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Beyond words: How visual imagery shapes collaborative sensemaking in entrepreneurial ecosystems

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ABSTRACT

Entrepreneurial ecosystems (EEs) are complex social systems dependent on connectivity and shared understanding between diverse actors. An often used, albeit oversimplified view, implies that diverse actors connect, collaborate and contribute to the EE in an almost frictionless way. However, this perspective overlooks the need for deeper forms of communication that can shift actors' perceptions, goals and motivations to trigger meaningful change. Recent research has highlighted the role of conversations, narratives and stories in developing (informal) institutions and shared understandings. What is missing from this discussion, however, are non-verbal forms of communication, which enable interpretation, support meaning-making and help implementation. This paper draws on communicative institutionalism theory and empirical observations from a larger participatory action research project. We discuss how visuals support richer interpretation of ambiguities, different perspectives and collaborative sensemaking. Images act as boundary objects enabling creative associations, revealing assumptions and catalysing explorative dialogue through inherent ambiguity. Representing complex concepts visually facilitates participant engagement over time. The co-creative process of iterative illustration also captures shared meaning as it emerges. Implications highlight visuals' potential for fostering future-oriented dialogue, reflective practice and embodied institutions fundamental for EEs. From this, we outline suggestions for further research and practice.

1. Introduction

Entrepreneurship is a socially situated phenomenon highly dependent on the context in which entrepreneurial action occurs (Welter and Baker, 2021; Welter et al., 2019), whereby it can take a variety of forms and involve a wide range of actors and institutions. The notion of *entrepreneurial ecosystems* (EEs) has emerged as a means to conceptually and empirically understand this phenomenon, providing a systemic view on the bi-directional interactions between entrepreneurial actors and their regional environment (Stam, 2015). An EE can be defined as “[a] set of interconnected entrepreneurial actors (both potential and existing), entrepreneurial organisation, institutions and entrepreneurial processes which formally and informally coalesce to connect, mediate and govern the performance within the local entrepreneurial environment” (adapted from Mason and Brown, 2014, p. 5). As this definition shows, EEs are complex and dynamic (Brown et al., 2023; Carayannis et al., 2022), influenced by a diverse range of interrelated spatial mechanisms and actors (Wurth et al., 2022, 2023).

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Given this interconnectedness and inherent diversity, the term EE is used broadly to encompass a range of perspectives, understandings, and variations. Indeed, EEs can be thought of as *configurational narratives*, where conceptual boundaries and understanding (s) are socially constructed based on how actors within the EE view and perceive its elements and attributes (Muñoz et al., 2020). Given the centrality of this subjectivity, extant EE research has for some time discussed the importance of engagement and communication between different ecosystem actors, be they policy makers, entrepreneurs, University academics, or other stakeholders. Indeed, even public policy interventions to support EE development prioritise building ecosystem connectivity. For example, Scotland's Ecosystem Fund, now into its second funding round, has earmarked more than £1 million in total to support events that bring together different ecosystem actors. Such engagement is recognised to be crucial in terms of supporting local expertise (Goswami et al., 2018) and building intra EE connections (Feldman and Zoller, 2012) and location-specific knowledge (Lowe and Feldman, 2008). It is also particularly critical if a 'shared understanding' between ecosystem actors is to be encouraged and supported.

Despite growing recognition, little empirical work explores fostering inter-actor engagement within EE. Recently, *conversations* – communications (often informal) between like-minded individuals and groups – have been discussed as a mechanism through which to support and build ecosystem connectivity (Rocha et al., 2021) as well as socially embedded understandings of EEs (Uyarra et al., 2017). Yet research largely examines conversational outcomes rather than unfolding dynamics enabling collective narrative construction and sensemaking. This paper contributes to our understanding of how such conversations can be further fostered and supported in the context of EEs. Drawing on the concept of communicative institutionalism (Cornelissen et al., 2015), empirical observations collated during a larger participative action research project on EE development in Scotland conducted in 2022 suggest inter-actor narratives develop through both verbal and visual means. Visual images arising during conversations support creating shared metaphors and meaning, while also catalysing further collaborative sensemaking as additional actors join.

