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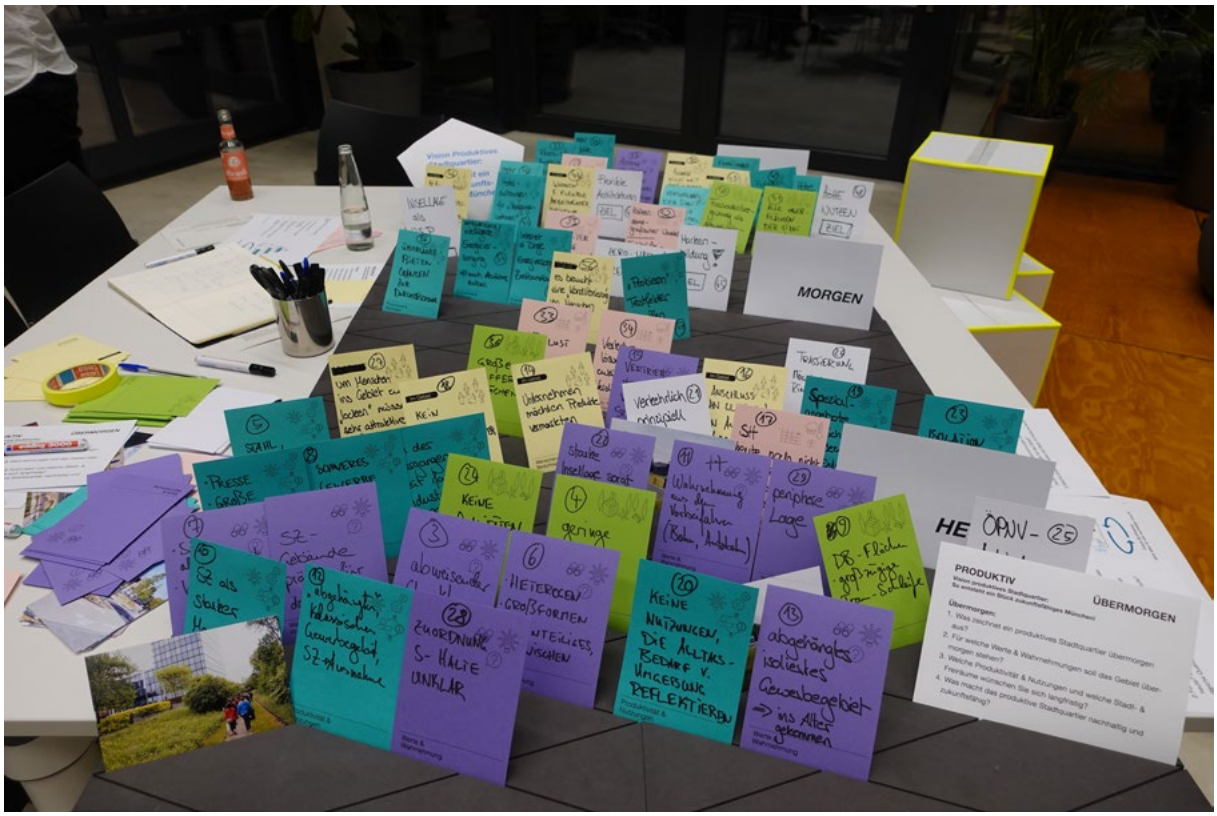

Productive Processes in Action. Source: Christin Buettner.

Productive Processes

Pushing Beyond the Urban Production Baseline

Robin A. Chang, Agnes Förster

Keywords: Urban production; urban and industrial lands; action; interaction; process

Abstract

Inspired by ongoing discourses for *the productive city*, this article argues for a shift in focus towards *productive processes* through a *strong* process view. The intent is to clarify *how* instead of *what* urban communities and their environments must adapt with regards to urban and industrial lands. A framework of agency perspectives to support capacities to act through multiple levels of space and organization elaborates how different configurations of combined elements based in the realms of the experienced (software), material (hardware), and governed (orgware) environment interact to shape the possible processes for planning and development of valuable industrial and employment lands. This brings together diverse interpretations of activities at the firm-level with those from the city-level as a part of a claim for more a coherent district-level interface in order to help stakeholders manage the changes on cities' industrial lands. The work draws on efforts from the pilot project on the Sustainable Adaptation of (Peri)Urban Industrial Lands (SAIL) to explore initial frameworks that might guide the analysis of future and empirical work.

