

Towards Society 5.0

Enabling the European Commission's Policy Brief 'Towards a sustainable, human-centric and resilient European Industry'

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RESEARCH NOTE

Towards Society 5.0: Enabling the European Commission's Policy Brief 'Towards a Sustainable, human-centric and resilient European Industry'

Prof Christian Nielsen & Prof Jacob Brix

The concept of Society 5.0 – a superintelligent society of humans, nature and technology in sustainable balance – was launched in Japan in 2016. Danish business academics Prof Christian Nielsen and Prof Jacob Brix propose a systematic, second track, bottom-up ‘society transition model’ to ease the shift towards this next stage of society.

Introduction

The European Commission published an highly relevant policy brief¹ entitled: 'Industry 5.0: Towards a sustainable, human-centric and resilient European Industry'. The vision elaborated in the policy brief is to recognise the following:

“the power of industry to achieve societal goals beyond jobs and growth, to become a resilient provider of prosperity, by making production respect the boundaries of our planet and placing the well-being of the industry worker at the centre of the production process.” (...) “by having a research and innovation drive the transition to a sustainable, human-centric and resilient European industry (...) that moves from solely shareholder value to stakeholder value for all concerned.”²

Although the degree of the managerial and organisational implications stemming from realising such a vision would naturally be determined by the individual organisation, local community, or region, such an idea would significantly affect the existing

1. Breque *et al.*, 2021

2. Breque *et al.*, 2021, pp. 3–4

routines and ways of working for established companies and organisations in all sectors. With this research note, our agenda is to propose how the transition towards Industry 5.0 and a more encompassing Society 5.0 can occur in practice.

Unlike prior contributions such as Japan Cabinet Office³ and Breque *et al.*,⁴ which start from the policy level and aim downward, this research note inverts the lens. It takes the point of departure in what local actors from different sectors can do to start materialising a Society 5.0 vision. We propose the 'Society Transition Model (STM)', a systematic, second track-based, bottom-up method that can be used in the early phases of initiating the transition towards a Society 5.0. STM is validated by a case study of how a bottom-up process was undertaken towards a Society 5.0 in the city and region of Aalborg, Denmark.

Differences between Industry 5.0 and Society 5.0

Inspired by Huang *et al.*,⁵ it is essential to clarify the key differences between the two constructs, Industry 5.0 and Society 5.0 since they are co-emerging and gaining traction separately. The European Commission's policy brief recognises that Industry 5.0 is an open and evolving construct that can be defined as follows:

"Industry 5.0 recognises the power of industry to achieve societal goals beyond jobs and growth to become a resilient provider of prosperity by making production respect the boundaries of our planet and placing the well-being of the industry worker at the centre of the production process."⁶

By comparison, Society 5.0 is "A human-centred society that balances economic advancement with the resolution of social problems by a system that highly integrates cyberspace and physical space".⁷ Central to Society 5.0 is creating a balance between economic development and solving societal issues. In Society 5.0, the metaverse is envisioned to play a crucial role in creating more value and better lives by exploiting the advantages of mixing citizens' physical and digital lives. The similarities between the two constructs are, e.g., the importance of human-centeredness and the resolution of societal and social problems. However, Industry 5.0 narrowly focuses on the industrial worker and Society 5.0 on citizens in general. Both constructs emphasise the parallel development of technological and social innovation instead of focusing too much on technology and too little on humans, as in Industry 4.0 and Society 4.0.⁸ We also see a difference in the pace within which the two areas have evolved. Society 1.0 started thousands of years ago with the hunter-gatherer society and is now in the Society 4.0 stage (information society) with the potential to move onwards to Society 5.0 (the super smart society).

In several parts of the world, we stand on the edge of a transition towards society 5.0, which makes new promises, i.e., to solve significant societal challenges in combination with an increase in wealth. Industry 1.0 to 4.0 and towards 5.0 has taken a shorter time, starting its evolution within the industrial society (Society 3.0). Both concepts agree on 'human centrality'; however, while Industry 5.0 focuses solely on the industrial worker, Society 5.0 holds a much broader perspective on citizens.

