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Verksted—A Networked Space for Collaborative Sense-Making

D'Silva, Francis

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Verksted—A Networked Space for Collaborative Sense-Making

Francis D'Silva

CGI Norway and Digital Society Innovation

The megatrends of globalisation, digitalisation, and climate change call policymakers to design interventions that can address the systemic challenges facing society. Even as initiatives like the UN's Sustainability Development Goals and EU Missions frame the challenges and provide direction, the journey towards implementation is long and arduous. Digital technologies and digital twins are proliferating at a pace that is causing a data and knowledge explosion while presenting solutions and challenges.

This paper speculates how societies might interpret recommendations from public studies and harness technology to engage multiple stakeholders in the design of products (goods and services) that are customised for local socio-ecological contexts. Towards this speculation, this paper explores and conceptualises "verksted" as an action-orientated place-based facility for multi-stakeholder collaboration, e.g., between developers, operators, policymakers, researchers, investors, educators, and concerned citizens (verksted is Norwegian for workshop). The paper makes two contributions towards framing actionable policy: (a) the knowledge loop as a conceptual and methodological construct of the verksted and (b) a capability map to guide the operationalisation of the verksted as a node in a network for continuous co-design, education, and experimentation.

The paper builds on literature in systems thinking, knowledge management, and enterprise architecture. The paper uses the author's observations and interviews from three main sources: (i) Norwegian authorities' policies for research-based

innovation, cluster-based entrepreneurship, and digitalisation, (ii) activities at HelseInn towards establishing a design-driven network in the Innlandet county of Norway and (iii) research projects at the Centre for Connected Care – a research-driven innovation centre comprising 17 organisations researching the design, procurement, and scaling of innovation in the health sector.

KEYWORDS: innovation ecosystems, digital design spaces, collaboration.

RSD TOPIC(S): Methods and Methodology, Methods and the worlds they make, Policy & Governance, Socioecological Design

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Introduction

The process for establishing consensus and framing global policy on sustainable development has progressed over five decades. In 1972, the report, *The Limits to Growth*, was presented to the world (Meadows et al., 2015) as a source of insight, reflection and action. The report, commissioned by the Club of Rome, presented findings based on simulation models to draw attention to the need for sustainable development. From then and on to the Brundtland Commission's report (Brundtland, 1987), the Rio Summit (*Agenda 21 - Rio Summit*, 1992) and the UN's Sustainability Development Goals (UNDESA, 2015). The SDG policy frames the challenges facing the planet and provides a blueprint comprising 17 goals on how different governments and their societies might act. Horizon Europe, the EU's primary funding programme for research and innovation, has taken a missions-oriented approach based on prof. Mariana Mazzucato's research on innovation policy ((Mazzucato, 2018a, 2018b).

- A platform for global policy is emerging as trade blocs, e.g., the EU commit resources for long-term, science-based activities and policy instruments like Horizon 2020 and its successor Horizon Europe.

Other studies show that economic activity drives people to move to cities and triggers the need for new urban environments. The United Nations Environment Programme (UNEP) estimates that by 2050, 66% of the global population will reside in cities, compared to ~54% in 2018 (Swilling et al., 2018). OECD's Rural Well-Being study proposes the replacement of the urban-rural dichotomy with a continuum of rural

spaces that support multi-stakeholder engagement and multi-level governance (OECD Rural Studies, 2020, p. 142). The Demografiutvalget (commissioned by the Norwegian Government to analyse demographic development) points to the importance of urban-rural linkages and a principled approach to develop services organised where they function for citizens and not only determined by cost-effectiveness in isolation(Ministry of Local Government, 2020, p. 15).

- Mobilising resources across the urban-rural continuum, especially at the sub-national level, could align well with global policy through instruments like public-private partnerships, technology transfer programs, capacity building and regulation and financial incentives.