2. Conceptual foundations of collaborative sensemaking

EE scholars have long noted the need for greater connectivity and collaboration between diverse ecosystem actors to further develop our understanding of EEs (Wurth et al., 2022; Bischoff, 2019). However, conceptual and theoretical underpinnings exploring how these actors interact, align interests and jointly shape the ecosystem remain scant (Wurth et al., 2022, 2023). As a result, disparate assumptions persist not only regarding the key components of EEs, but also the relational dynamics and communication processes through which alignment and shared understanding develops. This gap is noteworthy given the substantial research on entrepreneurial communication and interactions in other contexts. Examining how entrepreneurs and other ecosystem actors communicate and make sense of the ecosystem collaboratively offers a promising direction to address this theoretical limitation in the EE literature.

Looking to the wider literature on entrepreneurial communication, a key focus has been on narratives and, more specifically, language in the context of entrepreneurship and how entrepreneurs construct opportunities (e.g. Cornelissen et al., 2012; Liuberté and Dimov, 2021). Previous work explores the use of metaphors by entrepreneurs, often with a focus on their identity (Clarke and Holt, 2017), experience (Clarke and Holt, 2019), or interrelation of personal identity and purpose of the business (Drakopoulou Dodd, 2002; Ruebottom, 2013). Other work building on semiotics (Smith and Anderson, 2007) has considered a range of heuristic devices such as storytelling, folklore, imagery, and archetypes (e.g. Smith and Neergaard, 2007; Smith, 2014; Brattström and Wennberg, 2022). Whilst valuable, from an EE perspective a key omission is how discrete actors come together to interact and derive shared meaning(s) in an inherently complex, dynamic system.

Accordingly, collaborative sensemaking allows entrepreneurs to collectively interpret ambiguity, understand failures, articulate visions, gain validation and negotiate contradictory viewpoints (Clarke, 2011; Lounsbury and Glynn, 2001; Weick, 1995; Werle and Seidl, 2015). Through conversational interactions, intersubjective accounts emerge that coordinate entrepreneurial action (Downing, 2005; Maitlis and Christianson, 2014). To enable this, communication must move beyond simply conveying information towards actively constructing new meaning and shifting mindsets for change. This requires "deeper" forms of communication triggering cognitive and emotional shifts in how situations and futures (particularly distant futures) are perceived (Augustine et al., 2019).

The concept of communicative institutionalism, linked to the sociology of place, emphasises the role of communication practices in the creation, maintenance, and disruption of institutions (Cornelissen et al., 2015). It posits that through communicative acts, actors within institutions construct identities, engage in power dynamics, and negotiate meanings, thereby shaping institutional landscapes. Communicative institutionalism is particularly concerned with the micro-level processes of communication and the ways in which these contribute to the institutional fabric of social life. A core premise is that language does not just represent pre-existing institutionalised beliefs and macro-level cultural structures, but the development of new 'collective cognition' (Cornelissen et al., 2015) that actively shapes the emergence of social structures and institutions through coordinated activity (Heracleous and Barrett, 2001).

From an EE perspective, communicative institutionalism provides a valuable framework for examining how entrepreneurs, investors, policymakers, and other stakeholders use discourse to construct identities, negotiate meanings and therefore influence the evolution of institutions and EEs. More specifically, it suggests that through communication practices such as storytelling, metaphors, and narratives, stakeholders can articulate and co-create the core values, goals, and aspirations of the EE. EEs can, therefore, be understood as fluid communicative spaces where ecosystem actors construct shared meanings and norms through recurrent interactive meaning-making (Cornelissen et al., 2015; Gieryn, 2000). These communicative acts are not merely informational, but rather play a constitutive role, actively shaping perceptions, motivations, and behaviours of EE actors and gaining normative force over time (Phillips et al., 2004; McPherson and Sauder, 2013). It also provides a lens to examine power dynamics within EEs, as communication practices can also be used to negotiate authority, legitimise actions, and mobilise resources. By focusing on how communications are

crafted, shared, and received, communicative institutionalism offers insights into the iterative process of sensemaking that underpins the alignment of individual and collective efforts within EEs.