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The productive city – a point of departure

What does urban production mean for a productive city? Recent debates on the sustainable development of urban and industrial lands in Germany and across Europe broadly highlight the former as a means towards the latter (Laepple 2017; Werrer 2019; European Commission 2022). However, this leaves us with more questions than answers. It is not complicated to understand how *the productive city* broadly describes the intertwining of economies and cities; nor is it difficult to confirm Werrer's observation (2019) that this is transforming work and production into more flexible if not altogether new formats. We also see consensus that cooperation has greater purchase in these changing contexts of industrial activities (Bathen et al. 2019; Angstmann et al. 2022). But, all this is not enough to catalyze or facilitate processes that create (forms of) the productive city. To be clear, our definition of urban production underlines secondary sector activities limited by mechanical factors and their sites, much like Bathen et al.'s (2019) understanding of urban production. However, we also account for emerging, ancillary, or service-oriented activities that materially fix or move products in space; this emphasizes a spatial framing of economic (inter)action and less so the conventional or structural three-sector model of how economies relate to (productive or urban) meanings of space (Schafran et al. 2018). Excluding or separating activities sectorally is not congruent with our more nuanced understanding of how cities should address productive activities and their spaces. Moreover, regulation already promotes a mixing of activities – we only introduce this in the next section as it is out of the scope of this contribution to elaborate on this. Undoubtedly, regulatory attention for industrial activities is pivotal and requires greater consideration. The possibility of this, however, is contingent on the quality of processes that must first unfurl to provide the optimal foundations in discourse and governance that might help us appropriately update or craft policies and regulations.

The sharpened focus here is on *productive processes* to clarify *how* urban communities and their environments can sustainably adapt to contemporary and real-world understandings of urban production. The tongue in cheek suggestion that planning processes could be *productive* is partially an ironic critique of the lags between urban planning and the industrial interface of economy, technology, and society. It is also a clarion call for practitioners and scholars to take a strong process view of input-output relationships in urban planning and development contexts. This view emphasizes that change, which we interpret as capacity to (inter)act, is not only something to which things are subject. Instead, change is how reality is produced in every moment (Cloutier and Langley 2020). In the spotlight is active instead of passive engagement with how we sustainably adapt urban and industrial lands. This is a shift from productive matter to process through which input is framed by diverse perspectives of activity at the nexus of technology, economy, and society. This nexus relates to various levels of differing capacities to act. Capacity here, is shaped through perspectives that draw on different combinations of interacting inputs. We will highlight and detail these in later sections as software, hardware, and orgware. More importantly, these combinations of inputs (re)configure interactive agency and affect the quality of processes shaping urban and industrial lands. Understanding these combinations, configurations, and their (inter)activity might help us explore possible levers and impulses for the design of productive processes. Output in this context is not

a product nor a service in the traditional sense. It is the effective bundling of planning relevant processes and (inter)activity for which we still lack understanding. By shifting to this framing of productivity, we can contribute to planning-specific concerns in wider discourses on industrial urbanism (Hutton 2008; see also Nawratek 2017) or respond with much needed and improved knowledge on how to shape and study *productive cities* (Grodach et al. 2017). Moreover, such a shift could better recognize the diverse experiences of the laborers, engineers, mechanics, artisan manufacturers or production and site managers amongst many others affected by the mismatch between ongoing trends and lethargic urban and spatial policies.

Planning urban and industrial lands is not about designing terra nova but redesigning the terrain vague of spaces and processes that no longer serve the traditional and industrial purposes for which they were first planned. They are not only brownfields and greyfields or procedures and policies, but realms and concerns that require new interpretations of what it means to be productive. New competencies and qualities of being productive have emerged over time and continue to (inter)act through what others now recognize as the *productive city* or a concept of inquiry regarding urban production (Werrer 2019). We build on this to outline urgently needed pathways, or better yet, *processes* of inquiry and interaction toward the *productive city* (Bathen et al. 2019: 88).