Digitalisation has brought software-powered devices and virtualised infrastructures that generate vast data. These data are increasingly being captured through data models as digital twins (Batty, 2018; Guo & Lv, 2022) to represent entities and phenomena, e.g., genetic and non-genetic material, built environments, or activities in enterprises. Appearing in different varieties, volumes, and velocities, these data can automate workflows, generate models, and feed algorithms. The fluid nature of data and metadata allows them to traverse governance structures and cross disciplines and professional domains. The data explosion and corresponding explosion of knowledge is a source of complexity, concern and of hope as the theory and practice of system dynamics and systemic design matures. (Edmondson & Harvey, 2017; Sevaldson, 2022, pp. 20–21).

- Digital interventions and the data they manage and generate can facilitate policymakers, academia, and practitioners in different ways. From enhancing collaboration across different parties, including competitors, to enhancing education and outreach and improving transparency and tracking of programs and economic initiatives.

As the complexity of societal challenges increases, a growing body of collective knowledge augurs well for researchers addressing these challenges and for new entrants building solutions to address the challenges. However, there is limited literature that addresses the nature and design of organisations and facilities for applying knowledge in real-world settings and sustained knowledge-sharing.

Digitalising society

Research-based studies, frameworks, blueprints, models, data models, and similar knowledge-bearing artefacts are useful tools in designing and funding initiatives that can fulfil policy goals while also impacting policy. Executing these initiatives requires that the knowledge embedded in such artefacts serve as enablers and not as dictates.

In society, individuals interact within the boundaries of societal norms and their respective local ecologies and built environments. Enterprises in society operate under different value-creating logics to provide value to individuals, enterprises, and society. Institutions comprising regulatory bodies and agencies enforce legislation and the social contract while associations of citizens, workers, and enterprises promote the interests of their constituents; collectively, they seek long-term development for individuals, enterprises, and society (Figure 1).

This paper explores opportunities to combine top-down policy with bottom-up praxis using knowledge management practices. The paper conceptualises the “verksted” (Norwegian for workshop) as an action-orientated place-based facility for multi-stakeholder engagement; collaboration between, e.g., practitioners, developers, policymakers, researchers, investors, educators, and concerned citizens. The paper extends the thinking from rich design spaces (Kersten et al., 2018), embedded labs (Romm, 2021) and the knowledge spiral (Nonaka, 1998). The paper builds on interviews with policymakers and cluster leads and the author’s experience building socio-technical infrastructures, innovation partnerships and participating in research-based collaboration with academia.

