The Society 5.0 Landscape and Research Agenda

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Abstract

Different approaches are adopted in this paper to develop a conceptual Society 5.0 landscape overview as well as a roadmap and a preliminary research agenda. In the first place, we employed Social Network Analysis (SNA) on Twitter to identify the communities and communication around Society 5.0, followed by content analysis of two collected document repositories, one a set of academic publications and one a set of popular press articles on Society 5.0. We used the results of these investigations to develop a conceptual landscape overview of Society 5.0 using the themes that were identified during the analysis. The landscape model was subsequently used as a baseline to develop an initial research agenda for Society 5.0 studies. Anyone interested in doing research or adopting the Society 5.0 vision should benefit from our contributions.

1 Introduction

Humanity has experienced unprecedented technological developments during the past few decades, and few can argue that the lives we live and societies we are part of are undergoing vast, often unexpected, adjustments and transformation. More and more voices are requesting a rethink of the relationship we as humans have with technology in this new world. *Society 5.0* is the term that emerged to describe the new society that is the result of *"... the high degree of merging between cyberspace and physical space"* where we *"will be able to balance economic advancement with the resolution of social problems by providing goods and services that granularly address manifold latent needs regardless of locale, age, sex, or language"* [10]. The concept was first introduced in 2015 by Japan in their Fifth Science and Technology Plan.

However, despite the relevance and importance of Society 5.0 in the socio-technical landscape, there is no coherent vision or research agenda that guides research and adoption of Society 5.0. Initial investigations indicate the inclusion of very diverse topics into different definitions and visions about Society 5.0. In this paper, we use different approaches to develop a conceptual landscape overview and roadmap, as well as a preliminary research agenda for Society 5.0. We employed Social Network Analysis (SNA) on Twitter to explore communities and communication around Society 5.0 and related topics and the results of this study indicate limited integration and networks on Twitter. However,

related topics such as Industry 4.0, IOT and AI reveal intense interactions and discussions amongst different communities, which point to the necessity to develop a holistic view about Society 5.0 that incorporates discussions of these communities, which is the objective of this paper. The SNA analysis was therefore followed by content analysis of two collected document repositories, one a set of academic publications and one a set of popular press articles on Society 5.0. The results of these investigations were used to develop a conceptual landscape overview of Society 5.0 with all its concepts and facets. This conceptual model was subsequently used to develop a roadmap as well as an initial research agenda for Society 5.0 studies. Our contributions will be of value to any scholar or practitioner interested in doing research or adopting the Society 5.0 vision.

2 Background

In this section we provide background on Society 5.0 as well as the techniques and tools used within this study.

2.1 Society 5.0

We live in exciting times that present us with numerous new innovations and opportunities. However, as a society we also face many challenges, such as global warming and unequal resource distribution. In this era of challenges and opportunities, Japan has introduced a new concept, Society 5.0, which refers to a society that, "through the high degree of merging between cyberspace and physical space, will be able to balance economic advancement with the resolution of social problems by providing goods and services that granularly address manifold latent needs regardless of locale, age, sex or language" [10].

Society 5.0 follows the hunting society (Society 1.0), agricultural society (Society 2.0), industrial society (Society 3.0) and information society (Society 4.0). There is often confusion about whether Industry 4.0 actually did precede Society 5.0, and how these notions interlink. In 2019, Society 5.0 was acknowledged by the World Economic Forum and it was stated that "…As for the problems to solve, Society 5.0 aims to answer both the future economic and societal challenges faced by humanity at its present and future stage, by using all the advances of Industry 4.0" [54].

The question that arises is: what will be different in Society 5.0? Currently we live in a society in which knowledge and information are used without sharing, whereas in Society 5.0 the internet of things will connect all people; data, information and knowledge will be shared; and new value contributions will be possible. Society 5.0 will overcome social disparities regarding access to goods, for example, by using drones for distribution in rural areas. People will not be overwhelmed by information, as technology will be used to analyse large datasets, and other information and recommendations will be made based on the findings.

In 2019, Nakamura Michiharu [35], senior advisor to the Japan Science and Technology Agency, linked the vision of Society 5.0 with the UN's Sustainable Development Goals (SDGs). SDG 4, for example, focuses on education, with an emphasis on using technologies such as e-learning systems to make education affordable and available to everyone. In 2020 the use of e-learning systems became highly pertinent during the worldwide lockdown periods when teachers and students had to adapt to remote teaching and learning.

Society 5.0 is still a new concept and there are not that much written about Society 5.0. Within existing literature definitions and perspectives differ substantially, which motivates this research that was concerned with establishing an overview of Society 5.0 with an associated roadmap and research agenda. The remainder of this background section provides short summaries of the research approaches adopted for the study.

2.2   Social Network Analysis on Twitter data

Community interactions provide a specific lens for understanding society and how information flows and develop [47]. In our modern world social media is one of the most important forms of communication and plays an important role in determining the adoption of new terms, as well as views and opinions [3, 19, 25, 26, 46]. Social network analysis (SNA) is a mechanism that analyse network structures in social media and the results assist with deciphering how information and ideas flow, as well as how opinions and interactions develop [27]. SNA therefore provides a unique mechanism to analyse how a term and topic such as *Society 5.0* develop and is adopted on social media.

