson & Ackerman Anderson, 2010) dominate. Besides, these sections specify conditions of change motor interaction that are the most appropriate for application of this or that logic of change (Ford & Ford, 1994).

Section AB is dominated by transitional change and here the use of formal logic is appropriate since at this period the impact force of the teleological motor exceeds that

of the balancing development motor as well as that of the dialectical motor. At this section, the organization is enthusiastically working at transition to the envisioned final state implementing its current deep structure.

Section BD is dominated by developmental change and here the use of dialectics is appropriate since at this period the impact force of the dialectical motor exceeds that of the balancing development motor as well as that of the teleological motor. This section features contradictions between the contents of the current deep structure, the state of the internal environment of the organization and its external environment. Because the organization has achieved significant success in the accomplishment of the envisioned final state, main attention is paid to preservation of its current status by implementing developmental change.

There is point “C” inside section BD to mark transition of the life cycle motor into the decline stage. At section CD, the balancing development motor begins to overpower life cycle motor functioning due to entropy increase. However, transformational changes are scarcely probable at this section because: (1) decline of an organization starts from the blinded stage (Weitzel & Jonsson, 1989), (2) influence of the balancing development motor is not strong enough, (3) impact force of the dialectical motor exceeds that of the balancing development motor.

At section DA, transformational change dominates and the use of trialectics is appropriate since at this section the impact force of the balancing development motor exceeds that of the teleological as well as dialectical motors. At this section, the organization either implements transformational change successfully or collapses.

Using the logic of interaction of five agents (Wood, Fire, Earth, Metal, Water) (Chan, 1963; Graham, 1989; Jiuzhang & Lei, 2010; Maciocia, 2015) to present the process of functioning of five change motors allowed us to describe five combinations of stages with each of the five change motors emerging at the corresponding stage of performance (see Table 2).

The description of combinations of functioning stages of different change motors supplements the contents of five change motor model and can be used (1) to present the development process of an organization, (2) to find out conditions characteristic for implementation of various types of change (Anderson & Ackerman Anderson, 2010), (3) to find out conditions characteristic for the use of certain logic of change (Ford & Ford, 1994), (4) to analyze the interaction of change motors. The analysis of change motor interaction is considered in more detail below.

Table 2: Combination of Different Stages of Change Motor Functioning

Teleological Motor	Life Cycle Motor	Dialectical Motor	Evolutionary Motor	Balancing Development Motor
Prosperity. Active implementation of the teleological cycle (Van de Ven & Poole, 1995), i.e. consistent formulation of goals, implementation of goals, evaluation of the results, and modification of goals to provide transition of the organization to the envisioned final state on the basis of the current (new) deep structure (DS).	Growth. The organization tends to bring the work to perfection on the basis of the current (new) DS. Dominance of trialectics and transformational change gives way to the dominance of formal logic and transitional change. Implementation of transitional changes provides for the growth of the organization due to its transition from the current state to a new one.	End of Decline/Beginning. Elimination of the current contradictions and the emergence of new contradictions between the contents of the current (new) DS, the condition of the internal environment and/or external environment.	Decline. There is retention of the current (new) DS, the formation of which ensured the organization survival.	Slowdown. Equilibrium is restored (i.e., circulation of energy between order and disorder forces is resumed). Realization and strengthening of the current (new) DS take place by means of elaborating its facets (e.g., Tushman & Romanelli, 1985).
Slowdown. Considerable success of the organization in achievement of the envisioned final state on the basis of the current DS.	Prosperity. Since the organization has achieved the highest level of its development on the basis of the current DS, the impetus to its development weakens. Dominance of transitional change gives way to the dominance of developmental change.	Growth. Gradual growth of contradictions. Thesis (i.e., order forces) dominates over antithesis (i.e., disorder forces).	End of Decline/Beginning. Denial does not threaten the organization yet because it is successful. Strengthening of organizational inertia starts to impede the adaptation of the organization.	Decline. Current DS is realized and streamlined but order forces begin to dominate over disorder forces.
Decline. Conservation of the current state and enjoying success become the main purpose of the organization members since it has managed to achieve a lot in its progress to the envisioned final state on the basis of the current DS.	Slowdown. The efficiency of the organization functioning decreases. Developmental changes dominate.	Prosperity. Maximum aggravation of contradictions. Acute struggle between thesis and antithesis.	Growth. Threats to organization survival emerge, which resulted from dissatisfaction with its performance on the part of its internal and/or external environment. Variation process is taking place.	End of Decline/Beginning. The current DS loses its relevance, deteriorates, begins to collapse. Energy starts to accumulate within disorder forces.
End of Decline/Beginning. The teleological cycle stops since the organization is in disorder and its members are demoralized. However, the craving of the organization members to guarantee its survival starts the cycle anew.	Decline. Failure to overcome threats to organization existence by means of developmental change becomes evident. There is conversion to transformational change.	Slowdown. Antithesis dominates over thesis. Struggle between order and disorder forces results in the beginning of synthesis formation.	Prosperity. Threats to organization survival and necessity for its variability become evident.	Growth. Disequilibrium (i.e., disruption of energy circulation between order and disorder forces) manifests itself strongly. The current DS has collapsed. The organization has fallen into disorder because disorder forces fully dominate over order forces.
Growth. Formation of a new DS, which would ensure organization survival, becomes the main goal for its members.	End of Decline/Beginning. The organization either collapses or, in case of successful implementation of transformational change, its life cycle restarts on the basis of a new DS.	Decline. Either synthesis is achieved (i.e., transformational change of the organization is implemented), or antithesis totally overcomes thesis (i.e. the organization collapses under the influence of disorder forces).	Slowdown. There is selection for or selection against the organization.	Prosperity. Influence of disorder forces on the organization as well as the amount of entropy approach their maximum. A new DS is formed for organization survival. Otherwise, the organization collapses.

4 Analysis of change motor interaction

The analysis of change motor interaction is a crucial task since it can provide information necessary for carrying out progressive changes in an organization. However, the implementation of such an analysis requires consideration of three important aspects (Van de Ven & Poole, 1995): (1) the influence of change motors can be examined at different levels and for various objects, (2) different change motors can affect an object simultaneously or at varying periods of time, (3) change motors can influence each other.

The method of the analysis of change motor interaction given in this study is based on the advances of Van de Ven and Poole (1995) in the description of four change motors and on the five change motor model given above (see Figures 2 and 3). The advantage of the proposed method is determined by the fact that its application allows taking into account the above mentioned aspects of the analysis of change motor interaction.

The proposed method of the analysis of change motor interaction considers three levels of change motor functioning (Horton et al., 2003; Gray et al., 2015): (1) micro level (individuals, small groups), (2) meso level (organizations), and (3) macro level (industries, institutions).

Considering the use of the proposed method for meso

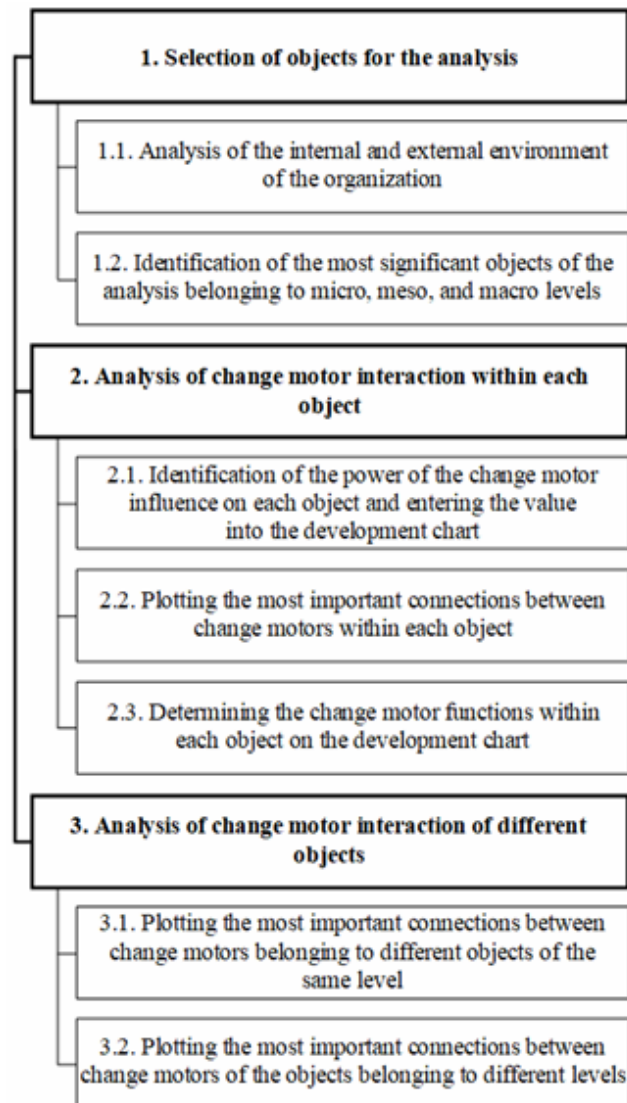


Figure 4: Steps in Plotting the Development Chart of an Organization

level objects, i.e. organizations, it seems viable to distinguish the following general stages of its implementation: (1) plotting the development chart of the organization and objects associated with it at the previous and current periods of time, (2) the analysis of the change motor interaction marked at the development chart during the previous and current periods of time, (3) detection of the problems in the organization's functioning, (4) working out recommendations aimed at ensuring progressive changes in the organization, (5) generation of scenarios for the future development of the organization using the development chart.

Thus, the method suggested is based on plotting the development chart of an organization as well as the objects associated with it. The development chart is the tool of the change motor interaction analysis that enables to identify the interrelations of change motors and their effect on the objects analyzed, whether they belong to micro, meso, or macro levels. The main steps in plotting the development chart of an organization are given in Figure 4.

First step. At the first step, the most important objects for the development of the organization are chosen for the analysis. At this step it is necessary to take into consideration the previous, current, and future time periods because the array of objects relevant for the organizational development may change with time: some objects may disap-

pear, others may appear. The analysis of the future period of time can be useful for generation of the organizational development scenarios.

Second step. At the second step in plotting the development chart of an organization one should determine the impact force of each change motor on the object in question (on a scale of 0% to 100%) using the method of expert evaluations. One plots the most important connections between change motors within each of the objects examined and marks the functions of change motors on the development chart allowing for their interaction using the model of five change motors, which was discussed in the previous part of the article. Change motor functions are denoted on the development chart by small and/or capital letters (S, s; W, w; O, o; Y, y) depending on the degree of implementation of a change motor function.

Third step. The third step in plotting the development chart of an organization includes identification of the most important connections between: (1) change motors belonging to different objects of the same level, (2) change motors of the objects belonging to different levels (see Figure 4 above).

Thus, the implementation of the above-mentioned steps allows plotting the development chart of an organization. An example of a fragment of such a chart is given in Figure 5.