3. Japan Cabinet Office, 2016

4. Breque *et al.*, 2021

5. Huang *et al.*, 2022

6. Breque *et al.*, 2021, p. 14

7. Japan Cabinet Office, 2016

8. Gershenfeld *et al.*, 2017

Why Society 5.0 and 'not only' Industry 5.0

While the Commission's policy brief takes a manufacturing company perspective, we stress the importance of broadening this approach towards a larger systemic view by tapping into the local, regional and national ecosystems. Our logic is that if we detach the broader society from industry, we risk missing out on significant social and technological innovation opportunities. We are not alone in sharing this view: "Industry is an integral part of society. The revolution of the industry will push the development of society. Also, the transformation of society will promote the next industrial revolution."⁹

New societal movements typically emerge as a response to solving the problems created within the existing societal form.¹⁰ The outcomes and potentials associated with Society 5.0 include, e.g., improving citizens' health and well-being, attracting and retaining talent and ensuring long-term prosperity – with resilience and sustainability as core themes. That is, we are currently moving towards a super-smart and human-centred society. Therefore, stakeholders in a region are bound to find it relevant to push for such a transition and proactively work towards it instead of ignoring it. There is a distinct advantage in taking an 'act-and-see' approach instead of a 'wait-and-see' approach.¹¹ The point is that now is the time to grab the social aspects of innovation and let both technological- and social innovation co-evolve much closer and better than we have seen until now. With increasing attention towards the seamless mix of cyberspace and physical space, we already see the metaverse as a technology that turns data into things and things into data to create value and higher standards of living.¹²

Conditions for success

The second track concept is inspired by principles of international diplomacy and conflict resolution, emphasising a focus on the common problem rather than the similarity of the involved stakeholders.¹³ The participants' relationship with the problem, rather than with each other, makes collaboration effective. Shaping the collaborative environment is crucial, not in terms of matchmaking between partners but rather in terms of all participants being connected to the same third parties and the problem at hand. This creates mechanisms that, over time, transform both individual and group cognition, establishing a common understanding of the problem. Thus, the mental models that facilitate collaboration do not depend on a perfect exchange but encourage sharing without expecting payback. Second track processes embrace higher levels of complexity and can transcend apparent paradoxes in societal development.

Essential conditions for success in such a second track-based collaborative effort identified in the 'collective impact' literature¹⁴ and inter-organisational learning and co-production models.¹⁵ Kania and Kramer¹⁶ recognise five characteristics of successful collective impact:

1. Create a common agenda, including a common understanding of the problem and a joint approach to solving it through agreed-upon actions.
2. Develop a shared measurement system with indicators on different levels that are used consistently by all actors to create alignment and hold each other accountable.

