Decentralizing Knowledge Management: Affordances and Impacts - Revisited

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Abstract: This paper updates a 2019 EJKM article (Electronic Journal of Knowledge Management). Rather than divergently analysing and differentiating knowledge management (KM) perspectives of real-world observations, the two publications aim for a convergent synthesis of corroborated models and terminologies to provide a holistic systemic base for comprehension and system design. Based on conceptual analysis and design science research, the original paper amalgamated twelve renowned models of dynamic knowledge creation in a three-dimensional 'public-transport-like' map. This update integrates four further models; it also demonstrates the map's application for benchmarking the affordances of a more knowledge-worker-centric KM System approach (KMS) currently developed as a digital knowledge co-creation platform in a start-up environment. To attest to the platform's mission for serving community members typified by diverse individual abilities, contexts, means, and ends (ACME), its envisaged functionalities were aligned to the map's pathways to identify unserved areas as well as verify compliance with requirements of KM standards and practices. Accordingly, this paper contributes to the intersection of KM, KMS design, and digital transformation (including educational technologies). As part of a longitudinal stream of research and publications, it also provides feedback on lessons learnt experiences often lacking in the KM and KMS fields corpora and may inspire or warn other scholars and entrepreneurs attempting to switch from path dependencies to path creation.

Keywords: Knowledge management, Dynamic knowledge management models, Digital platform ecosystems, Personal knowledge management system (PKMS), Knowledge co-creation, Memetics, Boundary objects (BO)

1. Dynamic Knowledge Management Model Mapping

Traditional theoretical lenses at the heart of current organizational knowledge management approaches have been explored in a EJKM-article (Schmitt, 2019a) covering twelve renowned dynamic models of knowledge creation. Rather than focussing on their particular differences, the conceptual analysis and design science research (Schmitt, 2016) focused on their complementing features and visualized them in a three-dimensional dynamic 'public-transport-like' map as an expanded version of Boisot's three-dimensional information or I-space (Boisot, 2004). Table 1 and Figures 1 and 2 modify the original representations as follows:

- Four more models have been added (m-p) to all three exhibits.
- The Figures' colour scheme has been modified together with some minor spatial adjustments to better accommodate the extended visualizations of the added systemic features.
- The amended original 3D-Map has been flipped horizontally to better fit flows and logistics.

Table 1: Integration of 16 Knowledge Creation Frameworks; based on (Schmitt, 2019, table 2) with m-p added

Legend (copied also in Figure 1):		Table & Figure	
Knowledge Creation Theories/Models:	**Sources:**	**T:1**	**F:234**
Information-Space, SLC, Knowledge Assets	(Boisot, 2004)	a	a
SECI-Spiral, Ba, Knowledge Assets	(Nonaka and Takeuchi, 1995; Nonaka, Toyama and Konno, 2000)	b	b, d6
Three Worlds	(Popper, 1978; Gaines, 1989)	c	c
'Seven Waterfalls', ARME, and OEAM Spirals	(Wierzbicki and Nakamori, 2007b, 2007a; Nakamori, 2011)	d	d, d0-d9
Foraging and Sensemaking Process	(Pirolli and Card, 2005)	e	e
Experiential Learning Model	(Kolb, 2014)	f	f
Holistic KM Framework	(Yang, Zheng and Viere, 2009)	g	g
Tacit and Explicit Knowledge	(Collins, 2010)	h	h

Self-Transcending Knowledge	(Uotila and Melkas, 2008)	i	i
Inferencing: Abduction Induction Deduction	(Shank and Cunningham, 1996; Chow, Jonas and Schaeffer, 2009)	j	j
Cumulative Synthesis	(Usher, 1954, 2013)	k	k
Memetic Evolution	(Dawkins, 1976, 2006)	l	l
Extended C-K-Design Theory	(Carvajal-Pérez *et al.*, 2018)	m	m
Orders of Ignorance	(Armour, 2000) aligned to (Kerwin, 1993; Schamanek, 2012)	n	n
Minimal Viable Product (MVP)	(Dennehy *et al.*, 2019)	o	o
Exaptive Bootstrapping	(Lane, 2011, 2016)	p	p
# Letters correspond to notions (table 1, fig. 2, 3, 4) and cycle phases (Figure 1) which may be followed by a lower capital letter to indicate sequence or sub-notions depicted.			