Main goals of development analysis		Analysis of the previous situation					Analysis of the current situation					Generation of scenarios of development of the object examined				
Change motor	Levels, objects	TM	LCM	DM	EM	BDM	TM	LCM	DM	EM	BDM	TM	LCM	DM	EM	BDM
		1. Macro level	Object 1.1
2. Meso level	Object 2.1	59% S - o y	5% - - - Y	35% - - - y	75% - w o -	95% s W O -	95% s W O -	55% S - o y	5% - - - Y	35% - - - y	75% - w o -	75% - w o -	95% s W O -	55% S - o y	5% - - - Y	35% - - - y
3. Micro level	Object 3.1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Time period		Previous time period					Current time period					Future time period				

"TM" = Teleological Motor; "LCM" = Life Cycle Motor; "DM" = Dialectical Motor; "EM" = Evolutionary Motor; "BDM" = Balancing Development Motor

← "S", "s" = strengthens, accumulates strength - - - - - → "O", "o" = overpowers, restrains the appropriate change motor
..... → "W", "w" = weakens, promotes functioning ← - - - - - "Y", "y" = yields to certain change motor
 of another change motor

Figure 5: An Example of a Fragment of an Organizational Development Chart

The following situation has been chosen as an example within the fragment of the development chart presented. At the previous time period the life cycle motor of the organization examined (see object 2.1 in Figure 5 above) was at the Decline stage, and the balancing development motor had a profound effect on the organization. At present, the life cycle motor is at the Growth stage. Furthermore, the current period is characterized by strong influence of the teleological motor, which presumes active implementation of the teleological cycle (Van de Ven & Poole, 1995) enabling the transition of the organization to the envisioned final state.

One of the possible scenarios of organizational development in future could be the transition of the life cycle motor of the organization to the Prosperity stage. In this case, the organization would achieve considerable success in accomplishing its envisioned final state.

The described method of the analysis of change motor interaction can be used for obtaining information that will help to ensure progressive changes in an organization.

5 Discussion and conclusion

The aim of this article was to describe the development process of an organization on the basis of change motor functioning. In accordance with this aim, the following results were obtained.

Firstly, the four change motors revealed and described by Van de Ven and Poole (1995) were supplemented by the fifth one that is the balancing development motor. Since its generating force is entropy, its interaction with the other four change motors can help to explain the process of an organization's transition to the decline stage (e.g., Mintzberg, 1984; Levy, 1986; Weitzel & Jonsson, 1989), as well as the process of transformational change (e.g., Cummings & Worley, 2009; Anderson & Ackerman Anderson, 2010) the implementation of which can give an organization a chance to survive.

Secondly, in this article the author proposed a model of five change motors based on their continuous interaction during the life cycle of an organization. This model presents (1) stages of change motor functioning, (2) phases of change motor functioning regarding certain functions performed by each motor, (3) description of the combinations of different stages in change motor functioning.

Besides, this model allowed the author to determine the conditions of change motor interaction that are the most characteristic ones for various types of organization change (Anderson & Ackerman Anderson, 2010) as well as the conditions in which the use of certain logics of organization change is the most reasonable (Ford & Ford, 1994).

Thirdly, a method of change motor interaction analysis was proposed. This method involves plotting the develop-

ment chart of an organization as well as the objects of the analysis connected with the organization and takes into account different time periods and the interaction of change motors.

The model of five change motors presented in this article can be useful as it provides additional information on the development process of an organization. Besides, this model expands the present day approaches to determining the essence of the various types of change (e.g., Golembiewski et al., 1976; Weick & Quinn, 1999; Anderson & Ackerman Anderson, 2010) since it is based not on the opposition of episodic and continuous changes but on their combination in the process of functioning and interaction of the five change motors.

In addition, the model of five change motors can be used as the basis for empirical research in spheres related to the life cycle of an organization and transformational changes in an organization. Using the method of the analysis of change motor interaction can be helpful for obtaining information that is necessary for launching progressive organizational changes.

Further research on the basis of five change motor model can help to work out mathematical models which will be applied to study dynamic systems (Cheng & Van de Ven, 1996; McGarvey & Hannon, 2004; Basu & Miroshnik, 2015). Therefore, in the further research on change motor interaction it is reasonable to use a Lotka Volterra system for n species (Takeuchi, 1996; Jørgensen & Svirezhev, 2004) since it allows taking into account various types of relationship between them. In this case, the five change motor interaction can be regarded similarly with interaction of five species.

Various types of relations that may be considered within Lotka Volterra system (Takeuchi, 1996; Jørgensen & Svirezhev, 2004) can be distinguished between different change motors. For example, according to the five change motor model, the relations between the teleological and balancing development motors could be regarded as a predator prey type of relationship while the relationship between the balancing development and life cycle motors could be regarded as competition.

Thus, the use of Lotka Volterra system for description of five change motor interaction could characterize the dynamics of impact forces of change motors depending on interaction between them. Yet, this problem requires a detailed and comprehensive research.

The use of the five change motor model presented in this article will provide insight into the development process of an organization as well as contribute to its further theoretical and empirical research.

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Model procesa organizacijskih sprememb

Namen/Cilj: Članek se osredotoča na proces razvoja organizacije, ki temelji na delovanju motorjev sprememb; zato se avtor osredotoča na doseganje treh ciljev. Prvi cilj vključuje dodajanje petega motorju, ki sta ga opisala A. H. Van de Ven in M. S. Poole, in bi ga lahko označili kot ravnovesni razvojni motor. Drugi cilj je oblikovanje modela petih motorjev sprememb, ki temelji na interakciji motorjev v življenjskem ciklu organizacije. Model predstavlja stopnje delovanja motorjev sprememb, opredeli njihove interakcije in kombinacijo različnih stopenj tega delovanja. Tretji cilj vključuje razvoj in opis metode analize sprememb interakcije motorjev.

Metoda: Lewinova teorija polja, teorija točkastega ravnovesja in teorija kompleksnosti so identificirali skupne vidike z metodo primerjalne analize in metodo sinteze, kar je omogočilo identifikacijo razvojnega ravnovesja kot petega motorja sprememb.

Rezultati: Uporabili smo metode metafor in metode konceptualnega modeliranja, da smo razvili model petih motorjev sprememb.

Zaključek: Rezultati omogočajo bolj temeljito razumevanje razvojnega procesa organizacije, saj prispevajo k razlagi, kako organizacija nazaduje v svojem življenjskem ciklu, z upoštevanjem delovanja svojih motorjev sprememb, in še posebej, kako je mogoče to nazadovanje zaustaviti z izvedbo transformacijske spremembe. Uporaba modela motorja petih sprememb, predstavljenega v tem članku, bo omogočila vpogled v razvojni proces organizacije ter prispevala k njenemu nadaljnjemu teoretičnemu in empiričnemu raziskovanju.

Ključne besede: Razvojni proces, Proces spreminjanja, Menjava motorja, Teorija upravljanja, Teorija organizacije

Industry 5.0 Beyond Technology: An Analysis Through the Lens of Business and Operations Management Literature

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Background/purpose: In comparison to Industry 4.0 (I4.0), Industry 5.0 (I5.0) shows a more systemic transformation that includes business innovations driving the transition to a sustainable, human-centric, and resilient industry. I5.0 implies on rethinking business models, ecosystems, managerial practices, etc. while moving toward sustainable development. Despite the novelty of I5.0 and the growing interest in the subject, the literature is still scarce. Therefore, this study aims to analyze the state of the art and understand the approaches that constitute the study of I5.0, through the lens of business and operations management.

Method: A systematic literature review was performed through the lens of the business and operations management literature.

Results: Four major themes were identified: (i) technological application, (ii) Human Resources and workers, (iii) education, and (iv) business and operations management. For each theme, the implications, future avenues and practical considerations are presented.

Conclusions: Most I5.0 studies have focused on Human Resources and workers discussing the role of technological applications on operator safety. Despite I5.0 calls for a step forward in sustainable development, studies on it are scarce. Also, the literature is still missing practical contributions and frameworks for how I5.0 could impact on business management.

Keywords: *Industry 5.0, Industry 4.0, Society 5.0, Sustainable development, Human-robot collaboration*

1 Introduction

Formally coined in 2011, “Industry 4.0” (I4.0) was still in its infancy when Michael Rada brought the idea of Industry 5.0 (I5.0) to the fore in 2015 (Rada, 2017). More recently, after a decade of I4.0, the European Commission decided in 2021 that I4.0 is not the better framework for achieving Europe’s 2030 goals (Dixson-Declève et al.,

2021). Realizing the necessity of complementing the digital transformation of production systems by expanding their scope to “people-planet-prosperity,” rather than simply valuing extraction to benefit shareholders, the official launch to European industry of I5.0 as policy reinforced enterprises’ role in contributing to a better, fairer world (Xu, Lu, Vogel-Heuser, & Wang, 2021).

I4.0 has become the standard for applications in recent

years (Gürdür Broo, Kaynak, & Sait, 2022; Tay, Alipal, & Lee, 2021), as the rapid implementation of its technologies (Barata, 2021; Sindhwani et al., 2022) consolidates the Fourth Industrial Revolution, still in progress. Conversely, these developments still cannot achieve the desired outcomes, neglecting the environment by prioritizing machines over humans (Sindhwani et al., 2022). On the other hand, I5.0 is more a systemic transformation that includes impacts on civil society, governance structure, and human identity, in addition to solely economic and manufacturing ramifications. I5.0 is the next evolutionary step (Rada, 2017), with I5.0 complementing the existing I4.0 revolution by having research and innovation drive the transition to sustainable, human-centric, and resilient industry (Breque, Nul, & Petridis, 2021). However, to enable I5.0, one enormous challenge lies in how to do it and understand what changes it will impose on businesses and operations management in directing the technological transformation of industrial production toward “planet-people-prosperity”. The concept of I5.0 has been strongly linked to Society 5.0. S5.0 advances the discussions on cyber-physical systems while reinforcing the relations between people and technology to improve the quality of life and ensure sustainable development (Roblek, Meško, & Podbregar, 2021).

The analysis of the current literature indicates that I5.0 has started to launch different approaches to the subject. As expected, concrete practices are still incipient, considering the infancy of the Fifth Industrial Revolution. Discussions around technological aspects prevail, followed by studies on the relationship between production automation and workers, some of them suggesting how to make such interaction more human-centric (Chin, 2021). Other studies raise concerns about the development of skills and competencies by workers and the challenges to universities that will contribute to this (Carayannis & Morawska-Jancelewicz, 2022; Gürdür Broo et al., 2022).

Despite the articles in this review, recent research on I5.0 reveals gaps that still require study. The literature shows scant discussion of how a firm could innovate its business model and put humans at the center, as a cultural mindset that enables the firm to generate new business opportunities (Mihardjo, Sasmoko, Alamsyah, & Elidjen, 2019). This idea of human-centrism as a cultural mindset can change the experience of customers from the personalization of customization into mass customization (Mihardjo, Sasmoko, Alamsyah, et al., 2019). In this paradigm, enterprises have a new role for workers, namely, using technologies to serve people rather than the other way around (Breque et al., 2021). A circular economy, linked to long-term vision rather than short-term overproduction and consumption models, appears as an element to consider as a contribution to sustainable development (Dixon-Declève et al., 2021). Therefore, existing business models developed in light of the I4.0 paradigm are

endangered and must be rethought, to advance to the I5.0 paradigm. Accordingly, they should consider such issues as future viability and competitiveness, organizational and production alignment in the context of digital transformation, and employee qualification and acceptance (Carayannis, Christodoulou, Christodoulou, Chatzichristofis, & Zinonos, 2021).

The present study considers the novelty of I5.0 and the growing but still scarce attention it receives in the literature. Therefore, we must know the state of the art and understand the approaches that constitute the study of I5.0, through the lens of business and operations management. Additionally, affirming the role of the paradigm in moving toward sustainable development is crucial. To date, research shows no study that has carried out a systematic literature review (SLR) concerning I5.0 in the context of business and operations management. Accordingly, this study aims to systematize the related scientific knowledge, creating a debate among business and management scholars. The object of the analysis includes the contribution of I5.0 to sustainable development. The research questions are:

RQ1: How is Industry 5.0 positioned in the business and operations management literature?