9. Huang *et al.* 2022, p.427

10. e.g. OECD, 2011

11. Ross *et al.*, 2018

12. Gershenfeld *et al.*, 2017; Nielsen & Brix, 2023

13. Bjurström *et al.*, 2020

14. Kania and Kramer, 2011

15. cf. Brix *et al.*, 2021

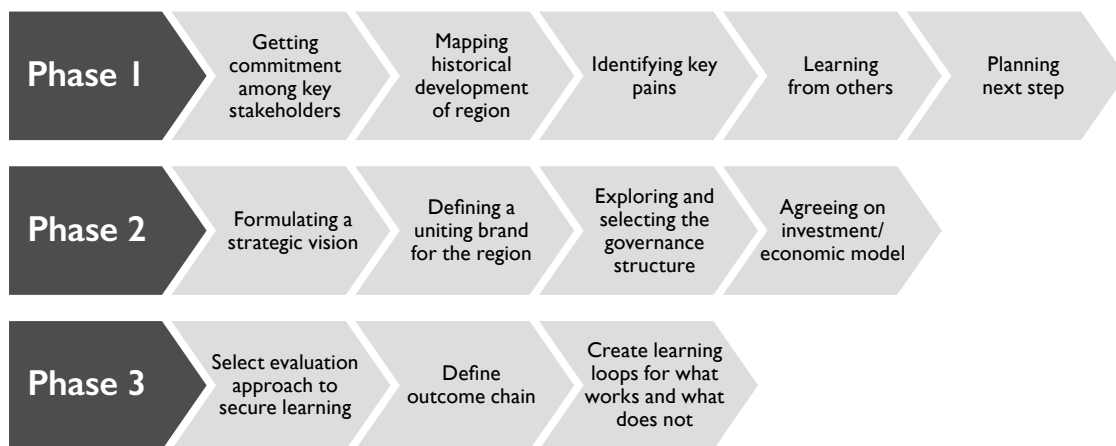
16. Kania and Kramer, 2011

3. Creating a plan of action with mutually reinforcing activities allows all stakeholders to make their efforts fit the schedule. The point is that uncoordinated movements by isolated organisations will deliver different results than coordinated actions.
4. Creating trust among actors through continuous communication. Creating a shared vocabulary is essential, and the organisations' CxO level leaders must participate, not skip meetings or send lower-level delegates. Here we can add having a pay-it-forward attitude.
5. Creating a backbone organisation is critical. This organisation's responsibility is coordinating and supporting the program-level infrastructure, such as facilitation, project management, data collection and reporting, logistics and administrative details.

A Society Transition Model (STM)

In this light, we propose that the transition towards Society 5.0 can be enacted in three different phases, each with distinct steps that take the initiative from a fuzzy ambition towards activities that can be evaluated formatively to create new knowledge relevant to learning and development.¹⁷ Breque *et al.*'s¹⁸ policy brief explain the visions and expected outcomes of working towards industry (and society) 5.0, and they summarise the 'next steps' on national and international policy levels. This research note identifies and unfolds concrete actions that actors can take as first steps on a local and regional level in establishing a Society 5.0 movement. We hence approach the society 5.0 movement with an empowerment line of thinking by developing a systematic model for local actors on how to take action here and now, so they can 'act and see', instead of waiting for new national policies to be created.

FIGURE I: Society Transition Model (STM)



Source: Authors' development

¹⁷. Brix *et al.*, 2020

¹⁸. Breque *et al.*, 2021

The Society Transition Model (STM) is explained in more detail.

Phase I – Initiating a Society 5.0 movement

1. Getting commitment among key decision-makers to explore the opportunity of one's city/local area/region concerning Society 5.0
2. Mapping the historical development of the city/areas/region's stages of development to understand the critical transformational success factors of that region
3. Identifying key 'pains' for the region and building a coalition of actors with decision-mandate from the public, private and third sectors.
4. Learning from others: reflecting on what could work well and less well back home
5. Planning: what should happen next?

In this respect, two important questions arise: 1) How do we secure a forward-looking governance structure where stakeholders are responsible for the common goal? and 2) how do we ensure that momentum is created and maintained in such an organisation to sustain the action? Having gone through the preliminary exploratory work, the project group will enter a second phase of the Society 5.0 project, devising a plan for moving the Society 5.0 transition forward.

Phase 2 – Devising a plan for moving the Society 5.0 transition forward

- Formulating a strategic vision. Such a strategic vision should be formulated by including major stakeholders and considering students, citizens and the organisations that wish to participate. This should be a high-level vision reaching out towards a 2050 horizon. It should provide a basis from which the following tasks can evolve.
- Defining a uniting brand that can be communicated to promote the region.

- Exploring and selecting the best-fitted governance structure to coordinate activities and ensure critical stakeholders' communication, activities and participation.
- Agreeing on an investment/economic model for enabling and maintaining the transition to Society 5.0. Investments can be in monetary resources, human resources, technology, and relevant workplace access.