A German and urban production context

In the German context, a baseline of work indicates urban and industrial lands as priorities for cities; over 60 percent of almost 200 municipalities surveyed in 2013 indicated that existing industrial lands require high(er) attention for renewal (Haensche and Köster 2020: 5–7). One fifth of all labour opportunities are also rooted in the industrial sector (Hackenberg and Jonas 2019: 3). As such, it is not just the lands for industrial uses themselves, but the production activities they host, which require attention while they provide livelihoods for cities' population. These activities often illustrate what Bathen et al. (2019: 22) define, by drawing on Brandt, as urban production or "the production and processing of material goods in densely populated areas, often using local resources and locally embedded value chains."

Urban production is a starting point for highlighting challenges in planning and developing industrial lands because it calls for finer-grained mixed-use in existing neighbourhoods and district settlements. This handling of urban change is sensitive to functional compatibility (mix of uses, density, frequency, and centrality) and functional connectivity of activities (Huettenhain and Kuebler 2021; Hees et al. 2019). An amendment to the Federal Building Code and its subordinate regulation, the Land Utilisation Ordinance (Baunutzungsverordnung, BauNVO) in 2016 demonstrates some attention to these sensitivities by enabling increased building density and relaxed noise control requirements via the new zoning category *Urban Area* or *Urbanes Gebiet* (Hees et al. 2017, 2019). However, experts underscore the need to address broader dimensions of change and call for commitment, cooperation, and communication of "crossover" or cross-jurisdictional nature within policy and public administration arenas (Laepple 2017: 22;

Bathen et al. 2019; BBSR 2019). As new policies such as the *New Leipzig Charter – the transformative power of cities* for the common good further encourage urban production as parts of sustainable transitions for productive cities in Europe, the resonance for these calls only amplifies (Huettenhain and Kuebler 2021; Hackenberg and Jonas 2019).

The urban production baseline

To begin addressing broader dimensions of change, it is key to acknowledge how urban industrial lands often already host stakeholders, machinery, or structures and spaces – in contrast to isolated, greenfield or (peri)surburban industrial developments for logistic or production sites (Huettenhain and Kuebler 2021). This baseline in knowledge and space highlights the remnants from prior Fordist and Taloryist developments (Hutton 2008), with which we must plan and design even as technological innovation, creative or cultural production, as well as regenerative and circular trends continue to evolve. The more pressing concerns are the lack of, or fraught and less productive processes through which cities are reckoning with these lands – often with outdated design and planning philosophies (Hees et al. 2017; Bathen et al. 2019; Angstmann et al. 2022; Grodach et al. 2017; Foerster et al. 2017; Norton 2017; Nawratek 2017). Shifting these understandings for processes would account for changes embodied in what Hutton (2008: 7) terms *the New Economy* – the *convergence* for cities and urban production through more interaction between production and consumption, emergence of new social or manufacturing actors, and the acceptance for combining or merging of input factors that are locally and externally sourced (see also Bathen et al. 2019). The implications of this are already notable as some update the three-sector model with nuanced distinctions between urban or governance-relevant tertiary-sector activities (Schafran et al. 2018). Our contention here is that this also means greater differentiation in logics of activity or agency. Other trends in work such as preferences for home-based or remote work will likely reinforce the growing diversification of logics at the heart of activities contributing to urban production and industrial sectors (Dellot et al. 2018; Grodach et al. 2017; Huettenhain and Kuebler 2021; Nawratek 2017).

> Improving how we understand the different logics of productive activities and how they draw on combinations – of programmed and planned uses or activities (software), material and built environment (hardware), as well as systems of planning or regulating (orgware) – over time can clarify which different pulses in productive processes emerge or need to be induced for adapting urban and industrial lands.