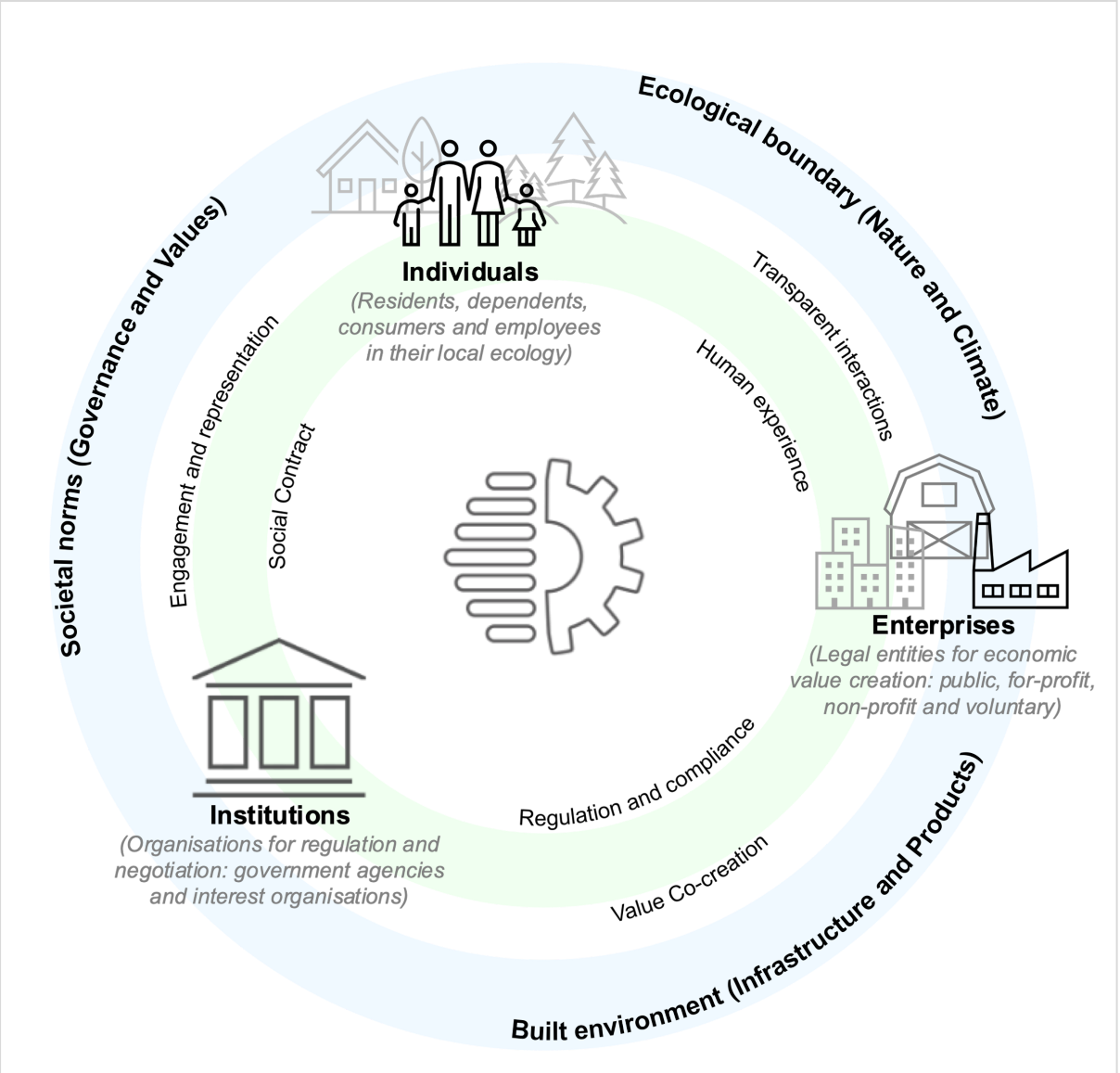

Figure 1. Stakeholders in society and their collaborations (author's graphic).

Observations

The author has conducted various types of innovation activities since 2009 for clients and non-profit communities and, since 2015, has been attached to the Centre for Connected Care.[1] The centre is based on the policy instrument for research-based innovation from the Norwegian Research Council. It is a consortium of 17 partners, including three academic research institutions, five care providers and nine vendors. The centre has a stipulated lifetime of eight years (October 2015– September 2023).

For this article, from June to August 2022, the author conducted two sets of interviews with two heads of innovation efforts at the policy level (Innovation Norway[2]) and cluster level (HelseInn). The basis for this article is Labs@Helseinn, a concept that emerged from a workshop facilitated by the author in June 2019, where the author's employer is a member. Labs@Helseinn was based on the author's experiments with the architecture of collaboration (Fjeldstad et al., 2012) and was designed to support facilities with (i) shared resources, e.g., tools, audio/video/document infrastructure, (ii) direct connection to teaching staff and students via local colleges and university and (iii) liaison with national or international centres of expertise.

The Norwegian Innovation Clusters program from Innovation Norway is a policy instrument aimed at stimulating collaboration and complementarity across businesses and cultivates 44 clusters (Innovation Norway, 2022). The Hub-Node is an experience-based, experimental instrument aimed at increasing multi-stakeholder engagement and multi-level governance by incentivising small innovation clusters to collaborate with full-fledged clusters (Innovation Norway, 2021). My informant at Innovation Norway explained the rationale as a need to adapt the experiences in using the cluster model to Norway's demographics (sparse and dispersed population with a strong local governance structure). The Hub-Node instrument was launched in 2021 and is scheduled to run for 3 years. It runs two pilot projects to test the policy instrument.