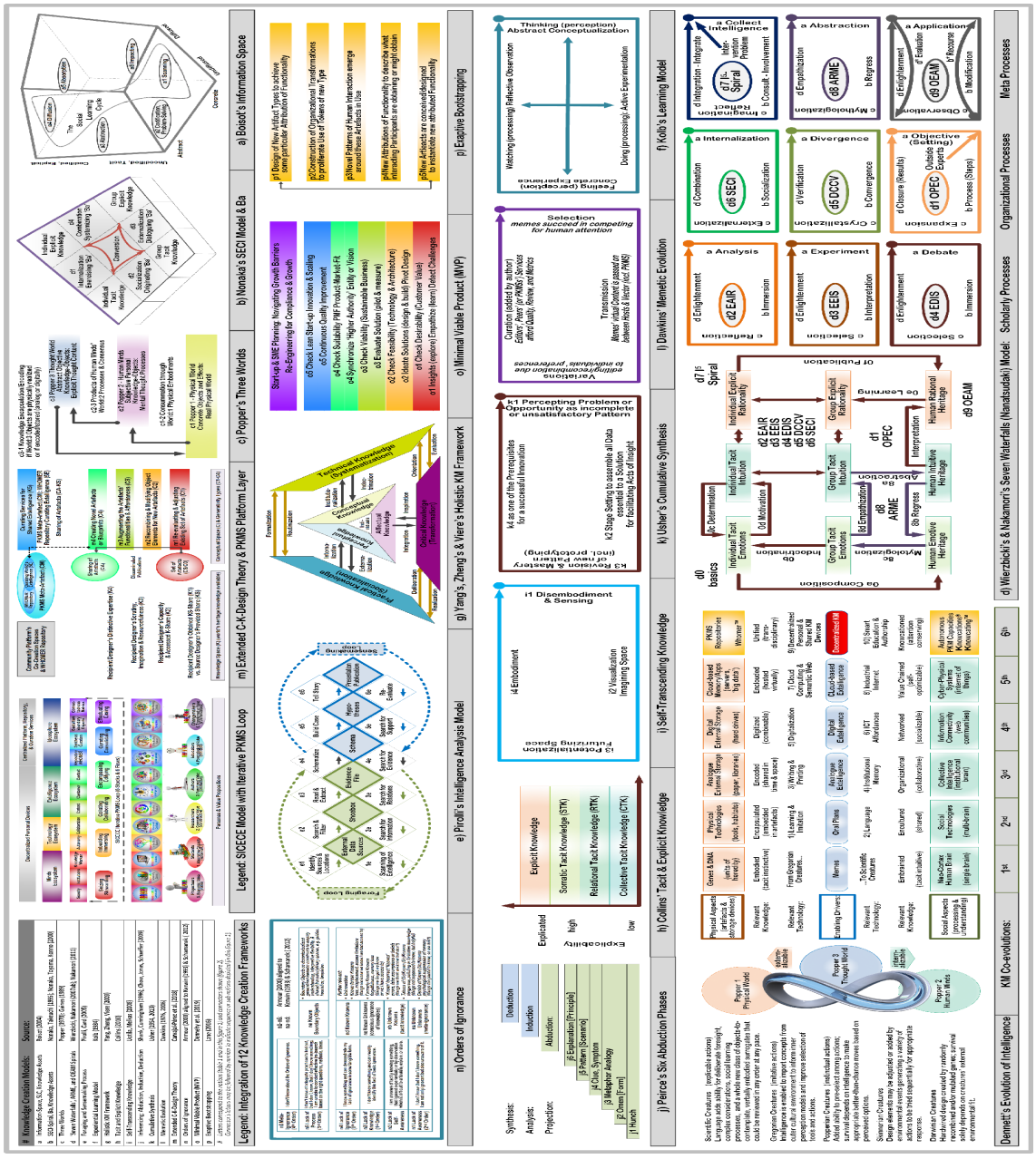

Figure 1: Extended original mapping of individual dynamic KM models (based on (Schmitt, 2019, Figure 2))

Figure 1 depicts the models covered in Table 1 individually, while Figure 4 provides the full 3-D mapping (synthesized theoretic dynamic KM model with their application in platform for knowledge co-creation). As even a full-page coverage presents a dense visualization, figures 1 and 4 are available in high-density poster format on the author's site for download (https://www.researchgate.net/profile/Ulrich-Schmitt/research). They are supplementary resources attached to this paper, and figure 4 is further provided as a version only showing the models and as a transparent overlay of the application (see thumbnail figures 2 and 3). Although the thumbnails 2 and 3 are illegible, their combined figure 4 and the downloads provided are, so the text further refers to them. With the downloads available, textual details have been added in smaller fonts.

The aim of the original article was to highlight the synergies between the dynamic KM models and to portray the intellectual capital landscape as a dynamic, multilevel, and complex ecosystem. It further served to 'think outside the box' of organizational knowledge management systems (OKMS) for easing the positioning and conceptualization of personal knowledge management systems (PKMS) approaches. OKMSs can be described as monolithic, centralized, top-down, heavy-weight, high-investment-and-maintenance systems with a fairly homogeneous user/client-base and a lacking integration of content-and-collaboration-focussed KM schools (as described by Earl's taxonomy (Earl, 2001)) (Schmitt, 2023).