This marks our departure from the urban production baseline. To help sketch out our point of departure, the categorical elements of software, hardware, and orgware can help us relate factors shaping cities; these are already established in urban and logistic development contexts (Karssenberg et al. 2016; Milenković et al. 2020; Studio for New Realities 2022). For our framework, they provide a heuristic for understanding how diverse combinations of process elements drive differentiated logics of agency; while they (inter)act to enable processes over time. When we look at different urban production

activities, a range of demands and consequences emerge depending on how they emphasize software, hardware, or orgware. We can visualize this general interaction as a spiraling triple-helix of software, hardware, and orgware informed logics for urban production as presented in figure 1.

For example, in creative and cultural forms of urban production, clustering is a pattern of (inter)action that enables the exchange of "tangible interdependences [...that...] benefit from frequent face-to-face communication, giving rise to specialized districts of cultural industries" (Martin and Grodach 2020: 3). Often these also require a particular form of "dense mixed-use built environment" (ibid.), attractive urban industrial and commercial districts, and catalytic urban districts as well as experimental spaces encouraging hands-on and space-sharing initiatives incubators (Werrer 2019). Entrepreneurial incubators or manufacturing FabLabs exemplify such spaces. In other words, these forms of urban production emphasize the availability of physical space (hardware), and the programming of compatible uses within these shared spaces (software). As such, this demands policies and capacities for planning, coordinating, and managing how activities dovetail (orgware). This can be abstracted to another level when we consider how sharing models and joint procurement are becoming popular, too (Bathen et al. 2019; Lopes 2014; Rudolph and Werland 2019). Sharing might be important for space and devices for example in the context of commissary kitchens or workshops, while procurement could focus on devices or transportation vehicles. Similarly, emerging activities associated with circular or symbiotic models underscore that sharing arrangements are not limited to uses, services, or procurement (*software*) but also material and natural resources (*hardware*); the management of these are undermined, however, by the lack of or weak communication, organisation, and supporting capacities (*orgware*) necessary for urban and industrial lands (Angstmann et al. 2022). Figure 1 presents comparative and triple-helix visuals of how differently emphasized combinations of software, hardware, and orgware informed logics might emerge over time in general, creative or cultural, circular or symbiotic, and logistics processes of urban production.

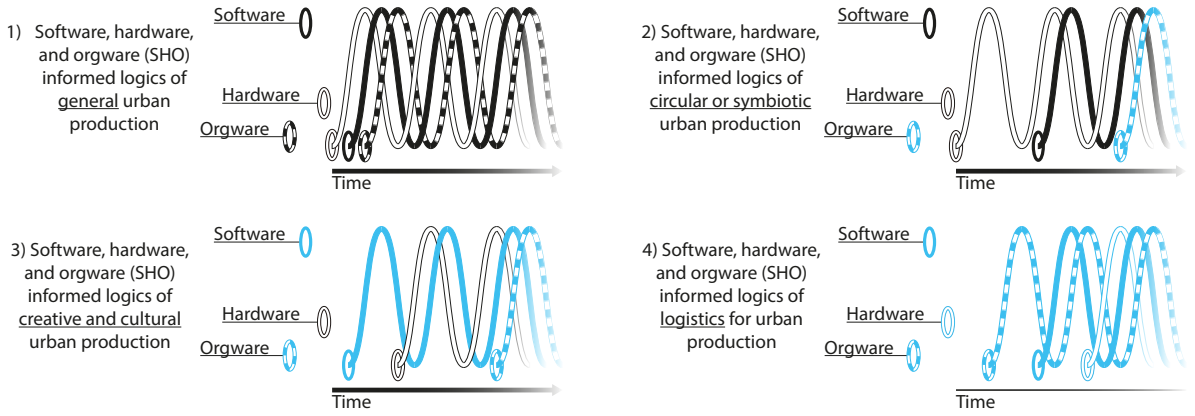

Figure 1: Software, hardware, and orgware informed logics as they interweave over time. The entry of software, hardware, and orgware dimensions are highlighted with blue strands at staggered points in time. These are visualised for 1) general activities of urban production, 2) circular and symbiotic of urban production, 3) creative and cultural activities of urban production, and 4) logistics activities of urban prodcution. Source: Authors.