RQ2: Which are the research themes in Industry 5.0 literature, seen through the lens of business and operations management?

RQ3: How does the Industry 5.0 literature present the role and contribution of Industry 5.0 for sustainable development?

The recent academic papers on this subject and their position in the business and operations management literature were analyzed. We identified four major themes by which to classify the analyzed papers: Technological Application in I5.0; Human Resources (HR) and Workers in I5.0; Education and Training in I5.0; and Business, Operations Management, and Sustainable Development in I5.0. For each group, the paper presents an analysis of the main findings and discussions. This SLR also identifies future questions and research avenues on the subject, representing a useful tool for researchers to develop new inquiries.

Next, the detailed method for proceeding with the SLR appears, after which concepts and a general view of I5.0, results of the SLR, analysis of the literature, discussion and future avenues for research, and the study's conclusions follow.

2 Method

We selected the Systematic Literature Review (SLR) as an appropriate approach to performing a detailed analysis of the literature and achieving the research purpose. An SLR constitutes a well-defined process to identify, evaluate, and interpret all available recorded documents (Kirst,

Borchardt, de Carvalho, & Pereira, 2021). This study follows the steps presented in Kirst et al. (2021). The relevance and novelty of I5.0 and (our research showed) the absence of an SLR that considers it from the perspective of business and operations management reinforces the relevance of this study. Add to this the lack of an organized analysis of different themes on the subject, and the present study aims to contribute to the field's development by filling this research gap.

This study demonstrates the following steps: formulating the research questions; establishing academic-paper inclusion and exclusion criteria; locating and identifying studies that meet those criteria; data extraction and coding; data synthesis and analysis; and results (Kirst et al., 2021). The aim of the study and research questions appear in the Introduction.

The search utilized the Web of Science and Scopus databases, seeking published articles and reviews from peer-reviewed journals written in the English language. Books and conference papers were excluded, following Kirst et al. (2021). The study considers all published papers up to the date of the authors' last search of the databases, January 30, 2022.

The selection criteria for including papers (articles and reviews) in the SLR encompassed the following aspects.

First, we considered the results of seeking the string "industry 5.0" in the article title, abstract, and keyword fields. The search kept to the subject areas related to business and management operations as follows: (a) Scopus: business, management and accounting, social sciences, decision science, environmental science, multidisciplinary, and economics, econometrics and finance; (b) Web of Science: management, engineering multidisciplinary, engineering industrial, environmental science, environmental studies, engineering manufacturing, social science interdisciplinary, development studies. This screening resulted in 153 items from Scopus and 83 from Web of Science.

Second, we read the title and abstract of each article, and excluded those that still did not study I5.0 from the perspective of business and management operations. This means that in some way, papers must present the impact, contributions, challenges, or implications for organizations leveraging 5.0 implementation. Also, excluding duplicates, the resulting list comprised 114 items from Scopus and 35 from Web of Science.

Third, the authors of this study carefully read, coded, and analyzed each paper, considering the extent to which the papers align with the scope of this study. Figure 1 illustrates this process and the final number of articles.

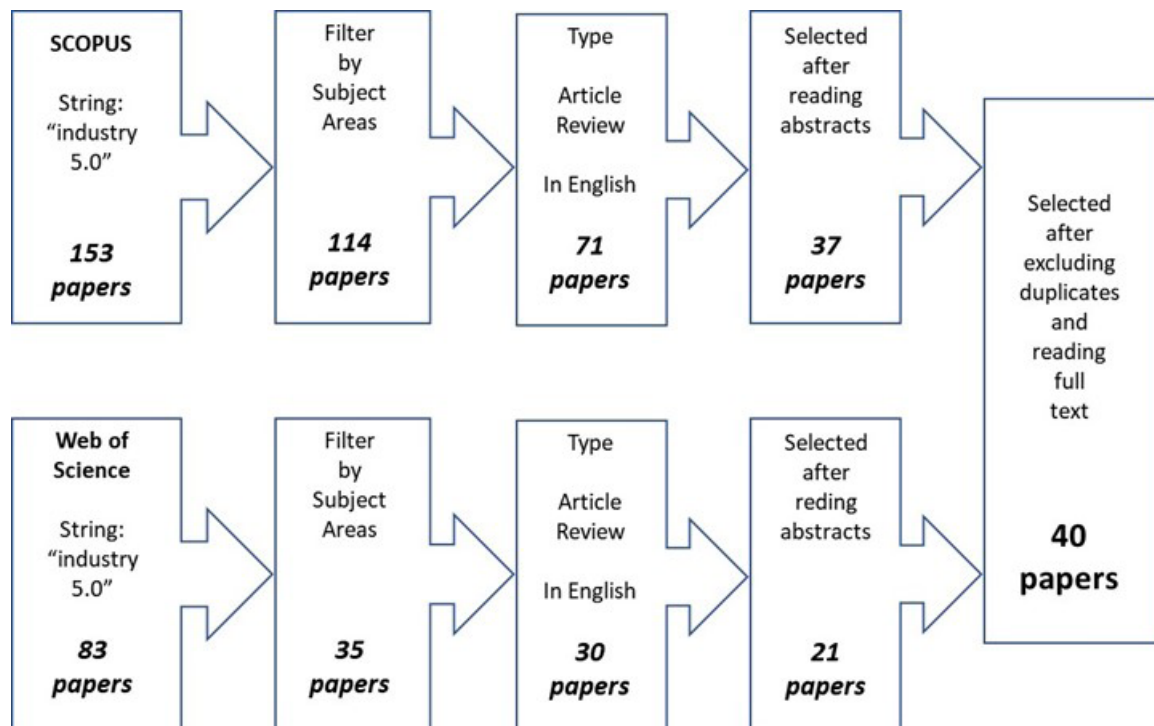


Figure 1: Understanding the process of article selection and its final amount

After excluding the duplicate papers, three of the authors performed the final analysis. They read the 40 articles and proposed four distinct themes based on the keywords and full-text content. After discussing the suggested themes with all authors and consolidating them into four cohesive groups, the three mentioned authors classified the papers according to their best-related theme. These authors also indicated the corresponding methodological approach described in each paper. Table 1 presents the journals where the papers were published, and Table 2 summarizes the result of this final paper's screening.

The first theme, "Technological Applications in Industry 5.0," encompasses the articles that discuss such applications and their potential impact on operations and/or businesses. The second theme, "Human Resources (HR) and Workers in Industry 5.0," presents articles that analyze challenges, avenues, and impacts of I5.0 that intersect with workers' skills, competencies, and abilities, and how organizations manage these. The third theme, "Education and Training in Industry 5.0," includes articles that explore how educational institutions (mainly higher education) could prepare students for this new context of I5.0 and contribute to businesses leveraging I5.0. Finally, the fourth theme, "Business and Operations Management in Industry 5.0," encompasses the articles that analyze the impact of I5.0 on business models, business management, supply chain, and customers' focus and relationship, as well as how I5.0 could contribute to sustainable development (SD).

3 Industry 5.0 – Concepts and General Venue

The Hannover Fair saw the term "Industry 4.0" (I4.0) arose in October 2011, when the working group on I4.0 presented a set of I4.0 implementation recommendations to the German Federal Government. The introduction of the term "Industry 5.0" (I5.0) occurred on December 1, 2015, just four years after the first introduction of I4.0, in an article that Michael Rada published within the LINKEDIN social network (Rada, 2017). At the ten-year mark of I4.0's introduction and six years after Rada's I5.0 introduction, the European Commission announced I5.0 (Xu et al., 2021). Through the I5.0 paradigm, the European Commission recognizes the power of industry to achieve societal goals beyond jobs and growth, to become a resilient provider of prosperity by making production respect the boundaries of our planet and place the industry worker's well-being at the center of the production process (Dixson-Declève et al., 2021).

The I4.0 paradigm is essentially technological. It focuses on the optimization of production systems and business models, and economic thinking supports it. One challenge is that I4.0 facilitates the creation of the techno-

logical monopoly and giant wealth inequality (Breque et al., 2021). Therefore, I5.0 requires a new economic orientation for industry performance, new designs for business models, value chains, and supply chains, new purposes for digital transformation, new approaches to policymaking in partnership with business and industry, new capabilities and approaches to research and innovation, and vertical and horizontal coherence by acting at all levels of government and through international standards (Dixson-Declève et al., 2021). Rather than taking emergent technology as a starting point and examining its potential for increasing efficiency, a human-centric approach in industry puts core human needs and interests at the heart of the production process. Rather than asking what we can do with new technology, we ask what the technology can do for us (Dixson-Declève et al., 2021).

I5.0 centers around three interconnected core values: human-centricity, sustainability, and resilience (Xu et al., 2021). The authors understand the human-centric approach to mean that technology is to serve people and societies, including the needs and diversity of industry workers. Sustainability relates to circular processes and leads to a circular economy with better resource efficiency and effectiveness (Dixson-Declève et al., 2021). Resilience refers to developing a higher degree of robustness in industrial production while ensuring critical infrastructure in times of crisis (Dixson-Declève et al., 2021).

Before the European Commission launched the I5.0 paradigm, the first academic papers to appear in Scopus and Web of Science, relating to I5.0 and its impact on businesses and processes, were published in 2019. The emphasis is on the integration of human beings with technology and reinforcing the customer experience by mass customization (Mihardjo, Sasmoko, & Elidjen, 2019; Pathak, Pal, Shrivastava, & Ora, 2019; Rahman et al., 2019). Some concerns started to grow, such as the lack of knowledge and skills to operate and manage a technological world leveraged by I4.0 initiatives (Correia Simões, Lucas Soares, & Barros, 2020; Nahavandi, 2019). How to build a business model and implement human-centricity as a cultural mindset while guaranteeing organizational agility in the context of digital transformation has intrigued some authors (Mihardjo, Sasmoko, Alamsyah, et al., 2019). This study has investigated the literature on I5.0 and its study and discussion, until the present.

4 Results from the Systematic Literature Review

Table 1 presents the journals that published the papers and the CiteScore per journal. Diverse journals have published representative articles on the subject of I5.0, some with high Cite Scores.

Table 1: Journals related to business and operations management that have published on I5.0.

Journal	Total published (until January 30, 2022)	CiteScore Scopus (January 2022) ^a
<i>Journal of the Knowledge Economy</i>	5	4.2
<i>Sustainability (Switzerland)</i>	3	3.9
<i>Applied Sciences (Switzerland)</i>	3	3.0
<i>Journal of Industrial Integration and Management</i>	2	3.3
<i>Sensors</i>	2	5.8
<i>Journal of Industrial Information Integration</i>	1	22.1
<i>Journal of Manufacturing Systems</i>	1	12.7
<i>International Journal of Production Economics</i>	1	12.2
<i>Technological Forecasting and Social Change</i>	1	12.1
<i>International Journal of Hospitality Management</i>	1	9.4
<i>Computers and Operations Research</i>	1	8.2
<i>Advances in Production Engineering & Management</i>	1	5.1
<i>The TQM Journal</i>	1	4.3
<i>Technology in Society</i>	1	4.2
<i>Asian Journal of Shipping and Logistics</i>	1	4.2
<i>Organizacija</i>	1	3.3
<i>IET Communications</i>	1	3.2
<i>Social Sciences (BASEL)</i>	1	2.3
<i>Anais da Academia Brasileira de Ciências</i>	1	2.1
<i>Applied System Innovation</i>	1	1.9
<i>IBIMA Business Review Journal of Human Resources Management Research</i>	1	1.2
<i>Journal of Legal, Ethical and Regulatory Issues</i>	1	1.1
<i>International Journal of Evaluation and Research in Education</i>	1	0.9
<i>Cultural Management: Science and Education</i>	1	0.9
<i>International Journal of Systematic Innovation</i>	1	0.2
<i>Logistics (BASEL)</i>	1	No
<i>International Journal of Supply Chain Management</i>	1	No
<i>International Journal of Innovation, Creativity and Change</i>	1	No
<i>International Journal of Recent Technology and Engineering</i>	1	No
<i>International Journal of Engineering and Advanced Technology</i>	1	No

Source: <https://www.scopus.com/sources.uri>. Accessed on January 30, 2022

Aiming to understand the main keywords that relate to I5.0, we produced a cloud of words with the keywords extracted from the selected papers (Figure 2). Analyzing the cloud enabled observing the terms that appear most frequently with Industry 5.0 (I5.0): Industry 4.0 (I4.0), Society 5.0, human-robot collaboration, artificial intelligence (AI), human factor, sustainability, COVID-19, personalization, Internet of Things, transformational performance,

and knowledge.