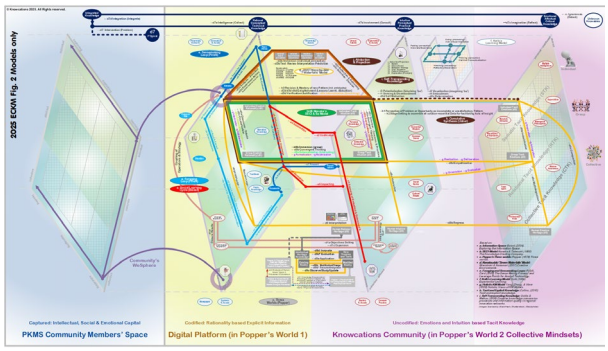

Figure 2: Modified original 3D-mapping of dynamic KM models (based on (Schmitt, 2019, Figure 3)

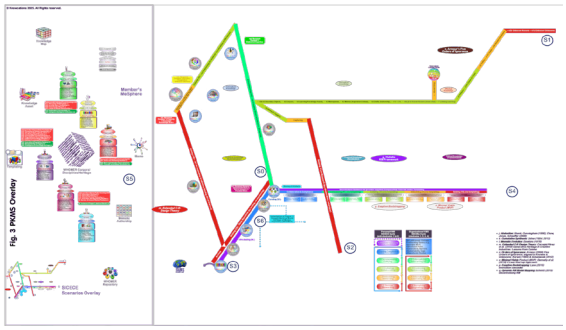

Figure 3: Overlay to be superimposed on original Mapping (Figure 2) for Consolidated Map (Figure 4)

The PKMS/CoCreation-Platform mission aims for an innovative KMS type of distributed, decentralized, bottom-up, affordable, knowledge-worker-centric application prioritizing personalization, mobility, generativity, and entropy reduction; its goal is to serve a knowledge-co-creating community characterized by highly diverse abilities, contexts, means, and ends (ACME) (Schmitt, 2023) facing increasingly volatile, uncertain, complex, and ambiguous challenges (VUCA) (Mack *et al.*, 2016).

As the research, design and prototyping have progressed (with a start-up complementing the academic project), it seems fitting to revisit and augment the original mapping to illustrate how the novel approach supports and impacts the various 3D-map-levels, from individual and team to institutional and societal scales. Visualizing the dynamics and interconnectedness of the digital ecosystem elements does not only guide and validate the development efforts but also establishes chains of evidence for compliance with standards. Although the PKMS differs considerably from OKMSs, a recent article (Schmitt, 2022) made the case that the maiden ISO 30401:2018-KMS Standard is still applicable (ISO.org, 2018); equally applicable is the recently introduced DQ standard (IEEE, 2021; DQ Institute, 2024) with its thirty-two 'Digital Intelligences' supporting sustainable personal and community development.

In addition to supporting the conceptual and visual communication, the contributions of this paper align theory, research, design, instantiation, and operational considerations and provide an updated boundary object (map) to analysts, designers, and implementors facing similar development and documentation complexities. The paper is structured as follows: After briefly recapitulating the prior dynamic KM models utilized (2.1), the adapted emphasis on former and new models is highlighted (2.2); an overlay is introduced to be superimposed on the existing map representing the PKMS internal and external flows and affordances as distinct user-related application scenarios (3.0-3.6), to be followed by a look at impact with conclusions (4).

2. Consolidated Dynamic KM Model Perspective

The initial map's "topography emphasizes how the models represent the external environment in which the PKM devices are expected to operate in and which of the workflows suggested are suitable for supporting the internal PKMS processes". Its initial aim has been "to proactively ease the challenging tension between the PKM and OKM perspectives […] for gaining system acceptance, [for] providing transparency of existing approaches with their shortcomings, and [for] instructions and visualizations of how new features fit into the current KM landscape" (Schmitt, 2019a, pp.115-116, 118).

2.1 3D-Map's Layout with Initially Integrated Twelve Models

This sub-section cites the introduction of the applied model layout (Schmitt, 2019a, pp.118-119); further details concerning the initial twelve models (a-l) are provided in the EJKM article. Due to the horizontal flipping of the map the positioning of components needed to be adjusted as indicated with [square brackets]:

- *Layout-defining Models:* "Boisot's three-dimensional Information-Space [a] forms the base of Figures [2, 3, and 4]. With its codification axis tipped horizontally and divided in four sections (from left to right: [captured: PKMS intellectual, social & emotional capital; codified: rationality based explicit information; uncodified: emotions and intuition based tacit knowledge]), its diffusion and abstraction axes provide the lattices for positioning the other eleven notions [b-l]. However, only Boisot's Social Learning Cycle (SLC) [a] and Pirolli's and Card's Foraging and Sensemaking Loops [e] align to the latter axis (from concrete to abstract) and appear dispersed over the full sections, whereas the remaining models are all placed in the middle of the abstraction axis and spread only across the diffusion dimension (from top to bottom: undiffused-individual, diffused-group, diffused-collective-organization-community-society). Eight icons (octagons) symbolize the relevant knowledge types in each corner (in line with the tacit/explicit, concrete-abstract, and diffused/undiffused combinations) supported by the exemplification of knowledge assets (ellipses). The three segments along the diffusion axis of the left section (uncodified-tacit-emotional) also corresponds to Collins' differentiation of tacit knowledge and its explicability [h]. Kolb's Experiential Learning Model [f] is displayed at the top between the two [right] sections to avoid illegible overlays, while Popper's Three Worlds Notion [c] is placed at the mid bottom and linked to the notions of Heritage Knowledge".
- *Transcending KM Models:* "Wierzbicki's and Nakamori's Spirals [d] which integrate Nonaka's SECI-Spiral [b] are stretching from top to bottom across all the three [right] sections. Yang's Holistic KM Framework complements the map by adding terminology and further connections [g] although some terms (namely: internalization, externalization, and indoctrination) are used differently. Uotila and Melkas link self-transcending knowledge [i] to the SECI Spiral by incorporating processes of disembodiment (sensing) and embodiment (located between the two left individual tacit sections) for visualizing (imagining 'ba') and subsequent potentializing (futurizing 'ba') the presence of potentials which do not yet exist. This emphasis on intuition leads straight to Shank's and Chow's conception of abduction with its six levels of inference [j] complementing the induction and deduction approach."
- An introduction of the *PKMS-shaping Models* (Usher's Cumulative Synthesis [k] and Dawkins' Memetic Evolution [l]) and of their *Memetic PKMS Context* is provided in the EJKM-article (Schmitt, 2019a).

2.2 Adapted Emphasis and Added Models

Further emphasis has been placed on model (g) Holistic KM Framework (HKMF)' (Yang, Zheng and Viere, 2009) as its terms and landscape supports the further segmentation as well as integration of the scenarios to be presented in section 3. With its focus on change, the HKMF provides a compass for navigating the interdependent technical (TK: explicit), practical (PK: tacit intuitive), and critical (CK: tacit emotional) knowledge domains.

The model m (Extended Concept-Knowledge Design Theory (CKDT) (Carvajal-Pérez *et al.*, 2018)) was not known to the author at the time of publishing the EJKM article. It segregates the CKDT approach into four steps which closely match the first four phases of the PKMS's SICECE cycle (see section 3.0). Its empirical findings motivating the CKDT's four-step-framing-refinement were based on a case study of three famous French "cuisine books, written by important chefs that were eager to share their knowledge heritage and generativity with their colleagues". The results promote the notion of "transfer of resources for creativity" by applying known objects in the "elaboration of still unknown objects" and by sharing knowledge resources as well as the capacities to use them ("creative spirit") (Carvajal-Pérez *et al.*, 2018, p.1523,1524 ; Schmitt, 2020).