Sensemaking is recognised to be a crucial process in regional entrepreneurial ecosystems (EEs) that enables alignment and coordinated action between the diverse actors that comprise them. As defined by Weick (1995), sensemaking involves the ongoing development of plausible meanings that rationalise what people are doing. In EEs, sensemaking allows diverse actors and stakeholders to make sense of the ambiguous entrepreneurial environment and derive shared understandings that guide strategic choices and behaviours (Roundy et al., 2018). However, sensemaking in EEs faces several challenges. Different actors comprise (and enter) the ecosystem, exhibiting diverse backgrounds, assumptions, goals and vocabularies (Autio et al., 2018). This makes it difficult to arrive at common interpretations of entrepreneurial opportunities, constraints, and courses of action. Power dynamics also complicate sensemaking. Not all voices carry equal influence in shaping collective understandings and institutions. Powerful ecosystem actors promote discourses that serve their interests, granting them greater legitimacy and influence over time. Thus, marginalised groups may struggle to insert their perspectives into dominant narratives. More research is needed on power dynamics and marginalised perspectives to understand how ecosystem-level narratives form. Without inclusive dialogue and collective reflection, dominant narratives tend to prevail even if they do not represent or serve broad interests.

Failed or inefficient sensemaking also has detrimental impacts on EEs, hindering the joint pursuit of opportunities, resource mobilisation, and proactive response to challenges (Roundy et al., 2018). Misalignment due to poor sensemaking leads to duplicative efforts, wasted resources, and inter-organisational conflicts. It also reduces the legitimacy of the EE in the eyes of external stakeholders, limiting inflows of financial capital, talent, and political support. Fostering collective sensemaking capabilities may be just as vital for EEs as growing venture capital funds and incubators. With better joint comprehension of entrepreneurial realities, actors can coordinate strategies in ways that allow the broader EE to flourish. Sensemaking should therefore be recognised as an ongoing, yet unequal, process of critical reflection and inclusive dialogue between EE actors, constructing shared understandings to collectively negotiate ambiguous situations (Maitlis, 2005).

However, cognitive barriers often inhibit reflexivity, perspective-taking and sensemaking in EEs. While language is recognised to shape shared understandings via new linguistic repertoires (Green and Li 2011), non-verbal elements are often overlooked. Visual imagery such as diagrams, maps and sketches are increasingly recognised as important sensemaking devices that reveal assumptions, stimulate associations, and enable reframing (Comi and Whyte, 2018; Meyer et al., 2013; Tuleja, 2017). Visuals also enhance collaborative sensemaking by providing shared references, stimulating new cognitive associations, revealing hidden assumptions and catalysing deeper collective exploration (Clarke and Holt, 2017). The potential of visual images arises from their inherent interpretive flexibility – the capacity to facilitate continued exploration of meaning rather than imposing definitive explanations (Bartel and Garud, 2009). EE actors can thus leverage this generative ambiguity to foster creative comprehension of complex challenges (Drazin et al., 1999). Through the lens of communicative institutionalism, we examine how visual imagery fosters, through conversations, collaborative sensemaking among diverse EE actors.

3. Context and empirical observations of how visual imagery shapes collaborative sensemaking among EE actors

The empirical observations explored below emerged during a participatory action research study exploring the development of Scotland's EE. This project aimed to collaboratively engage participants in knowledge creation and the research process (Eden and Huxham, 1996) through iterative cycles of reflection and action (Kemmis et al., 2014), aligned to the principles of communicative institutionalism (Birdthistle et al., 2022) and sensemaking. A series of five hybrid workshops were held in Glasgow, UK between March and May 2022 to bring together a range of EE actors and institutions with the purpose of identifying key challenges faced in the EE and the 'way forward' for the development of the ecosystem.

Each workshop was attended by a professional graphic illustrator¹ who in real time illustrated participants' discussion in a digital image which was projected on a screen in the room. The graphic illustrator was briefed in advance on the general focus of each workshop, as were all participants. The intention was for the graphic illustrator to create an 'aide memoire' for participants to take with them upon the completion of each workshop. Whilst not the focus of the project itself, it became clear early in the project that the visual images created (and the very process of illustration) were having a significant impact on workshop participants and their discussions, specifically how they navigated complex or opaque concepts and approached challenging issues from a range of perspectives. The three overarching empirical observations now presented are intended to foster discussion and consideration of implications for research and practice, rather than to be interpreted as conventional 'findings'.