The cloud of keywords indicates human-robot collaboration, human factors, and knowledge as subjects that relate to I5.0. Indeed, this study indicates that most articles from the SLR relate to human factors and how to prepare workers and leaders for I5.0 in the context of human-robot collaboration.

Table 2: Authors, journals, research method, and theme

Author	Journal	Methodological approach			Research theme			
		Revision / theoretical	Qualitative	Quantitative / modelling	Technological application	HR / Workers	Education	Business / operation management
(Pathak et al., 2019)	International Journal of Engineering and Advanced Technology	x						x
(Mihardjo, Sasmoko, Alamsyah, et al., 2019)	International Journal of Recent Technology and Engineering			x				x
(Nahavandi, 2019)	Sustainability (Switzerland)	x				x		
Mihardjo, Sasmoko, & Elidjen, 2019)	International Journal of Innovation, Creativity and Change			x				
(Rahman et al., 2019)	International Journal of Supply Chain Management		x					
(Javaid et al., 2020)	Journal of Industrial Integration and Management	x			x			
(Javaid & Haleem, 2020)	Journal of Industrial Integration and Management	x						
(Longo, Padovano, & Umbrello, 2020)	Applied Sciences (Switzerland)			x		x		
(Carayannis, Campbell, & Grigoriadis, 2021)	Journal of the Knowledge Economy	x						
(Carayannis, Christodoulou, et al., 2021)	Journal of the Knowledge Economy	x						
(Carayannis, Dezi, Gregori, & Calo, 2021)	Journal of the Knowledge Economy		x					x
(Orlova, 2021)	Social Sciences (BASEL)			x		x		
(Ojstersek, Javernik, & Buchmeister, 2021)	Advances in Production Engineering & Management			x		x		x
(Frederico, 2021)	Logistics (BASEL)	x						
(Roblek et al., 2021)	Organizacija	x						
(Rega et al., 2021)	Applied Sciences (Switzerland)	x				x		
(Brunzini, Peruzzini, Grandi, Khamsi, & Pellicciari, 2021)	Applied Sciences (Switzerland)		x			x		
(Madsen & Berg, 2021)	Applied System Innovation	x						
(Xu et al., 2021)	Journal of Manufacturing Systems	x						
(Fraga-Lamas, Lopes, & Fernández-Caramés, 2021)	Sensors		x		x			
(Rachmawati, Multisari, Triyono, Simon, & da Costa, 2021)	International Journal of Evaluation and Research in Education			x			x	
(de Miranda, Córdoba-Roldán, Aguayo-González, & Ávila-Gutiérrez, 2021)	Sustainability (Switzerland)	x				x		
(Ávila-Gutiérrez, Aguayo-González, & Lama-Ruiz, 2021)	Sensors		x			x		
(Pillai, Haldorai, Seo, & Kim, 2021)	International Journal of Hospitality Management	x			x			

Table 2: Authors, journals, research method, and theme (continues)

Author	Journal	Methodological approach			Research theme			
		Revision / theoretical	Qualitative	Quantitative / modelling	Technological application	HR / Workers	Education	Business / operation management
(Cillo, Gregori, Daniele, Caputo, & Bitbol-Saba, 2021)	Journal of Knowledge Management	x				x		
(Chin, 2021)	IBIMA Business Review Journal of Human Resources Management Research			x		x		
(Duggal et al., 2021)	IET Communications	x						
(Esthela, Rafael, & Bayardo, 2021)	Journal of Legal, Ethical and Regulatory Issues			x		x		
(Sivarethinamohan, Kavitha, Koshy, & Toms, 2021)	International Journal of Systematic Innovation		x			x		
(Mondal & Samaddar, 2021)	The TQM Journal		x			x		
(Taverner, Trojan, Simion, & Szkudlarek, 2021)	Cultural Management: Science and Education		x		x			
(Margherita & Braccini, 2021)	Technological Forecasting and Social Change		x			x		
(Alvarez-Aros & Bernal-Torres, 2021)	Anais da Academia Brasileira de Ciências	x				x		
(Carayannis & Morawska-Jancelewicz, 2022)	Journal of the Knowledge Economy	x					x	
(Nourmohammadi, Fathi, & Ng, 2022)	Computers and Operations Research			x		x		
(Shahbakhsh, Emad, & Cahoon, 2022)	Asian Journal of Shipping and Logistics	x				x		
(Fonda & Meneghetti, 2022)	Sustainability (Switzerland)		x			x		
(Gürdür Broo et al., 2022)	Journal of Industrial Information Integration	x					x	
(Sindhvani et al., 2022)	Technology In Society			x				
(Nguyen, Duong, Nguyen, Zhu, & Zhou, 2022)	International Journal of Production Economics	x						x

5.1 Technological Application in Industry 5.0

The main aspect of the theme Technological Application in I5.0 is to observe the contribution of technological application in business and operations management. This research theme relates to three papers (Fraga-Lamas et al., 2021; Javaid et al., 2020; Pillai et al., 2021).

One approach to this theme emphasizes that I5.0 consists of innovative technologies that connect wirelessly and can enhance automation in manufacturing and healthcare (Javaid et al., 2020). The discussion of potential applications of I5.0 technologies to create a smart healthcare environment with real-time capabilities in the context of

COVID-19 is based on theoretical studies. Considering the impact of COVID-19, specifically in the hospitality industry, I5.0 technologies center on customer journeys that could ensure hygiene, cleanliness, and safety (Pillai et al., 2021).

Other approaches in this theme call attention to the IoT technologies and their potential for the digital transition toward sustainability. However, the study we present indicates that they are not contributing to the Sustainable Development of the IoT sector itself (Fraga-Lamas et al., 2021)—an open space for advancing an understanding of the relationship between digital transition and sustainability.

5.2 Human Resources (HR) and Workers in Industry 5.0

The theme Human Resources (HR) and Workers in I5.0 encompasses most of the papers in this SLR (Brunzini et al., 2021; Esthela et al., 2021; Ojstersek et al., 2021; Orlova, 2021). They focus mainly on human-robot collaboration and its potential to improve safety, ergonomics, and productivity. Such applications positively impact workers' well-being (Nourmohammadi et al., 2022). In general, robots can perform repetitive, labor-intensive, or dangerous work, while humans can work on customization and thinking critically and radically, in and out of the box. The adoption of new technologies requires both time and investment. The main challenge comes from equipping people with the necessary technical and soft skills (Chin, 2021).

The establishment of human-robot collaboration demands a collaborative workplace (Ojstersek et al., 2021), in which personalization in labor relations with employees is a key element (Orlova, 2021). Also, it demands of workers new skills, capabilities, and competencies (Ávila-Gutiérrez et al., 2021). Technologies, such as virtual training, sensing technologies, and machine cognition, have the potential to support workers' adaptation to I5.0 (Nahavandi, 2019). However, the reskilling of workers has a huge cost and substantial risk, due to the significant distance between traditional and digital competencies (de Miranda et al., 2021). Micro, small, and medium-sized enterprises could face particular challenges with such costs, as well as with access to proper training programs (Fonda & Meneghetti, 2022). The main point is how to achieve a fair balance between capital development and labor welfare (Margherita & Braccini, 2021).

In general, I5.0 demands the ability to work with data, knowledge of interaction with computers, robots, and machines, and technical know-how in the areas of sustainable development, interdisciplinary knowledge, and mastering product, process, and system complexity (de Miranda et al., 2021). Soft skills are in the roll, including the art of communication and the ability to think in a creative and critical manner (Chin, 2021), as well as green skills or those that relate to the environment (Taverner et al., 2021). Despite these generic suggestions of abilities and skills, the literature calls attention to I5.0 presenting with unknown skills, competencies, and characteristics, due to its recent appearance in concept and little practical application (Shahbakhsh et al., 2022).

In addition, the question arises of whether reskilling workers and upgrading their competences to I5.0 creates different needs and requires different approaches between developed economies and emerging economies (Alvarez-Aros & Bernal-Torres, 2021). Developed economies prioritize technological advances through a more comprehensive R+D-plus-innovation system, to build technology

and prioritize operability throughout the supply chain. Emerging economies attend main aspects like sustainability and business survival that the results and its structure reflect. They do not prioritize the technological vanguard and prefer the adoption or appropriation of technology that impacts technological competitiveness. Such contexts characterize training and education of the workforce. In developed economies, the orientation of such personnel elements as the competencies, abilities, and skills of the personnel moves toward engineering techniques education, technological knowledge, and soft skills. In emerging economies, the need to develop the general skills arises but is not a priority, nor does it represent the same commitment as in developed economies.

Planning the transition to I5.0 involves human resources (HR). The literature presents five critical categories of human factors to consider: cohesive force (related to coordination and culture), motivating force (linked to job satisfaction, commitment, and flexibility), regulating force (concerning ethics and mindfulness), supporting force (regarding leadership, training, individual competencies), and functional force (related to responsiveness and interpersonal relationships) (Mondal & Samaddar, 2021). Without having concrete answers yet on how to leverage such transitions, the workforce strategies in the digital future should consider organization goodwill, collaborative training, organizational culture, clear purpose with the best talent, and freelance projects per demand (Cillo et al., 2021). HR challenges include how to implement and manage the transition to I5.0, considering both organizational and workforce perspectives.

Still in this theme, ethical concerns regarding the impact of technologies on humans arise. These include information and communication technologies and robotic engineering (Longo et al., 2020). The literature discusses ethical concerns that relate to job positions and workers, due to extensive replacement of human labor with machines, and to decision-making activities (Margherita & Braccini, 2021). Other concerns refer to human-robot co-working that could promote psychological issues around the lack of social interaction, with the potential to shrink the human workforce (Longo et al., 2020).

5.3 Education and Training in Industry 5.0

The literature in the Education theme focuses on Engineering Education (Gürdür Broo et al., 2022), the role of universities in the digital transformation (considering the social context inherent in I5.0) (Carayannis & Morawska-Jancelewicz, 2022), and the factors explaining social science students' resilience in dealing with the future I5.0 (Rachmawati et al., 2021).

In the I5.0 context, factors and trends that forge the profile and competencies of the engineers will influence

engineering education. The I5.0 environment will likely include social and environmental aspects in addition to utilizing data and technological advancements. We selected twelve influencing factors to consider in I5.0 education: automation, connectivity, data, data ethics, electrification (to deliver equivalent energy service with less energy input), higher education environment, AI, labor market, SDG, technological development, trust in technology, and lifelong learning (Gürdür Broo et al., 2022). Accordingly, higher education institutions should rethink their strategies concerning lifelong learning and transdisciplinary education; sustainability, resilience, and human-centric design modules; hands-on data fluency and management courses; knowledge of human-agent, machine, robot, and computer interaction (Gürdür Broo et al., 2022).