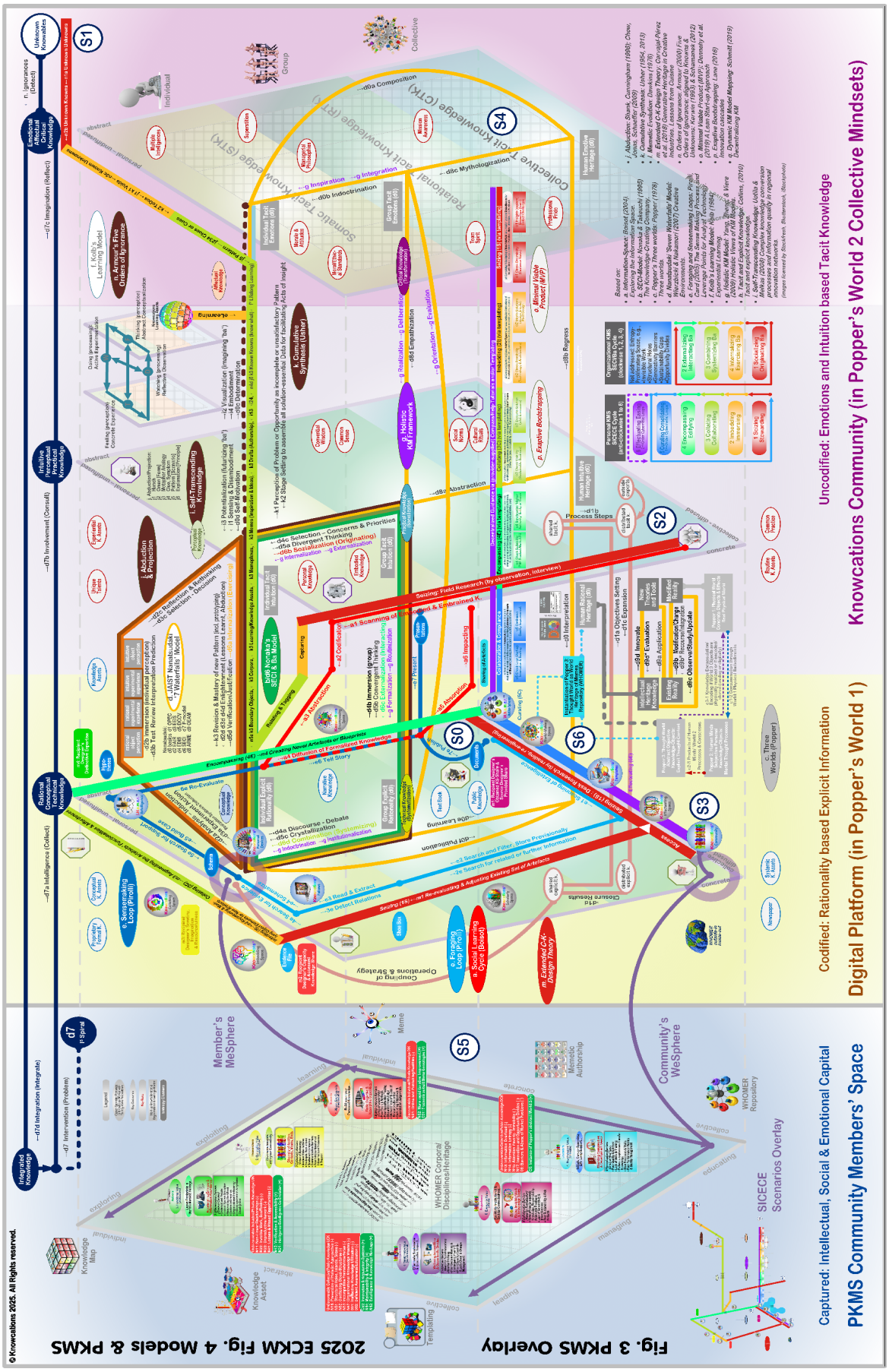

Figure 4: Original Mapping (Figure 2) with superimposed Overlay (Figure 3) based on (Schmitt, 2019a)

This creative-spirit-transfer-notion augments the concept of boundary objects (BO), defined as decontextualized generalized memetic constructs to amplify understanding, interpretive flexibility, and shared transdisciplinary spaces, e.g. guides, heuristics, templates (Star, 2010; Schmitt, 2020). The provision of BOs is a recent addition to the scope of PKMS features and is currently being integrated in the prototype. It is represented in the map as the S4 scenario (see section 3.4). The other three models (n, o, p) have been added to provide further insights and/or examples for the scenario presented in 3.1 (S1: *Individual Generativity and Creativity*). Scenario S1 extends the stand-alone or community version by focussing on generative and creative authorship. The relevant flows are depicted in the top-right sections utilizing three added frameworks (nop):

- (n): The original Ignorance Matrix (Kerwin, 1993) and Ignorance Map (Schamanek, 2012) to cross-reference Knowns and Unknowns have been expanded as 'Orders of Ignorance' by integrating process knowledge (Armour, 2000). It examines the dynamics of learning, knowledge transfer and wastes and provides a metaphor for self-reflection and managing the development of self and others.
- (p): The exaptive bootstrapping dynamic is addressing "cascades of changes in agent-artefact space" which "inextricably link innovations in artefacts, in organizational structure, and in attributions about artefact and organizational functionality" (Lane, 2011, pp.7-8). Its fourth step links with model k (Cumulative Synthesis (Usher, 2013; Schmitt, 2019b)) and, hence, adds a further dimension to the PKMS's meme-based constructivist knowledge asset/artefact/repository approach.
- (o): A recent case study suggested to amend the original Minimal Viable Product (MVP) heuristic to more easily liaise and 'synchronize' between lean-start-ups and partnering larger organizations (Dennehy *et al.*, 2019). The revised model has been added to exemplify a problem-solving and design-supporting approach and the boundary-object-logistics referred to. It adds one more dimension to the other iterative patterns which apply to both academic and entrepreneurial innovation spaces.

3. PKMS Overlay Representing a PKMS Base and six Application Scenarios

Figure 3 depicts and 4 integrates the overlay representing a PKMS base scenario S0 (users' internal iterative system flows) together with external application scenarios (S1-S6) to be detailed in the six sub-chapters. The visualized PKMS flows adopt the underlying dynamic KM model cycles (as seen in Figure 4's consolidated mapping). They detail the initial 'PKMS (Popper's concrete World 3)' section (left-hand Figure 2) which has been substituted to depict the fifth scenario termed 'PKMS Community Members' Space' (left-hand Figure 4).