Phase 3 – Making it work through continuous evaluation

Inspired by Brix *et al.*,¹⁹ we find three characteristics relevant to the identification and selection of evaluation methodologies of Society 5.0. These are:

1. Many stakeholders are involved in the process (e.g., public, private and third-sector organisations, as well as the general public, such as citizens, users and alike).
2. The activities representing Society 5.0 emerge and change over time and can merge and divide.
3. The activities representing Society 5.0 are not limited to one particular context (e.g., organisation) but take place as sequences of interactions and simultaneous interactions occurring in different contexts, e.g., across organisational boundaries.

Because of these characteristics, it is possible to frame Society 5.0 as a complex social phenomenon – a 'wicked problem'. This implies that it is impossible to infer context-independent causal relationships between activities and effects/outcomes. For purposes of evaluation, this means that methodologies within the range of 'contribution analyses' are relevant to use, for example, 'theory-based evaluation' and 'contribution stories'. Because of the high degree of complexity, it is not possible to distil 'ultimate truths'.

19. Brix *et al.*, 2020

Rather evaluators and stakeholders interested in the results of the evaluation will have to accept that evaluators only can bring to light contributions stories that will have to be regarded as a satisfactory conclusion concerning the extent and reasons why a given activity – or range of activities – has led to shared outcomes. This evaluation approach can be used to support the learning required to make progress and identify 'what works and what does not' in the collaboration. In this way, the formative approach to evaluation becomes a way to operationalise the second track process.

The case of Aalborg's "AA 5.0 movement"

This research note complements existing policy briefs by reporting on a process and distilling the mechanisms that generated the outputs and outcomes that made the City/region of Aalborg what it is today. Doing so sheds light on the process, barriers and opportunities in the transition towards a Society 5.0 style. In the following, we present a short case study of Aalborg's experiences following the STM logic.

Phase I: Initiating the movement

A group of forward-looking decision-makers led by the Mayor of Aalborg, the Rector of Aalborg University and the CEO of the Port of Aalborg took the initiative to discuss the prospects of the region of Northern Jutland, in which Aalborg is the central city. The promises associated with Society 5.0²⁰ intrigued the group. A commitment was made to explore the opportunities and barriers related to Aalborg's potential transition to a Society 5.0 region.

In the early stages, this group consisted mainly of representatives from municipal institutions, Aalborg University, and infrastructure providers. An output

of the first range of meetings was producing a book that provided a historical and economic account of the Aalborg region's development – from earlier societal stages to the present day.²¹ This mapping aimed to create insight into the characteristics of Aalborg's growth and prosperity successes and created, at the same time, a well-founded, transparent, and explicit account of the current state of affairs in the region. We argue that this is an essential foundation to build when searching to transition from a society of 4.0 towards 5.0.²²

Simultaneous to the production of the book "The Town by the Fjord",²³ a project group representing a concentration of the involved stakeholders formulated a Memorandum and a short-form pamphlet²⁴ to identify the critical plans and to describe the sense of urgency. This work helped build a guiding coalition for the project under the working title "AA 5.0". The university, the municipality, and an infrastructure provider invested in project-leader capacity in this project group.

One of the key learnings from the Memorandum was that Aalborg historically had been successful when it reached out for knowledge and resources beyond the Danish borders. Therefore, the first formal activity for the group was to complete a study trip to learn from others and gain inspiration from outside of Denmark. Regional and international experts were contacted, and a study trip was planned to Eindhoven in the Netherlands to visit the already implemented organisation *Brainport Eindhoven* which in many ways represents a region that qualifies as a Society 5.0 under rapid development. A broad stakeholder group was invited to the study trip, including sports clubs, public institutions, companies, and regional investment organisations. Visits were made to public, private and third-sector organisations to learn from their insights and experiences.

20. Japan Cabinet Office, 2016

21. Nielsen *et al.*, 2023

22. Huang *et al.*, 2022

23. Nielsen, 2022

24. Manifest AA 5.0, 2022

Following the study trip, Aalborg University invited the participants to a follow-up workshop to reflect on key learning points and map and understand the participants' perceptions, views and impressions of Brainport Eindhoven. In addition, the workshop's purpose was to provide input, making it possible to devise a plan for moving forward toward planning the next step.