3.1. Broadening participation and diverse perspectives

As noted, a key challenge in EEs is making diverse perspectives heard, resulting in dominant narratives. As participants' views were illustrated, dynamics shifted and individual thoughts grew into nuanced, interlinked discussions – visually and figuratively becoming a 'bigger picture'. Foundational questions arose on who creates and comprises the ecosystem and how to join, sparking relief at shared uncertainty among participants. Visualising complementary, interlinked 'Tetris blocks' (Fig. 1) catalysed reflection on personal preferences, actions and perspectives. The graphic illustrator 'translated' the discussion's multi-layered complexity (content and

¹ Graphic illustration services and fees vary geographically and based on the scope of work and level of involvement of the illustrator. Illustrators can take the role of an observer (as in this study), active participant or facilitator as required. For illustration only, fees are approximately £200/hr. For this project, the cost of the illustrator was £2,400, which included briefing the illustrator before workshops, production of a 'live' drawing and minor changes (e.g. correction of typos) to the completed drawings.

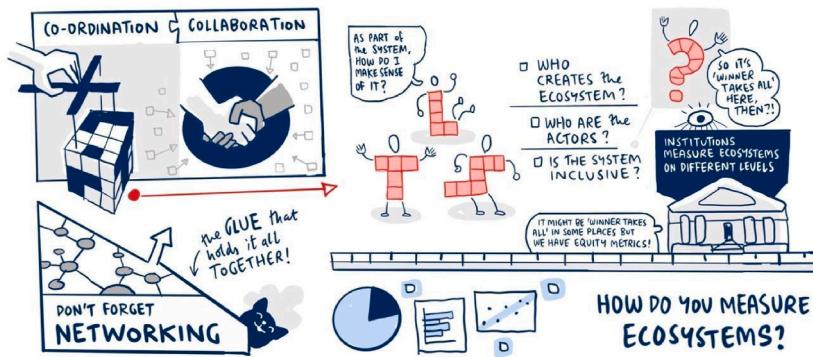


Fig. 1. Ecosystems, institutions, and the role of different actors (visual image from workshop 1).

social structure) into visuals, enabling individuals to see their questions as not isolated but rather part of a collaborative meaning-making journey.

A related discussion emerged around who the main actors are in the Scottish EE. In addition to some of the expected mentions such as successful start-ups and unicorns (e.g. FanDuel, Skyscanner) or support organisations (e.g. CodeBase), there were some unexpected suggestions. An interesting example is the case of prisons and the rehabilitation process. It was acknowledged that many prisoners have an entrepreneurial mindset, but the reason they are in prison is that they have not aligned this mindset to society's value structures and laws (left-hand side of Fig. 2). Unexpected suggestions like the entrepreneurial potential in prisons shifted the discourse towards inclusivity and recognising overlooked sources of potential within (or currently outside) the EE. This example was picked up again by participants during later workshops. The visuals enabled people to share personal stories and perspectives that likely would have stayed hidden without this prompt, inspiring rich conversations and reflection far beyond what would have emerged from narratives alone.

Given these early discussions of inclusivity, the third workshop (dedicated to the topic of inclusiveness in EEs) provided a forum for participants to further build and refine their emerging shared understanding. The question 'who is part of the ecosystem' evolved and expanded, including not only an actor-centric view of who should be included, but wider consideration of other issues such as norms, values and beliefs (Fig. 3). Visually capturing pathways and challenges reinforced that there is no single entrepreneurial narrative, prompting realisations about assumptions while sparking curiosity about others' views. Inclusion is not created by simply bringing people together, but by creating an environment that makes people feel a sense of belonging - that the EE caters for them and their needs and that they have a voice. This evolution of the focus of the discussion among participants is captured in the more actionable

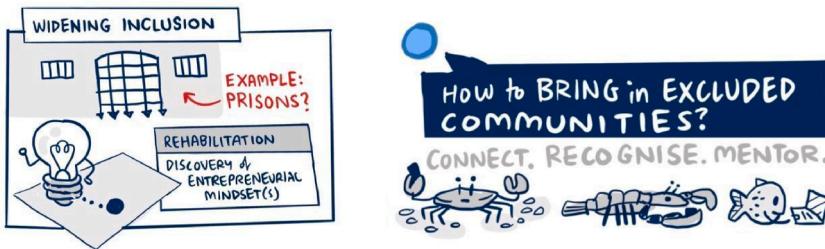


Fig. 2. The case of prisons and rehabilitation (visual image from workshop 2) and a general call for bringing previously excluded communities together (visual image from workshop 4).