When we consider logistics as another supporting arm of urban production, then trends towards hubs require not only planning and coordination (*orgware*) of goods that are delivered or stored (*software*) but have drastic impacts on the urban form (*hardware*). These are evident in Business-to-Customer (B2C) e-commerce trends through which growing presence of cargo-bikes, electronic vehicles, and even drones become forces that reconfigure inner-city spaces to accommodate the storage, drop-off, or pick-up of deliveries (Somasundram 2020; Klemme 2019). No wonder that some now recommend consideration for parking flow, proximity to people through land use management and zoning, or design of "curb and congestion points" as well as location-specific delivery areas for policy crafting (Aderneck and Whitehead 2023). The emphasis on orgware grows stronger.

Put differently, effective ways towards the productive city could be about arrangements for spatial compatibility or connectivity (Huettenhain and Kuebler 2021), or about densification and intensification (Aderneck 2020). It could also be about how we design the integration of urban production at the neighbourhood-scale with "productive urban building blocks" (Werrer 2019: 12–13). But all this falls short of the reality that matter is shaped through process. Further exacerbating this, but not altogether detracting from these directions are recent experiences following the COVID-19 Pandemic. These continue to emphasise capacity building processes that enhance self-sufficiency during crises as cities and regions reflect on, re-orient towards "inward-looking" policies (Canyon and Watson 2020: 2), and establish or accelerate reshoring instead of offshoring strategies (Somoza Medina 2022). We build our process of inquiry on the work by others such as Foerster et al. (2017) investigating how spatial strategies link with new forms of exchange and cooperation. Our intents also complement ongoing projects exploring co-productive governance formats for urban and industrial lands (BBSR 2022) targeting realities and not rhetoric on the sustainable adaptation and development of urban industrial lands.

Points towards productive processes

A first challenge of our process inquiry is confronting the many and layering perspectives at play. These perspectives reflect not only the logics of agency for distinct urban productive activities, but also demonstrate their own temporal logics. Productive processes illuminate these differences and possibly indicate how these could be synchronised through planning-relevant interactions. For this, encouraging and sustaining communication along with active engagement between diverse sets of stakeholders and their activities are beneficial. Planning-relevant interactions following this concede to decreased plannability and increases focus, instead, on creating moments for or catalysing as well as stabilising its interface for (inter)action. Through (inter)action, shared concerns and needs from productive stakeholders can be surfaced to engage the explorative attention from planning stakeholders for policy crafting and development. Planning in this sense is less procedural and regulatory and more synaptic. It seeks to:

- build shared understanding or strengthen knowledge transfer,
- promote and coordinate social and spatial (inter)action,
- build capacity for dynamism and deliberation instead bureaucracy,
- and enhance productivity of social or spatial exchanges.

This stresses complex processes that welcome opportunities to feedback and feedforward into continued (inter)action with insights grounded in the past and through opportunities presented in the future. Put differently, it shifts our understanding of flows of activity over time from a weak to a strong process view; processes does not only happen to things but are constant (re)constitutions of reality (Cloutier and Langley 2020). Productivity, in relation to this, is still about input and output relationships in production (Ben and Wang 2011) and how this emerges through urban production. However, we argue that it is not only the subject of our inquiries but also a possible quality and way of framing how we design and deploy processes of urban development.

> Processes can become productive when they effectively expose how activities are tightly interwoven through software, hardware, and orgware to change tangible assets and intangible values. The latter need to be countered and negotiated with committed (inter)actions towards sustainability and social imperatives.

To help frame such an understanding of productive processes, we introduce agency perspectives that illustrate interests and levels that (inter)act in planning relevant processes. The next section will introduce this framework in greater detail.

Perspectives and process framework

As a part of our efforts through a pilot project on the *SAIL – Sustainable Adaptation of (Peri)Urban Industrial Lands*, key agency perspectives are brought together in a triadic framework (compare figure 2). The intent of this framework is both analytical and reflexive in exploring how productive processes for the future of urban and industrial lands could be better shaped. The three components of the triad represent on one hand the agency perspectives for shaping urban and industrial lands 1) productivity, 2) planning & policy, as well as 3) stakeholders and management. Additionally, they highlight the agency levels at which these forces interact or overlay each other to shape urban production: 1) firms (individual), 2) district (collective), and 3) city (multi-collective).