Phase 2: Devising a plan

The project group's suggestion for the first task in this second phase is to formulate a strategic vision for Aalborg and to create a committed coalition to invest in this vision. Such a strategic vision should be formulated by including major stakeholders and considering students, citizens and the organisations that wish to participate. This should be a high-level vision reaching out towards a 2050 horizon. It should provide a basis from which the following tasks can evolve. Hereafter a second task is to define a uniting brand communicated to promote the region. Parallel to this task, the founding members must explore and select the best-fitted governance structure to coordinate activities and ensure critical stakeholders' communication, activities and participation. Finally, a critical task would be to agree on an investment and economic model for enabling and maintaining the transition to AA 5.0. Investments can be in monetary resources, human resources, technology, and relevant workplace access.

Aalborg needs investment money to move technology projects across the 'valley of death'. Here we have a distinct weakness in comparison to other parts of Denmark. We need a much more open dialogue among investment-related organisations, investors, technology-developing organisations and supporting business research institutions to ensure that investments and knowledge about such investment processes remain within the region.

It is also crucial for our future prosperity that investments in research and development (R&D) are improved. Respondents argued that Danish companies invest 2,5% of dividends in R&D, compared to an average of 6% in European companies. This allegation was attempted to be proven by studying Eurostat data; this was without closure. While Denmark indeed is lagging behind nations such as Germany, the US and several Asian countries on R&D investments, the level was not alarming when compared to similar European countries. It was also found essential that local companies were willing to invest in their R&D and research with other organisations and the university. There was evidence of a lower R&D investment ratio in Northern Jutland compared to the rest of Denmark. This would need to be addressed to relevant politicians and regional business organisations. Among additional pertinent questions to discuss going forward:

- Are Aalborg-based companies good enough at paying it forward and housing start-ups in symbiosis-like relationships?
- Are Aalborg-based companies good enough at investing in research in terms of funding PhDs?
- Are Aalborg-based companies good enough at employing the talents being educated locally, hence keeping talent in the region?

The companies participating in the second phase of this movement unanimously articulated worries about the ability to attract and build the right competencies and skills for the future work market. The discussions pointed towards creating jobs, creating tech/knowledge-based start-ups with scalability potential, attracting investments to create growth, enhancing international collaboration, attracting global talent with their families, and retaining them in the region.

Using McGuire's²⁵ network management framework, it is evident that the second track process needs to be lifted into a broader societal

25. McGuire, 2015

sphere for collective success to be achieved. However, before framing and activating citizens, a brand and governance structure needs to be in place to secure that the mobilising and synthesising phases can take place. Mobilising is concerned with creating support for the networks' activities from internal and external stakeholders, establishing and maintaining the legitimacy of the network, and using incentives to keep stakeholders motivated. Synthesising is also essential because it creates conditions for network participants to collaborate and reach their goals by helping build relationships and interactions among members.

Phase 3: Evaluation and learning

Once the second phase has been completed, there is an important job in operationalising the outcome chain of the AA 5.0 project and ensuring that the actors participating in this movement towards Society 5.0 in Aalborg agree on 'what is important' and 'why'.

Conclusions

This research note aimed to illustrate how the transition towards Society 5.0 could take place in practice and, in that sense, answer the enabling part of the European Commission's Policy Brief 'Industry 5.0: Towards a sustainable, human-centric and resilient European Industry'.

The policy brief designates that a future-state sustainable, human-centric and resilient European society must move from solely shareholder value to stakeholder value for all concerned. This means value creation must satisfy all relevant stakeholders in the Penta-helix (Manifest AA 5.0, 2022). Therefore, we propose that moving towards Society 5.0 can be supported by second track processes using the Society Transition Model (STM).