The role of the university in digital social innovation—in line with I5.0 concepts—calls for rethinking. Three proposed pillars would support such alignment: (i) a university provides knowledge that supports creating innovation; (ii) a university shares its tangible and intangible assets; (iii) a university supports (digital) social innovation development by advising social innovators and involving interested parties. University response to I5.0 should: (i) create proper structure and mechanisms supporting the development and implementation of social and digital transformation; (ii) promote cross-sector and multi-actor collaboration; (iii) incentivize utilization of AI wherever it can offer benefits to the economy and society; (iv) promote new curricula that focus on green, digital quantitative, and ethical skills necessary to ensure the effective and appropriate utilization of AI. Apart from digital, green skills, and digital literacy, those programs must also teach cognitive skills (critical thinking, creative thinking), social and emotional skills (empathy, cooperation), and practical and physical skills (communication and technology devices) (Carayannis & Morawska-Jancelewicz, 2022).

Changing universities to an I5.0 context demands student adaptation and resilience. One study in this theme is a survey that indicates the resilience of social science students considering I5.0 challenges. Such resilience includes having the knowledge and skills to deal with difficult situations and the efficacy to face them; good personal qualities; the ability to contribute to oneself and others; the skills to overcome difficulties positively and adaptively; control of actions and decisions (Rachmawati et al., 2021). Interestingly, the main aspects relate to personal abilities, likely relevant to universities and higher education institutions and HR areas in preparing their programs.

5.4 Business and Operations Management in Industry 5.0

The literature that relates to this theme illuminates (though without answers) how a firm could innovate its

business model and adopt human-centrism as its cultural mindset (Mihardjo, Sasmoko, Alamsyah, et al., 2019). It also presents some challenges that could influence business models—challenges in improving people competence, a culture of innovation and process regarding the use of technologies, customer experience based on collaborative platforms, and organizational agility (Mihardjo, Sasmoko, & Elidjen, 2019). Increasing customer experience demands considering investments and co-creation (Mihardjo, Sasmoko, Alamsyah, et al., 2019) in the business model. A good possible starting point for rethinking I5.0 business models is considering the umbrella of sustainable business practices (Madsen & Berg, 2021).

I5.0 also affects all ecosystems. The reorganization of the production process starts within the business perspective and spreads toward all ecosystem components. Such aspects promote the participation of all stakeholders who contribute to feeding the circuit of knowledge-creation and sharing (Carayannis, Dezi, et al., 2021).

The development of I4.0 technologies still cannot achieve the desired outcomes and has neglected the environment by prioritizing machines over humans. Therefore, I5.0 focuses on concepts of sustainability, bioeconomy, and a collaborative environment of technology and human beings, thus establishing a resilient industry that incorporates human social values (Frederico, 2021; Sindhwani et al., 2022). The I5.0 human-centric technologies could provide excellent protective support through the use of intelligent devices, systems, automation, and material (Javaid & Haleem, 2020). However, the focus of intelligent “things” alone on the environment is not enough; technologies also should economically sustain business activities (Rahman et al., 2019). Customer relationships, supply chains, and ecosystems will increasingly integrate digital technologies and green computing (Pathak et al., 2019; Rahman et al., 2019). Emphasis on enablers will boost progress toward meeting select criteria for resiliency in I5.0: bionic technologies; IoT; sustainable agricultural production; advanced simulation; big data (Sindhwani et al., 2022).

6 Discussion and Future Avenues for Research

This study sheds light on the topical issue of I5.0. The researchers perceive this as the first study that analyzes I5.0 through the lens of the business and operations management literature. Now, we present the discussions that relate to each research question and suggest future research avenues.

The first research question (RQ1) is “How is Industry 5.0 positioned in the operations management and business management literature?”. The findings indicate that despite the European Commission’s recognition in 2021 of a relevant paradigm, in which organizations surpass

digital transformation (Dixson-Declève et al., 2021), the I5.0 idea and concepts bubbled up from the exposure by Michael Rada in 2015 (Rada, 2017). The screening filters used to perform this study and produce the SLR identified the publication of the first academic articles in 2019 (five papers). In 2020, three papers appeared, and in 2021 and the beginning of 2022, the subject of I5.0 gained strength. Journals with high CiteScore ratings (Scopus) published papers relating to I5.0.

This study contributes to the literature in business and operations management, in the context of I5.0, by indicating a greater presence of conceptual and theoretical studies in the first publications. Out of 40 papers, 20 are theoretical or conceptual. No papers present practical applications of I5.0 in the global scope of operation or business management, suggesting possibilities for future studies focusing on applied research in I5.0 and its impact on businesses and operations management.

The SLR results indicate a strong association between I5.0 and Society 5.0. Although for some authors the concept of Society 5.0 (Chin, 2021) is broader than that of I5.0, the literature offers no clear, consensual definition. Despite its correlation with Society 5.0, this study shows that most papers study I5.0 from the perspective of challenges to workers and HR departments and/or the need to reskill workers (Shahbakhsh et al., 2022; Sivarethinamohan et al., 2021). This study contributes to the literature by indicating the need to deeply understand Society 5.0 and I5.0 definitions and limits, correlations, and complementarity and to enlarge the scope and means of potential contributions from I5.0 to Society 5.0.

The second research question (RQ2) is “Which are the research themes in Industry 5.0 literature seen through the lens of operations management and business management?”. This study answers this question and contributes to the literature by proposing four themes for classifying the selected papers: Technological Applications, Workers and Human Resources, Education and Training, and Business and Operations Management in I5.0.

In the theme Technological Applications in I5.0, two conceptual theoretical papers discuss possibilities for using innovative technologies to enhance automation in manufacturing (Javaid & Haleem, 2020) and healthcare (Pillai et al., 2021). One presents a case of digital technologies to improve operator safety and results (Fraga-Lamas et al., 2021). This study contributes to the literature by indicating the lack of papers that analyze the role of technological applications in business performance or operations management. The scope of the present literature centers on operator safety, certainly relevant, and on automation, which the I4.0 literature discusses (Bravi & Murmura, 2021; Correia Simões et al., 2020). The literature is still missing practical contributions and frameworks for how technology in the I5.0 context could contribute to business and operations management.

Most of the literature concentrates on the theme of Workers and Human Resources in I5.0. However, discussions in the I5.0 papers invert the role of technology to humans, asserting that technology should serve humans (Chin, 2021). In addition, the I5.0 literature emphasizes human-robot collaboration and its potential to improve safety and productivity, not necessarily well-being. Also, this study contributes to the literature by indicating that human-robot collaboration demands new worker skills, capabilities, and competencies, still in generic form, e.g., work with data and knowledge of interaction with computers (de Miranda et al., 2021). One unsolved question is how to achieve the balance between the investment in new technologies (Chin, 2021) and the huge costs to reskill workers (de Miranda et al., 2021), considering the potential need for yet unknown skills (Shahbakhsh et al., 2022) for HR to manage in the context of I5.0. This study contributes to the literature by identifying that the competency profiles, abilities that all functions and organizational competencies require, have generic descriptions (Cillo et al., 2021; Fonda & Meneghetti, 2022) but are still unknown. Will mature workers demand more training in new skills than younger generations? How do experience and maturity impact the new context?

This study also identifies ethical concerns regarding human-robot collaboration. Concerns on potential ethical issues when humans relate to the use of information and communication by digital systems, as well as psychological issues have been added to discussion (Longo et al., 2020). Although the focus of this theme is the human-robot collaboration, the literature fiercely points out the potential extensive replacement of human labor with machines (Margherita & Braccini, 2021). This study contributes to the literature by indicating that human-robot collaboration in the I5.0 literature, in which the human-centric approach is the direction to go, is a cultural, organizational, economic, and social challenge, without answers or practical analyses.

The third theme, Education and Training in I5.0, reinforces the need for lifelong learning for workers in a context of constant challenges (Gürdür Broo et al., 2022), highlighting the challenge to workers resident in the previous theme. This study contributes to the literature by signaling that universities and educational institutions face severe challenges in the context of I5.0. For example, digital and technological advancements in engineering courses are not enough (Gürdür Broo et al., 2022). Transdisciplinary education, cognitive skills, social and environmental aspects that technologies support (Carayannis & Morawska-Jancelewicz, 2022; Gürdür Broo et al., 2022) require consideration. Such challenges redefine the role of universities in supporting the I5.0 so that its results indeed contribute to a fairer society. The practical results on how to implement these considerations are yet unknown.

Table 3: Main findings and further avenues for research

Research Question	Findings and Considerations	Further Avenues for Research in I5.0
RQ1: How is I5.0 positioned in the business and management literature?	The first academic paper was published in 2019. The SLR identified 40 papers in 30 different journals; journals have CiteScore (Scopus) until 22.7; from 40 papers, 20 are theoretical or conceptual	
	I5.0 correlates with Society 5.0; practical results from I5.0 implementation are not available yet; conceptual limits between I4.0 and I5.0 are not clear yet.	Deeply understanding Society 5.0 and I5.0 definitions, limits, correlations, and complements.
	The findings evidence the novelty of the subject I5.0 through the lens of business and operations management; however, the subject is still in its infancy.	Analyzing practical applications of I5.0 and its implications for business results and operations management.
RQ2: Which are the research themes in Industry 5.0 literature seen through the business and operations management lens?	Theme 1: Technological Application in I5.0. The literature has been centered on operators' safety and automation. The role of technological application and how it could affect business performance and operations management are still missing.	Proposing frameworks and presenting practical contributions on how digital technologies applied in the context of I5.0 could contribute to business performance and operation management.
	Theme 2: Human Resources (HR) and Workers in I5.0. Human-robot collaboration is the main focus. It will demand new skills, capabilities, and competencies from workers and managers, still presented in a generic way in the literature. How to achieve the balance between the investment in new technologies and the costs to reskill the workers is one point to unveil. HR departments will have to reorganize soon, but for now, new competencies, profiles, and abilities of workers and organizational infrastructure and culture are unknown. Ethical concerns regarding human-robot collaboration came up, taking into account the potential use of information and communication by digital systems as well as psychological stress.	Analyzing the new skills, capabilities, and competences of workers and managers and how to develop them in the context of human-robot collaboration. Studying how to balance investments in new technologies and the huge costs to reskill the workers, determining the limit of the use of digital technologies under the economic perspective. Studying the limits and potential impacts on society from the potential extensive replacement of human labor with machines. Analyzing the ethical and psychological issues for humans related to the use of information and communication by digital systems.
	Theme 3: Education and Training in I5.0 The need for lifelong learning by workers. Universities and educational institutions must provide transdisciplinary education, cognitive skills, social and environmental aspects, supported by digital technologies.	Analyzing the challenges to universities and educational institutions in the context of I5.0, as well as the role of universities and curricular structure for a human-centric, resilient, and sustainable approach.
	Theme 4: Business and Operations Management in I5.0. The need to innovate in business models, putting humans in the center as a cultural mindset has predominantly focused on the competencies of the workers and the need to reskill them. The aspect customer / consumer of the business model 5.0 has been restricted to improve customer experience based on digital technologies. The literature mentions the need to evolve all stakeholders from the ecosystem to improve businesses' performance in the context of I5.0. There is a lack of answers on how to put humans in the center of business, including the ones outside of the organization but it could affect.	Studying how to innovate in business models putting humans in the center, not only as workers but also considering customers, partners, society. Proposing how to measure environmental and social value generation. Analyzing the contribution and impact of I5.0 implementation on business performance.