The legend for the six-colour-wheel-code is shown in the middle lower section of Figures 2 and 4 headlined 'Personal KMS'; it depicts the (anticlockwise cycle 1 to 6) PKMS's SICECE cycle (Seizing, Imbedding, Collating, Encompassing, Curating, and Effectuating). On its right side, the clockwise SECI/Ba cycle (depicted as model b (Nonaka, Toyama and Konno, 2000) has been added for information only; the SICECE and SECI/Ba differences and synergies have been covered in prior publications (Schmitt, 2022).

The *base scenario S0* in the yellow section is represented by a quadrilateral which represents the SICECE phases as colour-referenced in the legend just referred to:

- 1 Red – Seizing: e1/1e e2/2e e3/3e m1 Re-evaluating & Adjusting Existing Set of Artefacts,
- 2 Yellow – Imbedding: e4/4e m2 Recombining & Modifying Object Elements for New Artefacts,
- 3 Light Green – Collating: e5/5e m3 Augmenting the Artefacts' Functionalities & Affordances,
- 4 Green – Encompassing: e6/6e a4 m4 Creating Novel Artefacts or Blueprints,
- 5 Blue – Curating - specific to PKMS centralized platform services (section 3.6),
- 6 Purple – Effectuating - specific to PKMS centralized platform services (section 3.6).

Bullets 1-4 are system interface options to be iteratively performed by the user during learning and authoring processes; they have been conceptually and empirically validated by complying with KM models e and m (Pirolli and Card, 2005; Carvajal-Pérez *et al.*, 2018) and also contribute to the I-spaces diffusion phase (a4).

While the decentralized steps 1-4 operate on the users' personal content (MeSpheres), the centralized steps 5-6 iteratively consolidate and curate the users' shared content (see 3.6) and make it in-turn available to the community together with added services (see 3.5).

The base scenario is common to all following scenarios as they mainly differ in the way content and knowledge may be obtained by the user. In the base scenario, the most basic PKMS version enables a user to obtain content and information via own enquiry from the outside world and to capture it in the PKMS MeSphere (depicted as the bottom-line 'Seizing: Desk Research (by reading, re-engineering' (e1/1e); it offers just a stand-alone version without the benefits of networking, sharing, and centralized services.

3.1 Scenario 1: Individual Generativity and Creativity

S1 extends the stand-alone or community version by focussing on generative and creative authorship. The relevant flows are depicted in the top-right sections:

- 1 Red – Seizing: ← n2b Unknown Knowns, ← n1a Unknown Unknowns,
- 2 Yellow – Imbedding: ← k2 ToDos ← j1 k1 Voids ← n3c Known Unknowns,
- 3 Light Green – Collating: ← j5 Clues or Cues, ←j234 Pattern,
- ← n4d j6 k3 Known Knowns (know what) ← f* Lifelong Learning)
- ←i3 Potentialization (futurizing 'ba') ←i1 Sensing & Disembodiment
  [→ i2 Visualization (imagining 'ba')] [→ i4 Embodiment]
- ← k3 Memes (Inspiration & Ideas), ← k3 Drafts (Authorship),
- ← k3 Learning/Knowledge Assets, ← k3 Memeplexes,
- ← n5e k3 Boundary Objects, ← k3 Corpora,
- 4 Green – Encompassing: same as in base scenario.

Bullets 1-3 depict the generative and creative value chain of individual knowledge workers starting with the awareness of one's ignorances over lifelong learning activities towards the creation of multifaceted documents (n (Armour, 2000; Kerwin, 1993; Schamanek, 2012); f (Kolb, 2014); j (Shank and Cunningham, 1996; Chow, Jonas and Schaeffer, 2009); k (Usher, 1954)). It also integrates not yet existing potentially utilizable self-transcending knowledge to emerge in the future (i (Uotila and Melkas, 2008)). The PKMS supports the incremental iterative knowledge detection and creation by providing dedicated storage and tags to strengthen cumulative knowledge synthesis from initial void to ever more complex artefacts.

3.2 Scenario 2: Field Research involving External Agents and Environments

S2 extends the stand-alone or community version by focussing on conducting hands-on field research with peers, other agents, or stakeholders in the external environment. The relevant flows are depicted in the middle bottom-up section:

- 1 Red – Seizing: Field Research (observing, interviewing), ←a1 Scanning Embodied/Embrained K.,
- 2 Yellow – Imbedding: Capturing ←a2 Codification,
- 3 Light Green – Collating: Relating & Tagging ←a3 Abstraction
- 4 Green – Encompassing: same as in base scenario.