Besides the reported case study from Aalborg, our empirical probing has identified similar transitions in the Eindhoven region in the Netherlands and

Philadelphia, USA. These bottom-up initiatives represent initiatives where people from different sectors collaborate to create private and public value, which implies a human-centric approach to ecosystem innovation and collaborative governance.²⁶ Interestingly, Society 5.0 success depends on a solid regional and societally oriented university where local companies are willing to invest in R&D capacity and co-creation/co-research with academics and students (EUA, 2021). Should a region be interested in embarking upon a Society 5.0 transition, our experiences here indicate that it is necessary to create a backbone organisation whose objective is to support and help enable the societal developments that will take place – this acting both as a facilitator and an orchestrator to create an effective governance model.

The AA 5.0 project team identified several other concerns regarding initiating such an action group. However, clarifying the necessary investment to kick off the project is crucial to an embarkment. In addition, we need to ask what should be invested by companies and what should be invested by public institutions. In Eindhoven, each municipality pays a fee per inhabitant to Brainport Eindhoven, and companies invest in the Brainport Eindhoven organisation with money and allocate staff. The companies in Eindhoven are willing to keep investing from year to year, so they testify that Brainport Eindhoven gives them value for money, although not with a direct ROI calculation from year to year. In other words, they are willing to "pay it forward". Therefore, the question to local, regional and national decision-makers is: are we ready to initiate your community's transition towards a 5.0-version, or would you rather 'wait-and-see'?

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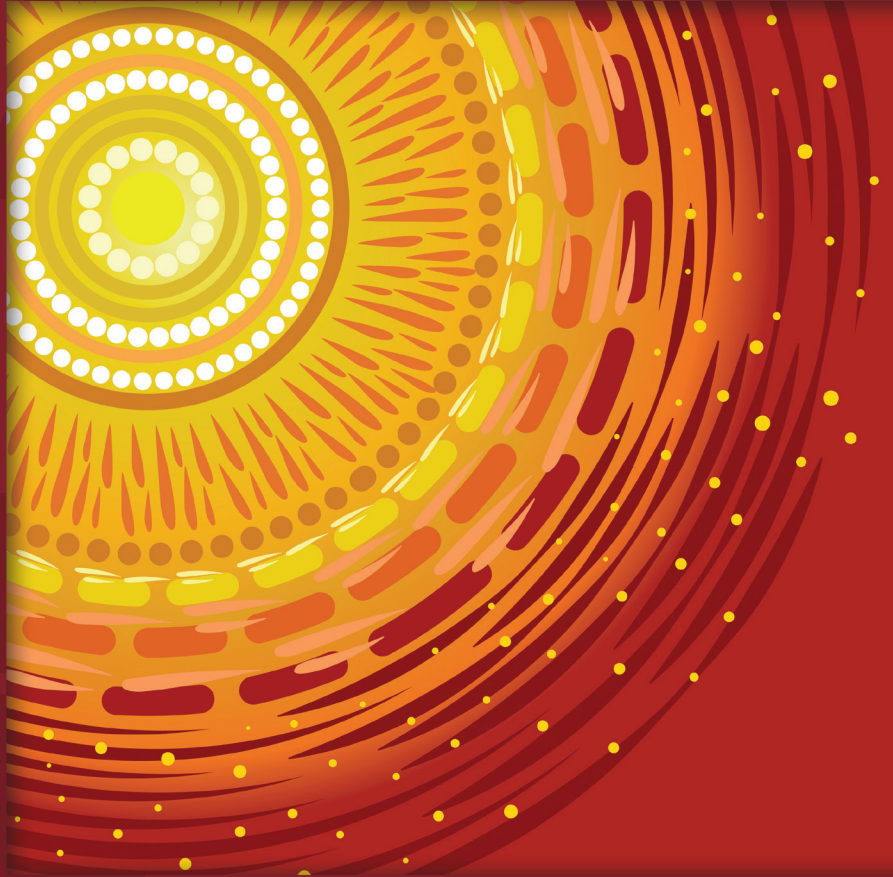
26. Brix and Antonsen, 2022; Klitgaard, 2023

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