The first agency perspective *productivity* reflects the experiences at the firm-level. These respond to emerging trends and dynamics from technology, research and development, as well as consumer demands. Productivity in this sense is not just input-output production relationships but the quality of these relationships expressed through different combinations of software, hardware, and orgware. These enable and limit the range of urban production activities as discussed earlier. For instance, traditional craft manufactures will employ classic manufacturing activities with a labour force to generate products for their consumers. They might also offer repair services for these same customers. In contrast, a new generation of manufacturers who employing devices such as 3D-printers or CNC machines might be able to manufacture products for customers, but not offer the additional repair services comparable to the traditional counterparts because their

manufacturing activities do not enable this. The agency here can also reflect Business-to-Busines (B2B) interactions that generate new industrial activities, demands, or solutions. Circular developments through which certain producers can valorise and capitalise on another producer's waste is an example of this.

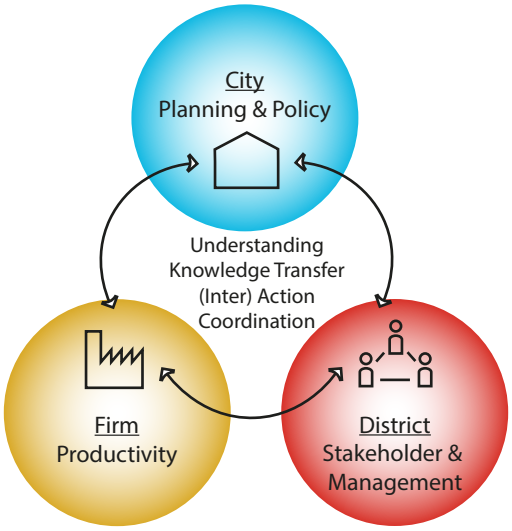

Figure 2: Triadic Framework: Agency perspectives for setting productive processes in motion.
Source: Authors

The second agency perspective *planning and policy* frames how public administrative representatives react to the new economic and spatial demands from firms. While much of this is addressed in the jurisdiction or planning or land use regulations (orgware), there are also efforts to affect development activities (software) and structures (hardware) through strategies towards creative or circular development. The Leipzig Charter from the European Commission (2022) is an example of the former while Circular Economy initiatives from the Ellen MacArthur Foundation (2022) indicate the latter.

The final agency perspective denotes the collection of diverse *stakeholder and management* arrangements at the district scale. Agency here refers to cooperative or coproduced results that maintain collaborative or symbiotic interactions. The spatial scale is underscored here not only because of spatial patterns (co-location at, densification, intensification) that delineate the arrangements, but because of the many and diverse actors invested in similarly bounded areas with shared or comparable needs and challenges. These range from owners to producers. All together they should be accounted for in the design, planning and development processes of sustainably adapting urban and industrial sites. By discerning combinations of process elements according to diverse agency perspectives, it is possible to better understand how different thrusts of agency from different levels interact over time. What also becomes clearer is that planning processes for industrial lands can no longer focus on singular processes but must shift through continual and possibly into continuous patterns of (inter)action and coordination with ultimate aims for transformation. Firms cannot afford not to interact with each other or with public administrations. They must first engage with each other to determine shared concerns and demands, which they can then collectively articulate to public administrations.

This means a business to district (B2D) interface is the final and key component of the framework to support actors and sustain agency that accounts for and aligns the productive and temporal logics from firm and city levels and perspectives. The justifications for this become more compelling in the face of trends discussed earlier or emerging gaps in knowledge. Gaps that surface could, for instance, result in sourcing and procurement demands for circular production; this could require frequent updates as upcycled waste or up-stream materials run out.