[1] The Centre for Connected Care (C3) develops knowledge-based methodology and tools and sets up collaborations between stakeholders .https://c3connectedcare.org/en/

[2] https://www.innovasjonnorge.no/en/start-page/

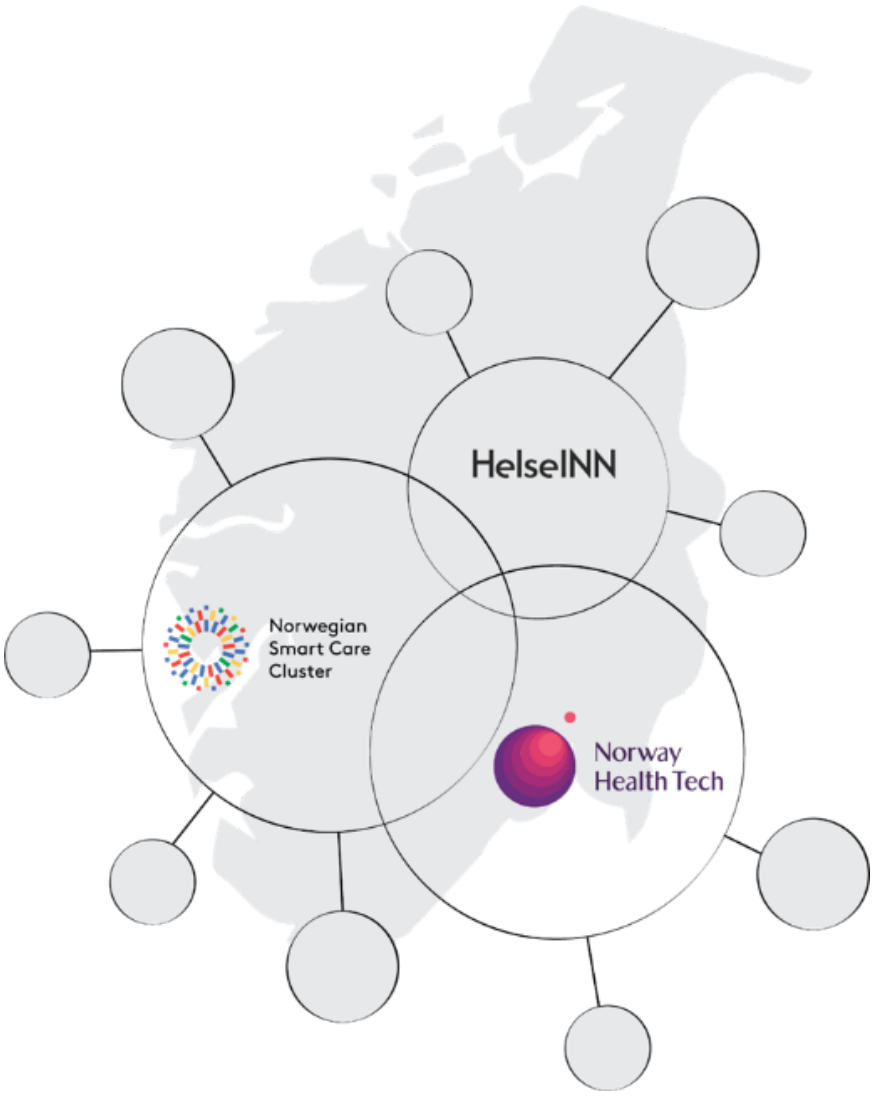

Figure 2. NH2 Helse, comprising three entities, is a pilot of the Hub-Node instrument.

NH2 Helse is one of the pilot projects aimed at testing the Hub-Node structure (Figure 2). It comprises three partners: HelseInn (Helseinn, 2015), Norway Health Tech (Norway Health Tech, 2009) and Norwegian Smart Care Cluster (*Norwegian Smart Care Cluster*, n.d.). The partners collectively have 580+ members across disciplines (law, finance, informatics, engineering, medicine etc.), industries (health, construction, software, education, manufacturing, regulation etc.) and sectors (public, for-profit, non-profits and voluntary organisations).