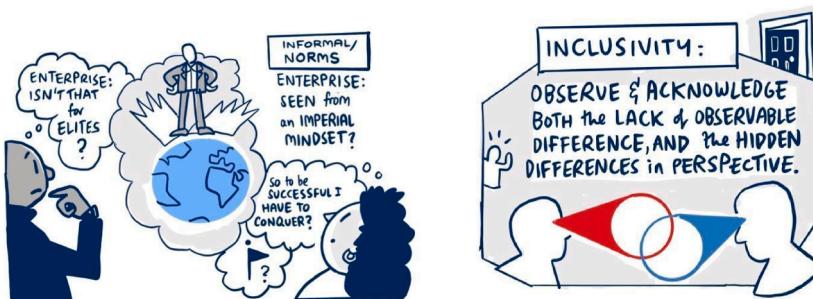


Fig. 3. Inclusivity and (informal) institutions in EEs (visual images from workshop 2 and workshop 3).

visual image based on the three key tasks of connecting, recognising, and mentoring (right hand side of Fig. 2). This highlights how visual images helped to facilitate continuous interaction and engagement with a topic, subsequently resulting in refining the concept, building on diverse perspectives and supporting collaborative sensemaking.

3.2. Stimulating metaphorical associations

Entrepreneurial ecosystems are complex social systems, based on interacting mechanisms and institutions. A representative example is the nestedness of local and regional EEs within national and even supra-national systems and environments. This concept was mentioned during the keynote of the first workshop and was revisited by participants numerous times during subsequent workshops and discussions. The graphic illustrator visualised this nestedness using the metaphor of Russian Matryoshka, or 'stacking dolls', (Fig. 4) and it was quickly adopted and discussed by participants, who used this metaphor when referring to multi-level aspects of EEs and how they are situated within the wider socio-economic environment. Yet the 'stacked dolls' were more than a single reference point. For individuals who only participated in later workshops, this metaphor and the associated visual image allowed them to 'see' and make sense the previous conversations, using this association to understand and contribute to further discussion. The metaphor itself evolved too. Participants built on this when trying to communicate or make sense of other issues pertaining to the EE, evidencing the formation of new institutional logics.

A second metaphor that was introduced by participants, and which evolved throughout the conversations, was the unicorn, which is both the national animal of Scotland and represents private companies with a valuation over \$1B. Contrary to the common narrative of striving to produce more unicorns (as a very limited definition of entrepreneurial success), participants evolved this imagery into symbolising Scotland's broader ambition (Fig. 5). The metaphor contributed to shared identity-building by integrating cultural

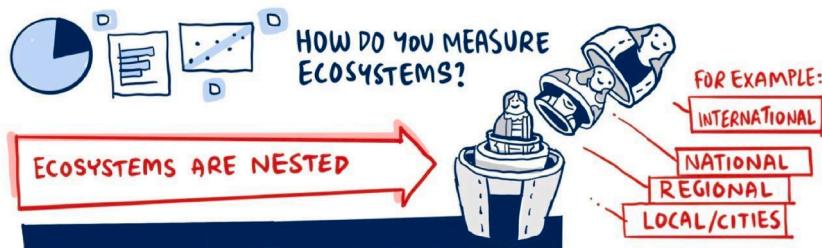


Fig. 4. Nestedness of EEs as 'stacking dolls' (visual image from workshop 1).

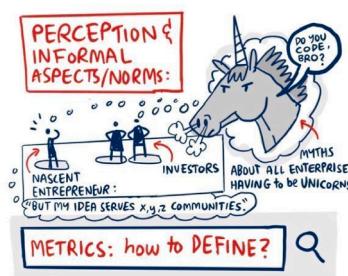
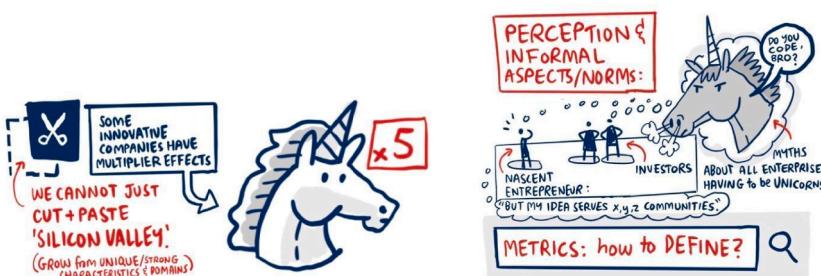


Fig. 5. The unicorn depicted in various visual images, reflecting both Scotland and the ambition of entrepreneurship (top visual image from workshops 1, bottom left from workshop 4, and bottom right from workshop 2).

narratives and local contexts, shaping how the EE is socially constructed through stakeholder sensemaking. Continual unicorn references in discussions highlighted the deeper meaning embodied in visuals to advance understanding.