Table 3: Main findings and further avenues for research (continues)

Research Question	Findings and Considerations	Further Avenues for Research in I5.0
RQ3: How does Industry 5.0 literature present the role and contributions of I5.0 for Sustainable Development?	<p>Despite the literature mentioning that I5.0 should relate to SD and the role of enterprises is to contribute to a better world, the literature does not emphasize the role of I5.0 for SD. Even in the word cloud (Figure 2), this connection does not appear.</p> <p>Shyly, some practices and approaches such as circular economy and bioeconomy have been mentioned. However, detailing or proposing how I5.0 effectively could contribute to SD is still missing. Additionally, it is suggested that business models for sustainability could be the basis for organizations that intend to implement I5.0 focusing on SD. This aspect needs to be unveiled.</p>	Proposing frameworks and analyzing practical studies on how I5.0 contributes to SDGs and/or sustainable development. Circular economy, bioeconomy, sustainable business models, ecodesign, and other approaches could be integrated into these studies.

The last theme, Business and Operations Management in I5.0, calls out the need to innovate in business models that put humans at the center, as a cultural mindset (Mihardjo, Sasmoko, Alamsyah, et al., 2019). However, this study indicates that, until now, most of the literature has put humans in the center by discussing worker competencies that require reskilling in the I5.0 environment. On the other hand, some authors suggest improving customer experience based on digital technologies (Mihardjo, Sasmoko, & Elidjen, 2019). The perspective includes evolving all stakeholders from the ecosystem when considering I5.0 implementation (Carayannis, Dezi, et al., 2021). This study points out that the literature's main perspective is still internal to the organization, restricted to workers and competencies, supply chain, or ecosystem. We contribute by indicating the lack of studies considering the impact of I5.0 on business and operations management. How to put humans at the center of businesses, including those outside of the organization that it could affect, remains without answers or practical studies.

Regarding businesses, the main challenges for I5.0 are social heterogeneity in terms of value and acceptance; measurement of environmental and social value generation; integration, from customers across entire value chains to SMEs; interdisciplinary research and system complexity; ecosystem-oriented innovation policy with an agile outcome orientation; productivity; and large investments (Xu et al., 2021). However, practical applications to overcome challenges are not evident. This lack of practical results indicates how interesting and prosperous the field of I5.0 could be to businesses and operations research, if deeply analyzed.

In the scope of the last theme, we analyze the third research question (RQ3) ("How does the Industry 5.0 literature present the role and contribution of Industry 5.0 for sustainable development?"). Surprisingly, despite the I5.0 revolution's call for a step forward toward achieving Sustainable Development Goals, by having research and innovation drive the transition to a sustainable, human-centric, and resilient industry (Breque et al., 2021), the results of

this study indicate that studies focusing on the contribution of I5.0 to sustainable development are scarce. Some studies suggest reinforcing the role of bioeconomy (Frederico, 2021) to leverage the results of I5.0 for the planet. The notion of applying Intelligent systems to sustainable agriculture has arisen (Javaid & Haleem, 2020). A circular economy, linked to long-term vision rather than short-term overproduction and consumption models, appears as an element for consideration (Dixson-Declève et al., 2021) but without practical studies. This study contributes to the literature by indicating that I5.0 papers focusing on the alignment of digital technologies with SDG goals still do not show effective results. Therefore, how I5.0 could effectively leverage the contribution to sustainable development requires further studies.

Table 3 presents a synthesis of the main findings that relate to each research question, as well as further avenues for research based on the results and analysis of this study.

This study was limited to an SLR, centered on the Scopus and Web of Science databases. The previously defined research area aimed to encompass papers on I5.0 in areas that study business and operations management. However, some papers addressing the subject and scope of this research could not join the defined research area. The authors conducted the categorization of the papers into four themes, through individual analysis followed by discussion. This understanding and categorization could assume different approaches performed by a different group of authors.

7 Conclusion

This study focuses on a topical issue: Industry 5.0 (I5.0). I5.0 aims to include human, social, and sustainability aspects amid the current and highly focused technological scope of I4.0 (Gürdür Broo et al., 2022). To the best of the authors' knowledge, no study has been conducted to proceed with an SLR through the lens of business and management operations literature. Although the literature

is still recent and scarce, a growing trend toward discussions about I5.0 by academic and practical audiences is evident. This study contributes to these academic discussions by analyzing how the business and operations management literature presents the implementation of I5.0 and its impacts on businesses. Papers were grouped according to four different themes to organize the analysis and discussion, the basis for suggesting future avenues for research to advance the studies in this field.

Practical insights for managers and decision-makers could emerge from this study. However, few field results are available yet. Concerns about balancing investments in digital technologies and reskilling workers and managers in a human-robot-collaboration context require consideration. Also, uncertainties of this new revolution challenge HR preparations to look ahead and plan. The literature has not yet deeply explored the field regarding innovative business models to insert the organization into the I5.0 era, considering sustainable issues and human-centric approaches behind workers' qualifications and safety. These two aspects, new economic orientation and business models, as well as sustainability issues and human-centric approaches, seem to be the great challenge for such actors as organizations, governors, and universities. Will new economic orientation and business models be possible, or is this just utopian? Some emerging lights are coming up, and putting our academic lens on them is the minimum contribution to a better planet.

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Industrija 5.0 onkraj tehnologije: analiza z vidika literature o poslovanju in upravljanju operacij

Ozadje/namen: V primerjavi z industrijo 4.0 (I4.0), kaže industrija 5.0 (I5.0) na bolj sistemsko preobrazbo, ki vključuje poslovne inovacije, katere spodbujajo prehod na trajnostno, na človeka osredotočeno in odporno industrijo. I5.0 pomeni ponoven razmislek o poslovnih modelih, ekosistemih, upravljaljskih praksah itd. ob prehodu v smeri trajnostnega razvoja. Kljub novosti I5.0 in naraščajočemu zanimanju za to temo je literature še vedno malo. Zato je cilj te študije analizirati stanje tehnike in razumeti pristope, ki sestavljajo študijo I5.0, z vidika poslovnega in operativnega upravljanja.

Metoda: Izdelali smo sistematičen pregled literature skozi optiko literature o poslovanju in upravljanju operacij.

Rezultati: Določene so bile štiri glavne teme: (i) tehnološka uporaba, (ii) človeški viri in delavci, (iii) izobraževanje ter (iv) poslovno in operativno upravljanje. Za vsako temo so predstavljene posledice, prihodnje poti in praktični premisleki.

Zaključek: Večina študij I5.0 se je osredotočila na človeške vire in delavce, in razpravlja o vlogi tehnoloških aplikacij pri varnosti operaterjev. Kljub pozivom v literaturi o I5.0 k koraku naprej v trajnostnem razvoju, je študij na to temo malo. Prav tako v literaturi še vedno manjkajo praktični prispevki in okviri o tem, kako bi lahko I5.0 vplivala na poslovno upravljanje.

Ključne besede: *Industrija 5.0, Industrija 4.0, Družba 5.0, Trajnostni razvoj, Sodelovanje človek-robot*

An Outline of Certain Generic Values - Work Dimensions

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Background/Purpose: Values-related issues have come into the focus of leadership thinking in the past few decades and it seems to be paradoxical why values work has not been more extensively used so far for defining and conceptualizing leadership. A reason for this can be that values-oriented research streams normally approach leadership from specific perspectives of values representation and transfer. Alternatively, this study examines values work from a generic perspective. Its goal is to suggest a generalized notion for values work and outline certain generic values-work dimensions.

Methods: Analysis in this theoretical paper is primarily based on Institutional, New Leadership, and Values-Oriented theories. Methods include argumentation and analytical framework development.

Results: This study presents a structured list of and an illustrative framework for some of the dimensions of values work as broadly defined and has research implications regarding issues of leadership influence and the demarcation of leadership from management.

Conclusion: The importance of values representation in contrast to power/influence perspectives in leadership is underlined. Our study points to the necessity for more research on generic aspects of values work. The results can also be used for leadership practice, consulting, and development.

Keywords: *Leadership, Power/influence perspective, New Leadership, Representation of followers' values, Institutional Theory, Value-oriented leadership*

1 Introduction

The issue of values came into the focus of leadership research and practice in the last decades of the 20th century and especially by the turn of the millennium. The attention to the issue of values was affirmed by the results of the GLOBE research identifying charismatic/value based as one of globally observable (House & Javidane, 2004) and by followers perceived as positive (Dorfman et al., 2004) leaders' behaviors.

In the leadership literature „...most definitions of leadership reflect the assumption that it involves a process whereby intentional influence is exerted over other people...” (Yukl, 2013, p. 18) As for some examples from this century, „the essence of Leadership is influence”, claims

Rumsey. (2013, p. 1). In Birnbaum's (2013, p. 256) definition leadership is an „interaction that influences others through non-coercive means”. The GLOBE research meant by leadership the following: „...the ability of an individual to influence, motivate, and enable others to contribute toward the effectiveness and success of the organization of which they are members.” (House et al., 2004, p. 15)

Alternatively, in the last decades numerous definitions offer a dual approach (influence and purpose giving etc.) in contrast to approaches to leadership with an influence emphasis. In these definitions influence is interconnected, as for example, with giving purpose, meaning, guidance (House & Aditya, 1997), structuring or restructuring of the situation and of the perceptions and expectations of the members (Bass & Bass, 2008) and showing the way, en-

visioning a desirable future, promoting a clear purpose or mission, supportive values, and intelligent strategies (Gill, 2011). The definition of leadership offered by Antonakis and Day (2018) integrates the two aspects by using the notion of goal influencing.

Despite a growing emphasis on the aspect of purpose giving etc. (giving meaning; structuring and restructuring of perceptions and expectations; showing the way; promoting a mission etc.), it can be stated as a problem that the latter aspect still seems to be undervalued in leadership conceptualizations and definitions. Given the values context of establishing goals, offering purpose, and meaning, dealing with followers' perceptions and expectations, showing the way, promoting a mission, etc., this theoretical paper is devoted to aspects of values work in leadership.

Emerging values-oriented research streams often approach leadership from specific perspectives of values representation and transfer. However, a gap can be seen in generic interpretations of the significance and overall characteristics of values work. This study approaches values work from a generic perspective. The goal of this paper is to suggest a generalized notion for values work and to outline certain generic values-work dimensions with references to underlying theories. Such dimensions include the following: characteristics of the values represented; values-profiles consistencies between leaders and followers; components of values-representation leadership behaviors; role distributions in values-representation processes; authenticity of the related leadership behaviors; and credibility implications of values representation.

In this paper a generalized concept of 'values work' is suggested on which basis generic leadership values-work dimensions are outlined and illustrated.

2 Theoretical basis

Regarding the subject of the values context of leadership, in the evolution of leadership thought, classical authors already stressed the importance of common goals and underlying generic guiding principles for organizations. Fayol's principles of management (1949) for example, entail principles like „subordination of individual interest to general interest”, and „esprit de corps”. Barnard (1938) emphasized the responsibility of the leaders towards their followers, and the importance of creating meaning („belief in the real existence of a common purpose”, p. 87) for organizational members to establish their commitment and identification.

The idea of meaning creation is an essential element of many other leadership concepts, for example the Leadership-Followership Theory of Edwin Hollander (1954). In his approach leadership supposes an exchange between the leader and the group. The leader helps the group to define reality and reach its goals while the group offers him/her

status, recognition, and „idiosyncrasy credit” for implementing changes (Hollander, 1954; Goethals et al., 2004).