HelseInn is a membership-based innovation cluster of 50+ organisations in Innlandet county, with members including hospitals, care homes, municipalities, businesses, academia, voluntary organisations, and non-profits.

Since 2019, HelseInn has established facilities at four locations, and a fifth is under development. Each facility is configured based on local priorities and active member participation. HelseInn has a diversity of members participating in the activities at the different facilities. One example is of the student nurses and their instructors attending a session where municipal home-care nurses explain how certain medical technology devices work/do not work. The discussion and debriefing are valuable for all participants.

My informant at HelseInn explained how these facilities emerged through a systematic redesign of Helseinn's existing facilities based on Labs@HelseInn. HelseInn has retained the original intent of the cluster— to cover the entire county (Norway's second largest in area)— but has adopted a replication strategy that empowers local actors based on knowledge-sharing and local autonomy. HelseInn has refined and extended the Labs@HelseInn concept into a real-world networked facility with governance models that ensure stewardship and openness (Figure 3).

Figure 3. HelseInn node-structure.

Verksted Knowledge Loop

Helseinn's facilities, backed by the Hub-Node instrument, can evolve into verksteds. These verksteds can elevate existing multi-stakeholder engagement through knowledge-sharing practices and establish robust knowledge loops across praxis, research, and education. A knowledge loop (second cell of Figure 4) is a construct that extends the Nonaka-Takeuchi knowledge spiral (first cell of Figure 4). The knowledge loop can be visualised as a continuous path between the contexts of praxis, research, and education and where a figure-of-eight loop connects any two contexts. The loop represents continuous exploration, validation, reflection and proposing as new insights emerging from complex settings are continuously developed and shared understanding established.

The knowledge loop can be visualised as a Gantt diagram where verksteds— products or published knowledge from verksteds can feed other verksteds (Figure 5).

Certain types of participants in a verksted, e.g., researchers or designers, can transfer knowledge between verksteds and potentially generate more innovation. Others, e.g., educators in academia and business, might accelerate knowledge creation and simplify the capture of feedback from practice.