3.3. Facilitating alignment on shared meanings

Discussions around the actors in an EE sparked reflection on the ambiguous definitions of “entrepreneurial ecosystems”, both in general and in the Scottish context. Successful ecosystems combine upward and downward causation leading to feedback loops – opaque concepts for most people. Visualising ecosystems through natural analogies and depicting dynamics as iterative, circular flows rather than linear steps helped concretise complexity and interdependence of policies, institutions, entrepreneurs and resources. Continuous refinement by participants created living representations embodied through iterative use in discussions. Figs. 6 and 7 capture this collaborative sensemaking, highlighting the shift from opacity towards aligned understanding. The analogy to natural ecosystems for making sense of the mechanisms within EEs also spurred a continuous focus on sustainability that simultaneously included environmental, human and economic wellbeing. Sustainable entrepreneurship, both from an environmental and economic perspective, was recognised to be linked to (sustainable) prosperity.

Despite EE definitions underscoring heterogeneous actors, public discourse fixates on unicorns and scale-ups. This risks excluding different kinds of entrepreneurs, integral to ecosystem diversity and strength. Visualising entrepreneurs as differently sized fish in the same pond (Fig. 8) prompted recognition of variety as collective health. Meanwhile questions persisted on governments' precise role within this diversity and what assumptions shape their efforts. Depicting governments' role enabled deliberating top-down and bot-

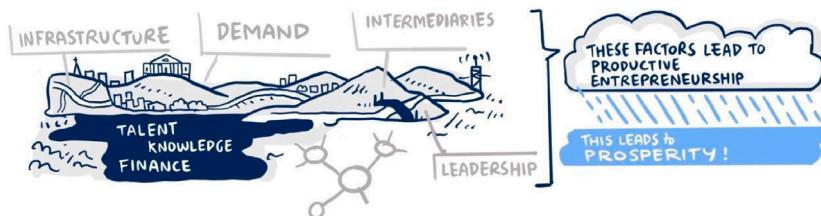


Fig. 6. Natural ecosystems and regions to show the composition of EEs and the flow of resources within them from (visual image from workshop 1).



Fig. 7. Natural ecosystems and regions to show the composition of EEs and the flow of resources within them (visual image from workshop 2).

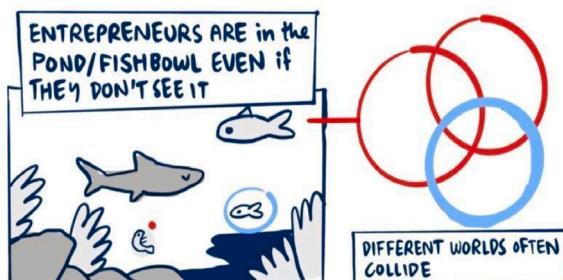


Fig. 8. Entrepreneurs as fish in a pond (visual image from workshop 4).

tom-up approaches to foster mutual understanding. Through continuous visual iteration, these representations embodied developing insights about ecosystem dynamics (Fig. 9).

4. Implications

The empirical observations presented highlight the value of integrating visual images within collaborative sensemaking processes. Introducing visuals into conversations supported the meaning-making process and construction of richer shared interpretations around EEs. Visually depicting ambiguous concepts also stimulated critical reflection on assumptions, perspectives and metaphors, catalysing more expansive dialogue. Shared understandings and common interpretive schemas were not just cognitively internalised, but actively produced and transformed through communicative interactions supported by visual artefacts. These visuals, in turn, provided an interactive infrastructure that shaped configurational narratives (Muñoz et al., 2020) and collective cognition (Cornelissen et al., 2015) as per the ethos of communicative institutionalism.