Further in the evolution of leadership thought it was Selznick (1957) who put the issue of values into the focus of research specifically from an Institutional Theory perspective. Selznick described how distinct institutional characters of organizations could be developed by their leaders and argued for the necessity of value infusions for organizations to become enduring institutions (Selznick, 1957). In a recent example of institutional theory research Raffaelli and Glynn (2015) advanced a model of value infusion by leaders for organizations.

Regarding further leadership concepts, Contingency Leadership and Strategic Leadership theories highlighted the need to pay attention to competing managerial and leadership objectives and underlying competing values (Quinn et al., 1990; Kotter, 1990; Yukl, 2013). Key leadership situations (e. g. future, strategy, innovation, transformation, crises, learning, and development-related) in an ever-changing environment conveyed substantial values-related problems and dilemmas for leaders. By the last decades of the 20th century a broad concept of New Leadership appeared in response to the large-scale change requirements. New Leadership distinguished itself from Traditional Leadership by its emphasis on value-based contents like charisma, vision, and transformation (Bennis & Nanus, 1985; Bryman, 1992).

The concept of Charisma in leadership came from Weber (1946, 1968) and gained new interpretation in House's theory. House's concept (1976) is built on strong values (as components of the specific personality characteristics) and trust in the leader's ideology (as one of charismatic effects on followers).

Vision-making and setting up new directions were identified as key leadership challenges of the twenty-first century by Bennis and Nanus (1985). In the concept of Visionary Leadership, it is assumed that leaders have an „insight into the followers' needs or values” and „develop a vision statement reflecting those needs or values” (Goethals et al., 2004). Vision development involving a clarification of values has become a fundamental practice in organizational strategic management and related planned change to the culture of the organization (e. g. Bennis & Nanus, 1985; Nanus, 1992; Yukl, 1998).

Transformational Leadership emerged as a broad theory including elements of Charismatic and Visionary Leadership. In Transformational Leadership leaders and followers raise one another to higher levels of morality and motivation. (Burns, 1978) Burns (1978) underlines the procedural nature of leadership with evolving interrelationships between leader and follower aiming at an alignment between their goals, needs, values and expectations. The goal of transformation is raising the level of performance of followers and developing them to their fullest potentials (Bass & Avolio, 1990).

Representatives of the transformational approach, Kouzes and Posner (1987; 1995; 2002) contributed in unique ways to clarifying the role of values in the leadership process. The authors developed a model of five fundamental practices that enable leaders to get extraordinary things done in organizations. The first fundamental practice of admired leaders is „Model the way”. It is about how leaders are clear about and believe in their own values, leadership philosophy and guiding principles. Other fundamental practices are: „Inspire a shared vision”, „Challenge the process”, „Enabling others to act”, and „Encourage the heart” (Kouzes & Posner, 1987; Northouse, 2018). Based on their research results in leadership excellence they identified credibility as the foundation of leadership (Kouzes & Posner, 2011).

Beyond values referred to classical authors of transformational leadership like morality (Bass & Avolio, 1990), follower development (Bass & Avolio, 1990), credibility (Kouzes & Posner, 2011), on the agenda of today’s transformational leadership research we find issues related to organizational values, like trust (Akter et al., 2021), employee engagement (Valldeneu et al., 2021), and social responsibility (Navia et al., 2019).

Evidence from research in Charismatic, Visionary, and Transformational leadership contributed to an understanding of the focal role values – fundamental to organizational culture – play in conceptualizing and practising leadership. As Schein (1985) wrote: „Leadership is intertwined with culture formation”.

Within New Leadership some of the further trends are Ethical Leadership (Ciulla, 1998; Kanungo, 2001; Brown & Trevino, 2006), Servant Leadership (Greenleaf, 1977; Van Dierendonck, 2011, Coetzer et al., 2017), Authentic Leadership (Avolio & Gardner, 2005; Maric et al., 2013; Bilgetürk & Bajkal, 2021), and Spiritual Leadership (Fry, 2003; Kriger & Seng, 2005; Korazija et al., 2016).

Through identifying ethics as the heart of leadership (Ciulla, 1998) the role leaders play in establishing and reinforcing organizational values became a key issue from ethical perspectives, as well (Gini, 1998; Carlson & Perrewe, 1995; Demirtas, 2015). Servant leadership has identified deep, values-based considerations about followers as a core element of the leadership process. Servant leader behaviors include putting followers first, helping followers grow and succeed, behaving ethically, and creating value for the community. (Liden et al., 2008). Authentic Leadership focuses on whether the leader’s behaviour is genuine, “real” (Northouse, 2019), while Spiritual Leadership describes how leaders can create conditions that increase the sense of spiritual meaning of work for followers (Yukl, 2013; Palframan & Lancaster, 2019; Riasudeen & Singh, 2020).

The attention to the values context of leadership was affirmed, as mentioned above, by the GLOBE scholars. In a search for global cultural differences and relevance

of leadership phenomena it was described how different cultures, view leadership. The research identified globally observable behaviors, namely charismatic/value-based, team-oriented, participative, humane-oriented, autonomous, and self-protective (House & Javidane, 2004). The GLOBE project went on investigating attributes that were universally endorsed by the respondents of a global sample as positive aspects of the leaders’ behaviors. Under this category fall: high integrity, charismatic/value-based, and having interpersonal skills (Dorfman et al., 2004).

By the end of the last century, the term Values-Oriented Leadership (Lebow & Simon, 1997; Prilleltensky, 2000; Lašáková et al., 2019) appeared in leadership research. The term Values-Oriented Leadership can cover different approaches, for example it can identify leadership styles specifically built around certain values, can be used as an umbrella term for various, values-related theories (e. g. charismatic, transformational, servant, authentic, spiritual) or can refer to underlying leadership processes and methods of the transfer of values (Lašáková et al. 2019).

Regarding concepts of values-related leadership processes and methods a definition of values work is offered by researchers Gehman, Trevino and Garud (2013). They use the example of an institution’s honor-code-related actions and processes for investigating organizational reactions to value postulations. They identify values practices and values work as organizational sociological phenomena in the following way. Values practices are „the sayings and doings in organizations that articulate and accomplish what is normatively right or wrong, good or bad, for its own sake...” (Gehman et al., 2013, p. 84). In their definition values work includes „four key interrelated processes: dealing with the pockets of concern, knotting local concerns into action networks, performing values practices, and circulating values discourse.” (Gehman et al., 2013, p. 85; see also Gehman, 2021). In another, less specific definition by Wright et al. (2020, p. 1) values work is „the purposeful effort of actors to create, maintain and disrupt the values of organizations, professions and other institutions”.

Concerning the practice of values-related leadership activities, authors inspired by the aforementioned Institutional Theory report on results from different segments of social and economic life. To take a societal leadership example first, Vaccario and Palazzo examined the impact of values in changing institutions that are highly change-resistant. They report on how values infused by a group of young activists were instrumental in successfully challenging institutionalized practices behind organized crime in a local culture (Vaccario & Palazzo, 2014). From the private business sector Raitis et al. (2021) report on how culture and values can be key drivers of entrepreneurship, and how value conflicts can inhibit entrepreneurial efforts. On the example of a global family firm, they identify three types of values-work, rooting, revitalizing, and spreading.

In a complex case of societal and business, and, also, of organizational, sectoral, and national relevance Raffaelli and DeJordy (2018) give an illustrative example of the leaders' involvement in establishing and maintaining institutional values, too. Studying the recent history of the Swiss watch-making industry, they report on how a balance between values of renewal and stability could be established by key stakeholders of the strategic transformation of the sector for mutual and common economic and societal benefits.

The authors found that the key players were thinking about Swiss national and sectorial historical values in terms of strategic resources. On this conceptual ground a process of social harmonization between guards of the traditions and entrepreneurs for renewal was built for a more effective use of technological resources. The urge for technological innovation provoked by the Asian competition started a „creative refinement” process among the Swiss key actors standing on different platforms. „Together, the combined interaction between entrepreneurs and guardians helped introduce several innovative structural, cultural, technological, and organizational changes to the field of Swiss watchmaking” (Raffaelli & DeJordy, 2018).

Given that values-related aspects in leadership have come into the focus of leadership thinking—as shown by number of theoretical streams referred to in this article—it seems to be paradoxical why these developments have not been more reflected in the generic theorization of leadership, and more concretely, in a more appropriate balance between different leadership definition perspectives in the literature. In other words, a question can be raised why values-related aspects and especially values work as such, have not been more extensively used so far for defining leadership, relative to anchored influence definitions.

In this context a reference can be made to Humphrey's (2014) distinction between two leadership perspectives. The distinction serves a broad categorization of Leadership definitions. As Humphrey (2014, pp. 6-7) writes: „According to a power perspective definition of leadership, leaders command, control, direct, and influence followers to achieve group, organizational, or societal goals”. While „from the leaders as representatives, perspective, leaders are those who (1) best represent the values of their followers and (2) are better at solving their followers' problems and achieving their goals”.

According to the latter perspective: „people emerge as leaders because they are better at articulating the values and desires of the group or are in some way seen as best representing the group.” „... people are often selected for promotion based on the degree to which they represent the organization's core culture and are involved in carrying out the organization's core mission. At the national level, leaders are elected when the public perceives that the leaders share their values” (Humphrey, 2014, p. 7).

Humphrey offers at this point a generic concept of rep-

resentation of followers by the leader. Specific leadership theories interpret the leader's (and h/h's values) being representative of the led group in different ways. Social Identity theory, as for one example, suggests that followers are more likely to trust leaders if they are „group prototypical” (Hogg, 2001; Hogg & van Knippenberg, 2003; Klenke, 2007).

Humphrey also does not specify here how to represent the group from values aspects (for example, what specific types of values to represent, or what concrete processes of values-work to promote). Unlike authors of certain theories in which specific types/sets of values with specifically related practices and processes are emphasized, and/or in which values-related work is only one element/part of the leaders' activities, Humphrey (2014) uses representation, and within that values representation as broad, descriptive terms for identifying a perspective of leadership as such.

To further characterize Humphrey's values representation leadership-definition perspective, it can also be stated that values representation in his—otherwise broad—interpretation is specific in a certain sense. Namely in this values-representation definition approach, he logically emphasizes the representation of the values of followers and puts less direct emphasis on the representation of the values of certain other stakeholders e. g. owners, partners, customers, society, and the leader him/herself.

In summary, the afore mentioned theories have conveyed multiple types of arguments for identifying the leaders' values-related work as a key element of leadership, moreover, offer reasons for laying more emphasis on values and their representation, when defining leadership.

The research spectrum is broad and diverse, and a gap can be seen in the research of the generic descriptions of the values-related work of the leaders in contrast to specific values-related approaches. Also, a gap can be seen in the theoretical evaluation of the balance between the interconnected leadership perspectives: values representation, and power/influence.

Regarding the above-stated need for generalizations and, following Humphrey's (2014) leadership definition approaches this study attempts to reflect on values work from a broad perspective. In this endeavour, more concretely, the aim of this paper is to suggest a generalized notion of values work and to outline certain generic dimensions of it. structure.

For obtaining the targeted results methodologically this theoretical study uses argumentation organised around the identified problems. Beyond that this paper applies methodological elements of analytical framework development. Theoretical/analytical frameworks are parts of conceptual frameworks and are informative about pre-existing theories regarding the research problem. Based on the argumentation organised around key problems identified through literature analysis in chapter 2, a proposal for a generic interpretation of the notion 'values work', as well

as a structured description and an illustrative framework of certain values-work dimensions will follow in Chapter 3.