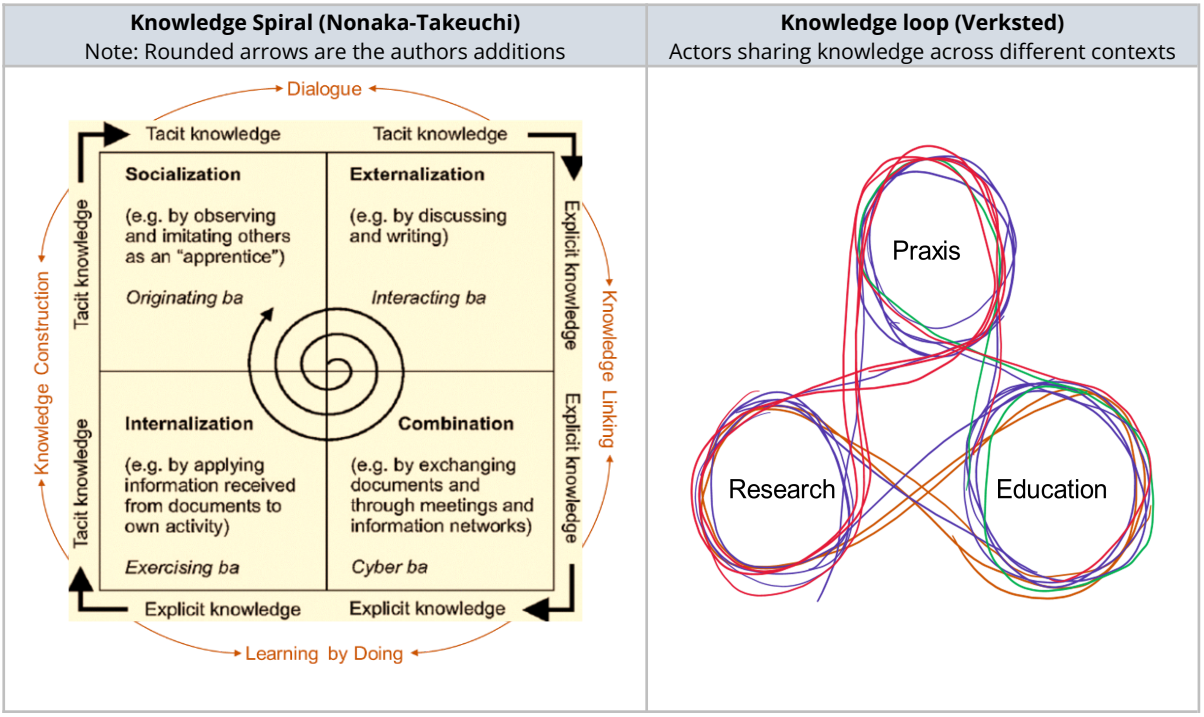

Figure 4. The Knowledge Loop covers three contexts and extends the Knowledge Spiral.

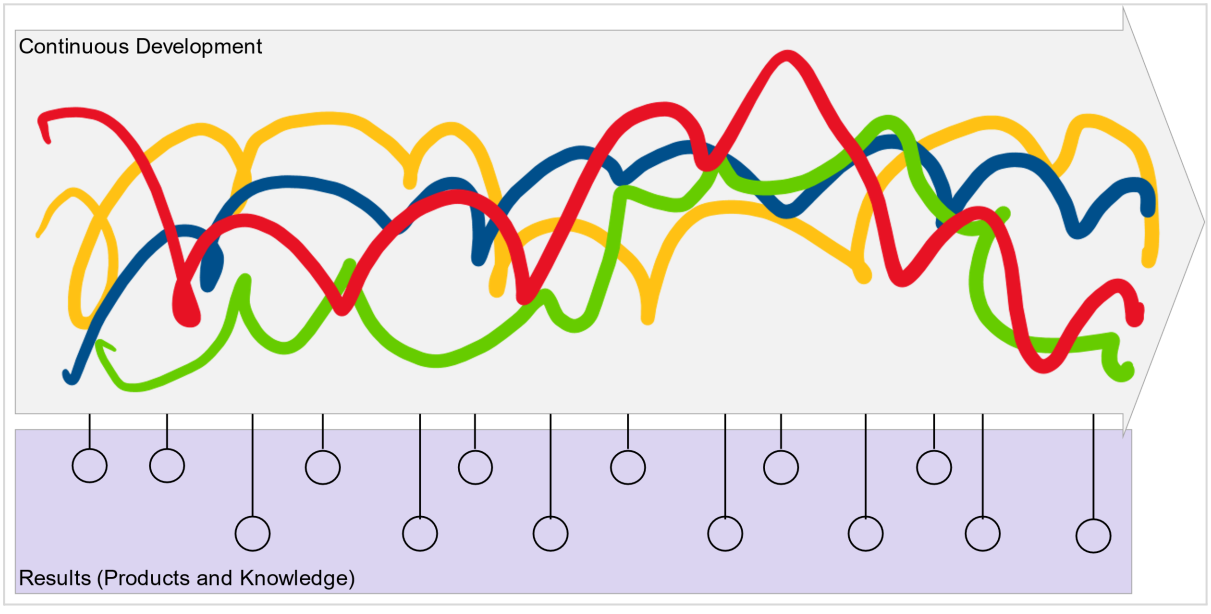

Figure 5. The Knowledge Loop is visualised along a time axis.