The visuals have emphasised the importance of extending current conceptual understandings of 'conversations' (Rocha et al., 2021) in EEs, looking beyond verbal narratives to include other artefacts and sensemaking devices (Ewenstein and Whyte, 2007; Stigliani and Ravasi, 2018). In this space, we can draw inspiration from the design literature, in which conversations inherently involve visual representations of emerging ideas, so-called 'thinking by drawing' (Cross, 2011). Visual images act as interactive boundary objects, enabling EE actors to bridge different perspectives, leverage visual ambiguity for creative sensemaking and materialise intersubjective cognitions. Tracking the process of image creation and refinement over time can evidence the experiential journey and changes in individual and collective thinking.

This is critical when considering that the current landscape for EE development (and funding) is largely built on the premise of bringing ecosystem actors together to increase connectivity (Uyarra et al., 2017). Whilst important, such interventions (e.g. events, workshops) have the potential to be time-bound, with limited sustained impact. To ensure further legacy and sustained value creation, interventions need to support sensemaking not only in real-time, but also lay the foundations for further iteration and refinement linked to wider institutional and social change. These observations open opportunities for research drawing on practice theories (Johannesson, 2011) examining the materials and practical activities through which understandings and institutions are embodied within EEs. Future research could explore if, when and how communicative infrastructure enables and constrains forms of collective sensemaking and action.

Creating alignment between diverse EE actors also requires grappling with 'distant futures' (Augustine et al., 2019) and questions of what could be. This demands moving beyond events and interventions producing immediate shared cognition. Sustained platforms allowing iterative sensemaking and narrative revision over time using visuals may support this (Muñoz et al., 2020). Visual images and the process of co-creating ambiguous depictions provide infrastructure to bridge perspectives and jointly make sense of alternative futures or 'futurescapes'. This requires careful facilitation to leverage visual ambiguity for generative dialogue building place-sensitive complexity (Comi and Whyte, 2018). Policymakers implementing ecosystem support may therefore want to incorporate visual practice.

From a communicative institutionalism view, the visuals can be seen as contributing, even if temporarily, the communicative spaces and facilitating minor institutional impacts by enriching the discourse and shaping participants' emerging mental models. While they informed stakeholder communications during the workshops, their specific impacts on EE building, such as deeper reconstructions of the EE narratives or logics, remain difficult to substantiate outside the workshops. Being able to link these efforts to concrete sociological or organisational outcomes, however, requires sustained integration, follow-up activities, and ties to definite objectives.

There is also a need to consider the influential role of the graphic illustrator in visually translating complex ideas and paving the way for further sensemaking, as shown through the 'stacking dolls' example which provided conceptual clarity across workshops



Fig. 9. A graphical representation of going from understanding EEs to thinking about collective, purposeful impact (visual image from workshop 4).

(Dean-Coffey, 2013; Hoff and Geddes, 1962). Skilful facilitation leverages visual ambiguity for generative dialogue rather than imposing narrow interpretations. Further research should examine how co-creating visual images with entrepreneurs and ecosystem actors, not just professional illustrators, can support collective understanding and action in EEs (Gieryn, 2000; Clarke and Holt, 2017, 2019; Muñoz et al., 2020). Combining ‘live illustration’ and images drawn by EE actors could enable deeper reflection and sensemaking. Policy makers implementing ecosystem support may also want to incorporate visual practice within events, courses and projects to facilitate shared understandings.

5. Concluding remarks

This article has aimed to contribute to our understanding of how conversations and collaborative sensemaking activity can be further supported in the context of EEs. Drawing on the concept of communicative institutionalism (Cornelissen et al., 2015), it has presented empirical observations which indicate that inter-actor narratives about EEs can be fostered not only through verbal conversations but also through visual imagery resulting from these conversations. The evolution of EEs, and the collective efforts required, cannot be described solely in practical terms and distinct actions, but rather requires dealing with ‘distant futures’ (Augustine et al., 2019). These ‘futurescapes’ require more ‘place-sensitive complexity’ and consideration of how narratives are created and revised (Muñoz et al., 2020; Rindova and Martins, 2022). Such collaborative sensemaking requires us to move beyond words.

CRediT authorship contribution statement

Bernd Wurth: Writing – review & editing, Writing – original draft, Project administration, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Suzanne Mawson:** Writing – review & editing, Writing – original draft, Project administration, Methodology, Funding acquisition, Formal analysis, Data curation, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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