3 Results

On the theoretical basis laid down in Chapter 2, parts, for a broad definition of values work can be suggested one that would build on both the two sub-perspectives (values-representation and problem-solving/goals achievement) of Humphrey's (2014) leaders as representatives, perspective. Thus, in a broad sense Leadership as Values Work (LaVW) is suggested to mean: Conceptualizing and making personal strategic choices about values and acting as a mover within the dynamic (organizational) processes of (1) identifying/constructing, further elaborating, sharing values, and (2) using them as guiding principles in solving problems and achieving goals.

As can be seen values-related work in the definition proposed in this paper goes beyond the representation of the values of followers, a sub-perspective by Humphrey (2014). Namely it implies the leader's concern on h/h own and other stakeholders' values, as well, including ones that are competing with or controversial to followers' values.

Regarding possible dimensions of Leadership as Values-Work the literature covered in this paper reflects on different topics in leaders' values-related preferences, roles, and activities.

As to the content of the values to be represented or infused by the leader different types of values can be distinguished based on the theories referred to. Certain of these theories (for example Ethical, Servant, Authentic, Transformational) show commonalities in describing how leadership works through partly or wholly given, of external origin, generic, ethically and/or functionally pre-determined sets of societal and organizational values.

Other approaches, like Contingency and Strategic leadership are more open to values urged by instrumental, functional (e. g. actual societal, business-) needs, and, also, ones more open to ways of identifying values through own, internal, customized search. Some theories typically refer to human values in a generic sense (e. g. Ethical Leadership), while some other (e. g. Servant Leadership, Spiritual Leadership) are concerned with more specific types of values.

Regarding the generic components of values work they can be logically grouped as follows: inner (intra-personal) values work, fundamental values work and applied values work. Inner values work can be identified as an intra-personal work on conceptualization, harmonization, and operationalization of own, owners'/governors', and other stakeholders' and generic social values. Fundamental values work can be defined as moving (or participating in the moving of) dynamic group/organizational processes of identifying/constructing, further elaborating, and shar-

ing values. Applied values work is meant to use values as guiding principles in solving problems and achieving goals within the organization/led entity.

Besides the types of values on the agenda and the basic values-work components significant parameters of values work can be historical and present similarities or differences in the values profiles between leaders and followers, peer members, and different organizational groups/units (for example intercultural or other, individual, group or broader level, inherited differences, or similarities). Regarding the values consistency between leaders and followers, for example, we can talk about a high or low values-consistency.

In case of a high consistency the leaders' role can be characterized by a representation of the values of followers, while in case of a low consistency by an infusion of alternative values. As to an opportunity of the leader to infuse alternative values, a reference can be made to the Leadership-Followership Theory of Hollender who described the phenomenon of the so-called „idiosyncrasy credit" offered by followers to the leader as a reciprocation for the leaders' help in defining reality and contributing to the achievement of the group's goals (Hollender, 1954; Goethals et al., 2004).

Different degrees of involvement of leaders, individuals, and groups in initiating and performing formal and informal values-related activities can also be important characteristics. This question is related to strategic choices: representing follower's values vs. influencing followers from a power perspective of leadership; trying to dominate values work vs. setting up a dynamic process of mutual involvement of followers/stakeholders in creating and maintaining values.

As referred to before, authenticity (Avolio & Gardner, 2005; Maric et al., 2013; see also: Northouse, 2019) and credibility (Kouzes & Posner, 2011) are also essential elements of leadership influence.

To summarize, a draft list of basic dimensions of leaders' values work, primarily based on the leadership approaches referred to in this paper, entails the following (see also Table Chart 1):

1. Content characteristics of values – ethical, spiritual, functional, and other values.
2. Level of generality of values to be represented – universal values rooted in societal/(sub)cultural moral consensus vs. specific/local values urged by more instrumental, functional organizational needs.
3. Multiplicity and diversity of values – multiple values of a broad (or indefinite) scope/array vs. less numerous / a narrow, special segment of values (for example: ethical values in a generic sense or related to certain ethical/spiritual concepts, like service, responsibility, specific religion).
4. Origin of values to be represented – imported vs. intra-organizationally generated.

5. Prevalence of values – historical vs emerging or actual created values.

6. Generic components of values work: inner (intra-personal) values work, fundamental values work and applied values work. For working definitions for these overlapping values work components the following are suggested. Inner values work is suggested to mean an intra-personal work of the leader on conceptualization, harmonization, and operationalization of own, owners'/governors', and other stakeholders' and generic social values. Fundamental values work is proposed to be the following: moving / participating in the moving of dynamic group / organizational processes of identifying / constructing, further elaborating, and sharing values. Applied values work can be interpreted as using values as guiding principles in solving problems and achieving goals.

7. Consistency between the values profiles of leaders and followers – high or low consistency.

8. Differences in role distributions / levels of involvement between leaders and followers and other stakeholders in identifying and cultivating values – leader's initiatives and involvement vs. followers' or other parties' dominance in values work vs. multiple initiatives and involvements. Regarding values consistency between leader and followers the leader's role options can be a representation of followers' values or an infusion of alternative values. Infusion of alternative values is enabled by idiosyncrasy credit gained by the leader from the group (Hollender, 1958).

9. Authenticity of the leader's behaviour in representing values (high/low).

10. Credibility implications of the values work (positive/negative).

For integrating the dimensions, a conceptual framework is outlined (see Table 1.). The first five dimensions are included into one column named „Types of values to be represented/infused“. (For values infusion see primarily Hollender, 1958). Dimension 6 is illustrated in the next column, and Dimensions 7, 8, 9, 10 are shown in further columns, respectively.

4 Discussion

For leadership influence traditional (legitimate power, traditional rewards and punishments, expert power, information, etc.) and non-traditional (New Leadership, i.e., ethical, neo-charismatic, transformational, etc.) power sources can be used. The use of traditional (e. g. transactional leadership) sources is highly limited in certain situations. Certain contingencies not only allow but enforce the use of non-conventional means of influence. Behind non-conventional means of influence clear and shared values, authenticity and credibility are immanent in the New Leadership paradigm. Leadership influence and values work have never been separable but the need for non-con-

ventional means has made the role of values work more visible and central in leadership influence.

The nature of the relationship between leadership and values can vary according to sectoral, organizational, and other contingencies. In societal leadership, for example, values work is more evident than, for example, in business organizations. Nevertheless, a certain shift from influence perspective to values work perspective is urged in business leadership, too. Especially in the last decades certain contingencies have made leaders move towards non-conventional means of influence to be effective in business organizations, as well. Consequently, the problem of influence in organizations, including business organizations, boils down in a good part to values-related issues of leadership. Values-related work deserves more emphasis in defining the phenomenon of Leadership, because credibility and authentic leadership behaviors are key conditions for Leadership success, and they certainly are in close connection with the level of values consistency between leader and followers. Values work is specifically defined by different authors. The Leadership as Values Work (LaVW) framework presented in this paper offers a broad interpretation of values-related leadership considerations and activities.

Some ethical, values-oriented leadership approaches are criticized for being normative and self-explanatory in literature (see, for example, Antonakis & Day, 2018). The LaVW framework is descriptive and not normative. For example, it does not exclude, that in bad cases, the content of different, espoused and lived, values might – unfortunately – be unethical, or dysfunctional (under the list item 'Other'). Moreover, if the negative values would in given bad cases meet the will, acceptance and support of followers, leadership might – unfortunately, and paradoxically – be 'authentic' and 'credible' in doing bad. Consequently, there is a danger of potential misuse of leadership tools (see, for example the problem of pseudo-transformational leadership, Bass & Steidlmeier, 1999, and narcissistic leadership, Alhasnawi & Abbas, 2021). I personally share the view that the danger of potential misuse should only multiply the efforts of scholars, administrators, and others related to present and report on concepts and examples of ethical and functional uses, and to fight against the danger and realities of misuse.

Values perspectives in Leadership are essential in further studies and clarifications of the (theoretical and practical) line between Management and Leadership, because Management is often associated with conventional tools of administration and cognitive/rational excellence in solving organizational problems and achieving goals, while Leadership is often linked with the use of non-conventional means of influence and, consequently, the representation/infusion of values behind rational solutions and factual results.

5 Conclusion

The primary goal of this study was to outline certain generic dimensions of values work. For identifying generic dimensions, a broad definition of leadership as values work (LaVW) was used, and an illustrative framework showing the dimensions in a logical structure was created. The targeted results have been obtained through a historical review and analysis of several underlying theoretical concepts and generalizations from values-related leadership approaches.

Leadership is traditionally defined from perspectives of power/influence, while values representation can be conceived as another definition perspective (Humphrey, 2014). As noted earlier the two aspects are highly inter-related. This paper emphasizes the – by the literature –relatively neglected values-representation perspective and approaches leadership as values work (LaVW). The description of LaVW offered by this paper is based on an extended and generalized interpretation of the ‘values representation’ leadership definition perspective by Humphrey (2014). Furthermore, the present study contributes to the literature by outlining certain generic values-work dimensions with references to underlying theories, as well as by offering a structure and an illustrative framework for these dimensions. Such dimensions include the following: characteristics of the values represented; values-profiles consistencies between leaders and followers; components of values-representation leadership behaviors; role distributions in values-representation processes; authenticity of related leadership behaviors; and credibility implications of values-representation.

A conclusion from this study is that generic problems of leadership values and values related work deserve more attention in future research. There is a need for more generalizations that go beyond analyses of the relationship between specific types/sets of values with specifically related values-oriented practices and leadership influence. Such generalizations are needed for a better understanding of the leadership phenomenon, moreover, for further developing the definition(s) of leadership from a values/values-work perspective.

A practical conclusion of this paper is for leaders for whom it is necessary to find a balance and synergies between values representation and power/influence perspectives while pursuing their different political, economic, social etc. goals in practice.

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Oris določenih generičnih vrednosti – dimenzij dela

Ozadje/namen: Vprašanja, povezana z vrednotami, so zadnjih nekaj desetletjih prišla v središče razmišljanja o vodenju. Zdi se pa paradoksalno, zakaj vrednote dela doslej niso bile v večji meri uporabljene za definiranje in konceptualizacijo vodenja. Razlog za to je lahko, da vrednotno usmerjeni raziskovalni tokovi običajno pristopajo k vodenju s specifičnih vidikov predstavljanja in prenosa vrednot. Druga možnost je, da ta študija preučuje delo vrednot z splošnega vidika; njen cilj je predlagati posplošeno pojmovanje vrednotnega dela in orisati nekatere generične vrednotno-delovne dimenzije.

Metode: Analiza v tem teoretičnem prispevku temelji predvsem na institucionalnih teorijah, teorijah novega vodenja in teorijah vrednot. Metode vključujejo argumentacijo in razvoj analitičnega okvira.

Rezultati: V študiji smo opredelili strukturiran seznam in ilustrativni okvir za nekatere razsežnosti delovanja vrednot, kot so široko opredeljene. Zato ima ta študija raziskovalne implikacije glede vprašanj vpliva vodenja in razmejitve vodenja od upravljanja.

Zaključek: Poudarjen je pomen zastopanja vrednot v nasprotju s perspektivami moči/vpliva pri vodenju. Naša študija kaže na potrebo po več raziskavah o generičnih vidikih delovanja vrednot. Rezultati se lahko uporabijo tudi za vodenje, svetovanje in razvoj.

Ključne besede: Vodenje, Perspektiva moči/vpliva, Novo vodenje, Zastopanje vrednot sledilcev, Institucionalna teorija, Vrednotno usmerjeno vodenje

AUTHOR GUIDELINES / NAVODILA AVTORJEM

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