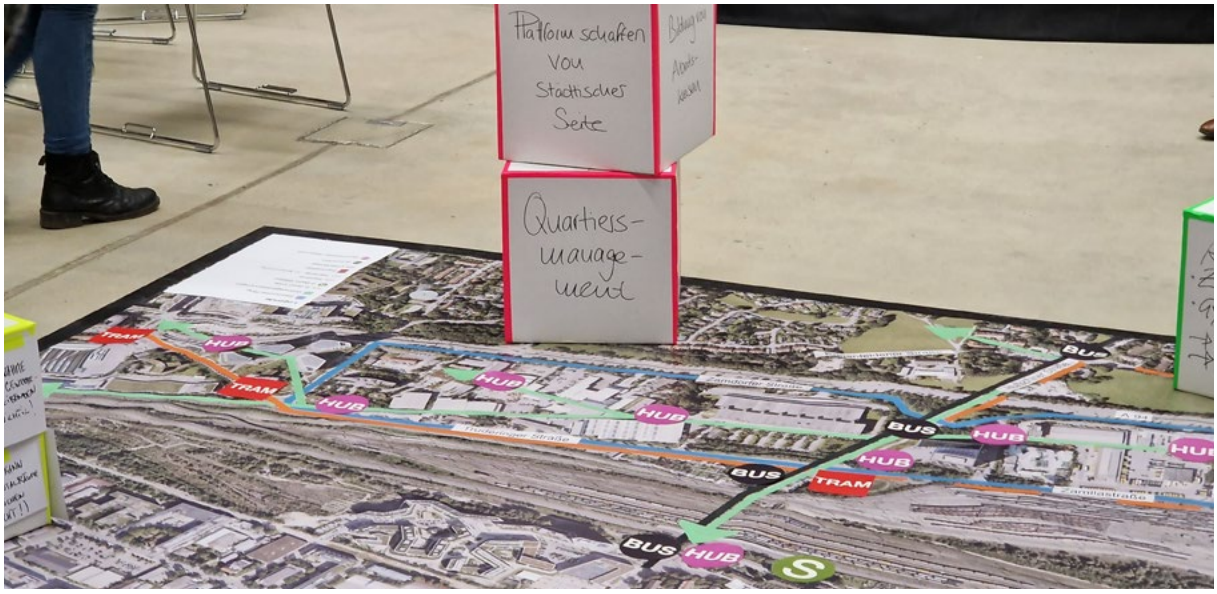

Figure 3: Workshop recommendations for a district-scale platform to manage processes of adapting industrial lands. The tangible results were photographed from a workshop on urban and industrial lands in Munich in January 2023. Participants included representatives of public administrations, industry, development, and civic society. Source: Robin A. Chang.

The strong process view encouraged through this framework recognizes that each agency perspective has its own logic for activity and recursive dynamics of change; these bundle software, hardware, and orgware distinctly with unique emphases. The various logics of different activities can be invited and integrated into broader and collectively productive processes for adapting urban and industrial lands. The inquiry through this process seeks to set interactivity in motion in such a way that coordination and knowledge become transferred. The former is cooperatively maintained, developed, and stabilized. The latter addresses issues of *what and where* (system knowledge), the *why* (target knowledge), and the *how* (transformation knowledge) as change unfolds. Figure 4 visualises this strong process view and how it relates to (inter)activity as well as knowledge resulting from processes. Please note that this visual emphasizes the processual interaction and fails to explicate fully the mutually constructive relationships between process and structural elements (software, hardware, orgware).

This framework advances that the era upholding planning and development of industrial lands through monofunctional designs and mono-intentional strategies is no longer relevant. Instead planning processes du jour are recursive and place-based efforts in building governance capacity. These processes set the conditions for discourse as well as

policy and regulation crafting while juggling and adapting the coordination of evolving demands. By linking the combinations of resources, potential capacities that evolve with urban and industrial lands, along with their owners or tenants, productive processes in pushing towards mediating connections that are not only spatial but social, too. An even more radical foresight is to argue for the public hand to facilitate such productive processes as a public service. This becomes fundamental if we reflect again on the employment opportunities, or the products and services that come from urban and productive lands. With evidence that industrial lands are gentrifying (Boeck and Ryckewaert 2020), the justifications for public administrations to take on governance management responsibilities could potentially grow stronger.