Bullets 1-3 depict field-research-related activities which correspond best to the I-space's initial phases (a123) (Boisot, 2004). To accommodate this work, the PKMS is able to provide community-shared classification, tagging, and reference lists covering, for example, research subjects (e.g., research fields or socio-economic objectives), industry sectors (e.g. standard industrial classification codes), spaces (e.g., countries, zones, regions, cities, locations, languages, or organizations), and meta-services (e.g., research fields, courses, disciplines classification codes or activity types) which are further extendable by the users.

3.3 Scenario 3: Tapping into the Community's WeSphere

S3 is based on the PKMS community networking option and relies on the centrally consolidated and curated content voluntarily shared by users or offered as part of the provider's services (steps 5-6 in section 3.6). The relevant flow is depicted in the lower yellow section from where it connects to the left blue section representing the PKMS's knowledge base (see 3.5).

- 1 Red – Seizing: Access - specific to PKMS centralized platform services (section 3.6).

3.4 Scenario 4: Provision of Boundary Objects (BO)

S4 is based on the need to overcome barriers to knowledge access and creation. The newly added model m (Extended CKDT Model (Carvajal-Pérez *et al.*, 2018)) has been introduced in section 2.2 and 3.0; it empirically and conceptually determined (in regard to creative-spirit-transfer-proficiencies in the top-culinary-book-space) also substantiates the base scenario of the PKMS's digital space.

The enriching of the PKMS solution pursued involves the creation of BOs (in the initial phase just by the provider) so that users do not have to compose complex document from scratch but are guided and provided with assistance and examples all the way. One of the current cases involves creating a BO for system design documentations which is tested by crafting the specification for the PKMS itself. In this paper, model p and o have been added to the map to demonstrate the general principle. The flows depicted from the bottom-right

to the bottom-yellow section exemplify these KM-and-startup-related models o 'Minimal Viable Product (MVP)' (Dennehy *et al.*, 2019) and p 'Exaptive Bootstrapping' (Lane, 2011):

- 1 Red – Seizing via templating: p1 Conceiving and designing of new artefacts as virtual or physical embodiments for instantiation of newly attributed functionalities/affordances and feedback; o1 Insights (explore) Empathize (learn) Detect Challenges - Check Desirability (Customer Value)
- 2 Yellow – Imbedding via templating: p2 Designing/authoring new artefact types to achieve attributions of functionalities evidenced by content to investigate, innovate, inform, entertain; o2 Ideate Solutions (design & build) Pivot Design - Check Feasibility (Technology & Architecture)
- 3 Light Green – Collating via templating: p3 Constructing transformations [utilizing existing structures, functions, and processes for diffusion (e.g., conferences, publications, web pages)] to proliferate use of tokens of new type by ensuring availability, diffusion, and understanding; o3 Evaluate Solution (pilot & measure) - Check Viability (Sustainable Business)
- 4 Green – Encompassing via templating: p4 Novel interaction patterns [comprehension by audiences for discourses] emerge [altering prior perceptions to trigger new insights] around the artefacts in use [by also promoting other referenced sources and related ideas]; o4 Synchronize 'Higher Authority' Entity or Vision - Check Suitability PMF Product-Market-Fit
- 5 Blue – Collaboration & Compliance: p5 Generating new attributions of functionality by modifying elements and relationships via desk or field/lab research for describing outcomes by participants or observers and by testing newly devised content, blueprints, physical model; o5 Continuous Quality Improvement - Check Lean Start-up Innovation & Scaling

Bullets 1-5 exemplify how methodological guidance and entrepreneurial practices may be linked to generative authorship and design processes for further assisting and supporting cohorts, teams, or institutions including start-ups. The relevance of this PKMS feature is further addressed in section 3.5.

3.5 Scenario 5: The PKMS Community Member and Solutions Space

S5 is based on the client-based segmentation of the envisaged community. The goal is to serve a membership typified by highly diverse abilities, contexts, means, and ends (ACME) as well as to enlist and retain those members to achieve scaling and network effects (Cantner and Vannuccini, 2012). Rather than opting for a separation of customer segments, the PKMS recruitment and retention approach is focussing on career-spanning personas. By fitting the top-individual to bottom-collective partitioning of the map, the left blue upper section introduces three primarily self-focussed personas:

- 1. Students and Life-Long Learners eager to utilize community-shared content for fostering their own personal knowledge and ambitions,
- 2. Researchers who may engage in discourses to co-create new insights with their peers and community,
- 3. Authors who may further share their own novel contributions for leaving footprints in the world's memetic heritage.

While continuing to benefit from these affordances, the personas placed on the left blue lower section may also decide to step outside their personal comfort zones to take collective responsibility for empowering others or engage in matters of transcendental or altruistic impacts:

- 4. Educators for supporting their cohorts,
- 5. Projecteers for managing their teams or entrepreneurial endeavors,
- 6. Changemakers for leading campaigns, institutions, or society.