Verksted Capability Map

The primary purpose of the verksted is to increase understanding of systemic complexity through multi-stakeholder engagement. A secondary objective is to design knowledge-creation patterns that might benefit from multi-level governance and funding mechanisms. A verksted is a place-based facility with software and facilitation tools and workbenches appropriate to the focus of the verksted. A verksted acts as an autonomous node in a digital network of participating verksteds and embedded labs at businesses, government agencies, and academic projects.

The capability map is a tool for policymakers and owners of clusters on how verksteds might be shaped and configured in a network (Figure 6).

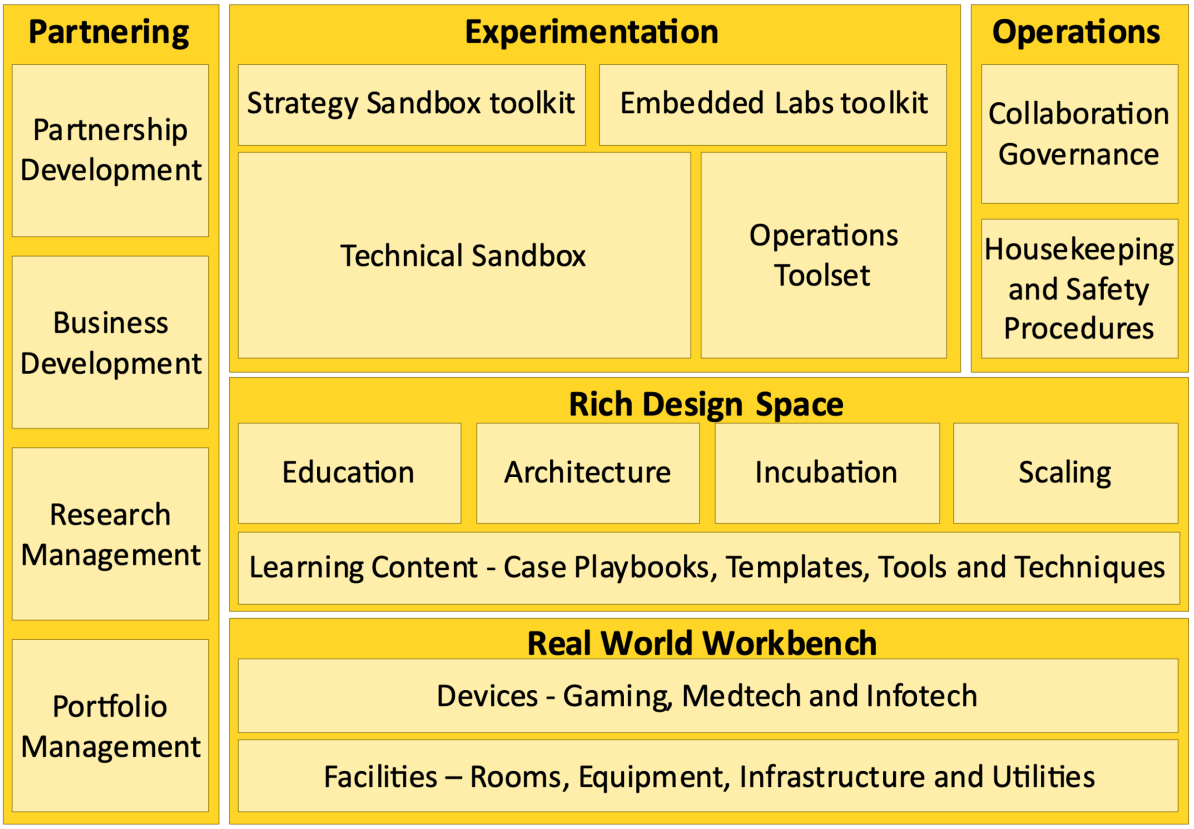

Figure 6. Capability Map for a verksted (a speculative design).

Below are the highlights of the five sub-capabilities of the verksted (Figure 6):

Rich Design Space: This sub-capability provides participants with theory and concepts in different settings. The primary objectives are to develop and enhance the design skills of individuals and groups and to enable participants to accelerate ideas into products that can scale for wider adoption. This sub-capability can be a result of collaboration between incubators, academia, and design experts. Dependent on ownership clauses, the results from the knowledge loops can be harvested for educational use.