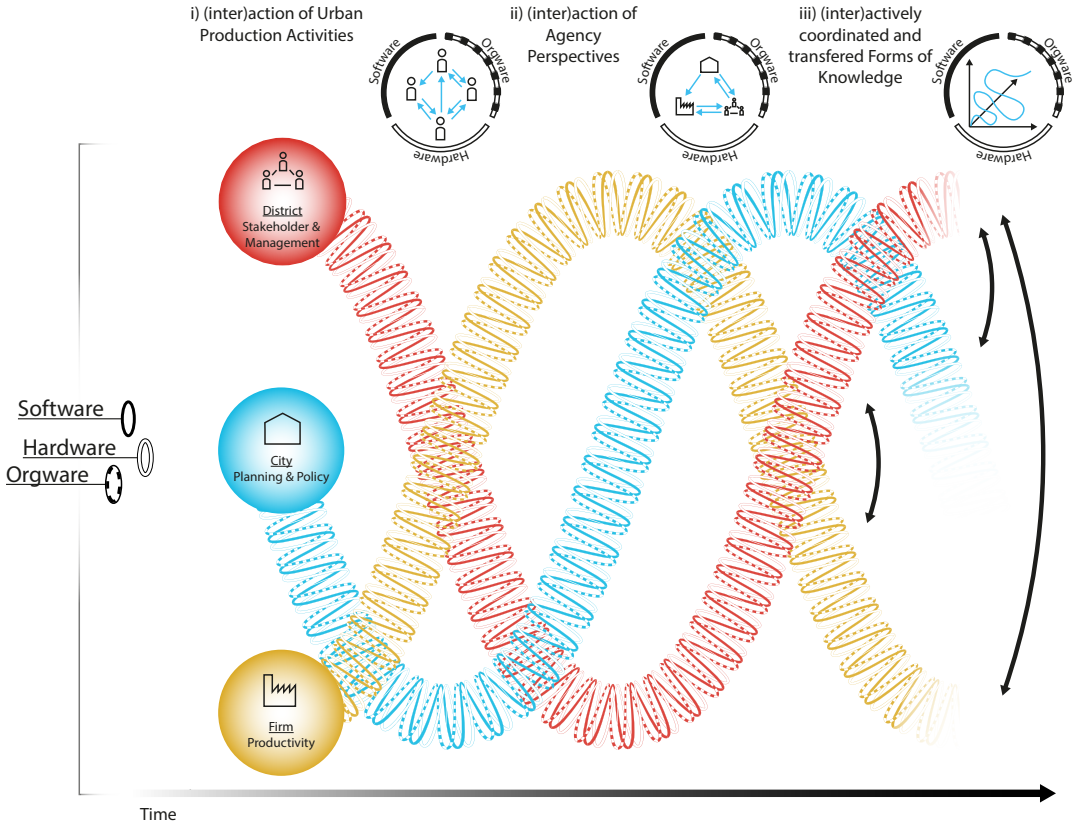

Figure 4: Agency perspectives interacting over time - a strong process view. As cross-sections for this process are also different dimensions of (inter)action between different (i) urban production acitvities, (ii) agency perspectives, and (iii) forms of knowledge that result from the (inter)activity. Source: Authors.

Looking ahead

The steps towards sustainable adaptation of urban and industrial lands are still numerous, but the pathways for these are not impossible once cities and their communities familiarize themselves with the processes through which they might be taken. We have argued here for a strong process framing that undertakes the shift from urban production to productive processes. This shift draws on the agency of multiple key stakeholders and spatial perspectives that act across levels. It also asserts that the logics and

interests from firm- or city-level activities need to be convened to interface at a district-scale in space and for (inter)action. This, however, cannot happen without considering how logics of activity unfold within realms of urban production and planning. The respective differences of these logics can be teased out by highlighting combinations of software, hardware, and orgware. And, depending on the place-based contexts and conditions that shape cities unique agency perspectives, different configurations of combinations of software, hardware, and orgware will generate qualitative differences in how we can sustainably adapt urban and industrial lands. It is not lost on us that the framework here could be improved with real world case studies and analyses grounded in practice. Gaps also remain in articulating more precisely how logics are inflected with different temporal attributes. Indeed, the outlook for this work is to continue developing the spatio-processual syntax here so that we can actualize shifts in urban production throught productive processes.

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