The sequence of these six personas further represents progressing career roles. As presented in the blue section, each persona has been furnished with specific further attributes including its key value proposition, its key outcome, and its key risks. From the systemic design perspective, each ascending level contributes its own progressing needs, wants, and desires which can be translated into specific functional requirements, physical design parameters, and operative services and performance indicators (which are all informing the system design documentations elaborated on in scenario S4).

The introduction of boundary objectives allows to substitute the main persona-career-steps-construct with other ascending-stepladders; as an example, the areas below the six personas show start-up growth barriers with their challenges of organizational knowledge wastes (Ferenhof, Durst and Selig, 2015). This flexibility

provides the basis for boundary-object-solutions which may address and benefit other entities than just the personas (like start-ups or SMEs who currently also lack access to affordable KMS).

3.6 Scenario 6: The PKMS's World Heritage of Memes Repository (WHOMER)

S6 focusses on the novelty of the knowledge connectedness facilitated by the cloud-based services which consolidate, curate, and feedback the voluntarily shared content and knowledge by and to the community members. Collective viabilities and advances depend on innumerable small knowledge-based 'nano-actions-and-contributions' by individuals (knowledge workers) which govern, if effectively combined, institutional and societal performances (knowledge economy and society) (Wiig, 2011). The PKMS's continuous iterative sensemaking and sensegiving cycles (as presented in scenarios S0 to S5) ensure that chronological chains (as-built genealogies) of original memes and their revised versions are utilized and repurposed by decentralized devices, while the centralized services – after eliminating redundancies and fusing traceabilities – aggregate the shared content and safeguard the associative memetic integrity of its knowledge base, termed World Heritage of Memes Repository (WHOMER). The relevant flows are depicted in the middle bottom-up section:

- 5 Blue – Curating: c* d0 d9* Instantiation of Popper 3: Thought World as WHOMER
- 6 Purple – Effectuating: - specific to PKMS centralized platform services.

In the real-world of models c (Three Worlds (Popper, 1978)) and d9 ('OEAM Spirals' (Wierzbicki and Nakamori, 2007a)) existing and modified realities are studied (c1-3, d9c) to update the heritage knowledge by creating an ever-increasing, attention-consuming, scattered, and entropic information abundance (c3-1). New hypotheses and tools are created (d9d) and evaluated (d9d*), applied and tested (d9a), to incrementally or radically change the reality (d9b, d9b*) in an iterative end-and-relentless cycle.

While most of these flows are also taken place in the (digitally-twinned) decentralized PKMS devices, the PKMS's platform component acts as a game changer: Its memetic knowledge base is constructed to evolve into a "steadily growing (expanding community sharing existent and novel content), single (cloud-noSQL-based), unified (transdisciplinary), negentropic (redundancy-eliminating), concrete, tangible, accessible, and interrogatable archive of an up-to-date knowledge heritage" (Schmitt, 2021, p.16). Consequently, Popper's abstract non-interrogatable World Three is transformed into its concrete tangible interrogatable WHOMER counterpart.

4. Projected Impact and Conclusions

The paper and mapping attempted to demonstrate the PKMS design's versatile potential to cater for people and knowledge connectedness. It argued that the benefits for knowledge workers provide value by supporting their absorptive capacities, generativity, functional facilities, psychological resilience, economic well-being, and transformative muscle (representing the personas' value propositions). A paper-under-review also exemplifies the synergies with the SDG's inner development goals, circular economy, and industrial symbiosis; a paper-in-press presents the platform as a construct of multiple twins. In the latter, the applied metaphor of memes as living organisms (able to represent not only abstract content but the aboutness of concrete agents and entities) is a key factor; it also allows for the repurposing and integration of further dynamic models (for example, from the organizational learning domain) in the future. A patent application is also envisaged.

The scope of this paper has been determined (and limited) by the visuality of mapping sixteen renowned KM-related dynamic models. However, prior papers and articles have already applied other complementing PKMS perspectives which in-turn informed the design efforts and mapping's interpretations, including fore-and-backcasting, visioneering and change, digital platform ecosystems, technologies and AI, entropy and scalability, evolution and sustainability, transdisciplinarians and entrepreneurship, and the future of work and education.

The original EJKM article highlighted the "knowledge worker's central position (marked by a transparent purple donut in the individual segment of the codified-explicit-rational section) [which theoretically] affords him/her full access to the methodological processes described" (Figure 1) (Schmitt, 2019a, p.11). The donut remained in the same position (Figure 4), but the knowledge worker may finally be provided with an adequate tool to use his/her potential - as the World development report (World Bank Group, 2016, p.2) summarized: While "digital technologies have been spreading, digital dividends have not".

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