Experimentation platform: This sub-capability provides toolkits to accelerate the development of prototypes. These toolkits can consist of templates and canvases or software tools and guides. A technical sandbox allows for constructing and testing digital twins, e.g., testing APIs or creating synthetic data to test scenarios that are restricted by legislation, e.g., health, life science (humans) or critical infrastructure. An operations toolset governs the safe use of the Experimentation platform.

Real World Workbench: This sub-capability provides different kinds of workbenches, e.g., mechanical, electronic, and biophysical workbenches, with devices, tools, and gauges to construct products and run experiments in a self-contained setting (Figure 7). Workbenches have a long tradition in some industries, e.g., manufacturing and pharmaceuticals. Adding experiences from software development can accelerate the design and construction of digiphysical products enabled by digital twins.

Operations: This sub-capability, together with the Partnering sub-capability, acts as a knowledge-switch in a verksted. The administrative tasks of the verksted are handled by this sub-capability. Together with Partnering, the Operations sub-capability ensures how a verksted's resources are shared and how confidentiality and integrity are managed across the network The primary purpose is to establish transparency and ensure clarity on how the verksted operates in the network.

Partnering: This sub-capability provides autonomy in the network. It aims to attract new actors to the verksted and facilitate the connection to other verksteds or international forums that are relevant to the verksted. This sub-capability is also crucial in the verksted's rapid response to funding calls from local, regional, national, and international agencies.

Figure 7. Sample electronic and mechanical workbenches. Courtesy: Inventas.no.

Operations and partnership capabilities fit the value-network configuration where the primary activity is connecting members and governing the membership catalogue. The other capabilities fit the value-shop configuration where the primary activity is problem-solving and curating the knowledge base.

All verksteds have these sub-capabilities to varying degrees of sophistication. The scope of the capabilities and content will vary depending on the focus of the verksted. Networked knowledge-sharing aims to enable each verksted to grow while also contributing to the growth of the network (Figure 8). The verksteds develop their capabilities by participating in and contributing to a vibrant innovation ecosystem across different kinds of institutions and enterprises. The networking of verksteds continuously evolves by copying, enhancing, and sharing practices across boundaries of sovereignty, disciplines, and sectors.

The continuous development of verksteds as autonomous units in a participating network is a topic for further research. Emerging research in organisation design, including meta-organisation design (Gulati et al., 2012), can help refine the capability map and the corresponding business, operating and governance models.

Figure 8. Verksteds in and as a network.

Closing comments

The concept of the verksted needs further analysis and elaboration. Existing designs of cross-disciplinary labs, research consortia and university-industry collaborations can provide insights as to how the verksted might be realised.

There are two primary beneficiaries of such an analysis: those responsible for designing, funding, and executing policy instruments and those operating cluster-based networks at sub-national and district levels with inter-regional collaboration. Such an analysis might benefit from the continuous findings of the Hub-Node initiative (ends autumn 2024) and the conclusions of the Centre for Connected Care (autumn 2023). The results can provide insights into different topics, e.g., (a) multi-level governance models, (b) the nature of the urban-rural continuum, and (c) how models might be animated through socio-technological interventions that use digital technologies and digital twins for collaboration over distances and d) how standardisation and standards might enhance knowledge sharing and manage the data and knowledge explosion.

The overall intent is that verksteds contribute towards (a) improved digital literacy, especially among populations, by activating them in addressing local societal challenges, (b) growing transdisciplinary knowledge in academia and activating knowledge for enterprises, institutions, and academia, and (c) strengthening cross-sectoral partnerships across geographies and industries and trade blocs and ultimately (b) stimulating systemic creativity across the rural-urban continuum.

This paper will be enhanced through further dialogue among actors in the author's working environment and participants of the author's ongoing executive master's studies in systems oriented design.

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