We used Twitter to collect social media data for this study as Twitter is known for idea development by social media influencers. The Twitter platform was released in 2006 and it is described as a minimalistic microblogging platform where user posts are limited to 280 characters [60]. Users can markup their tweets using hashtags, and they can follow or reply to other users using their Twitter handles. Twitter is adopted by users to share often controversial opinions, as well as to connect and interact given events, interests, and topics. Twitter is known for the rapid spread of content through the Twitterverse, and it is therefore an ideal data source to analyse for the adoption of specific terms and concepts such as Society 5.0 [61].

The Social Media Research Foundation (SMRF) [59] was established to investigate and assist scholars with tools and methodologies to do SNA. They developed a SNA tool, NodeXL [13] with an associated methodology for SNA on Twitter data. Subsequent research using NodeXL on Twitter identified six distinct archetypical network patterns that depict community conversations that are shortly summarized in Table 1 [20, 48].

The ***Polarized Crowd*** depicts a small number of divided groups that ignore each other.

The ***Tight Crowd*** depicts highly interconnected nodes typical of communities interested in a specific event or topic.

Brand   Clusters   is   highly fragmented and depict information flows about products, services, or celebrities.

Community Clusters depicts multiple smaller groups or hubs with an own audience, influencers, and sources of information.

A Broadcast Network depicts a distinct hub-and-spoke that reflects discussions around topics such as breaking news stories or opinions of influencers that are repeated.

A Support Network is also a hub-and-spoke   observable   where customer   services   for   a   major business   are   handled   by   Twitter service accounts.

Table 1: Social Media Network Patterns (reproduced from [48])

In this study we used NodeXL with the associated SMRF methodology to analyze Twitter data collected using the term "Society 5.0", as well as related terms. The research method is presented in Section 3.

2.3 Classical content analysis and word count analysis

One of the most accepted methods to understand a topic and its landscape, is to analyse the existing published literature on the topic, both academic as well as popular press publications. The academic body of knowledge and popular press articles therefore provide repositories for the identification and investigation of concepts and facets relevant to Society 5.0. In order to gain a thorough understanding related to Society 5.0, a literature review is executed to establish context and background, and to obtain insight into previous work related to the topic of investigation [44]. Four main types of executing a literature review have emerged namely traditional (synthesized narrative recording of chosen literature), systematic (highly structured analysis), meta-analysis (analyze findings from chosen literature) and meta-synthesis (analyze findings from chosen literature and build interpretations) [9]. Onwuegbuzie and Leech [39] identified 17 data analysis techniques used to analyze literature such as constant comparison analysis, keywords-in-context, word count, classical content analysis, domain analysis, taxonomic analysis, componential analysis, theme analysis, discourse analysis, secondary data analysis, membership categorization analysis, narrative analysis, qualitative comparative analysis, semiotics, manifest content analysis, text mining, and micro-interlocuter analysis.

In this study we applied 2 of these techniques, namely classical content analysis and word count analysis. Classical content analysis is a "technique for making replicable and valid inferences from texts to the contexts of their use" [28] and systematically (deductively or inductively) reduces sources to codes before counting the number of codes [39]. As a method, content analysis can be both qualitative (generally in developmental stages of research) or quantitative (applied to determine frequency of phenomena) [12]. Word count refers to tallying the number of times a particular word is used [39]. Both these techniques lend themselves to the application of technology to analyze the chosen literature and several software tools are available efficient analysis and visualization of large pooled primary qualitative datasets [12, 21].

We adopted Leximancer (www.leximancer.com) for content analysis and visualization of the academic literature repository. Leximancer is software that conducts quantitative content (semantic) analysis and relational analysis using unsupervised machine learning. The outcome of the analysis is presented in a concept map where the concepts identified are clustered into heat-mapped themes represented by colored circles [58]. We opted for MonkeyLearn (www.monkeylearn.com) for word count analysis and visualization of the popular press repository. MonkeyLearn is a machine learning platform for text analysis, with a tag cloud or word cloud feature for data visualization. A tag cloud is a visual representation of a weighted list of text data where the frequency of each tag is represented via font size [5]. The relevance score is algorithmically derived by combining key words frequency with other factors e.g. how descriptive and how long a word is [8].

3 Research Approaches

3.1 SNA analysis

For this study we adopted the SMRF method using NodeXL to detect community conversation patterns in Twitter data [48]. The purpose of the study was to determine whether there are recognizable communities and discussions about Society 5.0 on Twitter. The Twitter API limits the number of tweets that can be collected to a maximum of 18 000 tweets. For this study we collected three datasets using NodeXL, two about Society 5.0 and one dataset analysing related terms. Initial data cleaning included

the removal of duplicate tweets but adding an edge-weight value in this case. Within NodeXL tweets identities are unique vertices and interactions such as *replies* and *mentions* are directed edges and a replies-to creates a new vertex. A tweet that is just an opinion without replying or mentioning another Twitter user is represented with a self-loop edge.

- Dataset 1 (DS1): A dataset consisting of tweets from 329 Twitter users whose recent tweets contained "Society 5.0", or who were replied to or mentioned in those tweets, obtained from Twitter on Friday, 12 March 2021 and over the preceding 7-day period. Additional tweets that were mentioned in this dataset were also collected from prior time periods.

- Dataset 2 (DS2): A dataset of 148 users whose recent tweets contained ""Society 5.0" OR Soc5", or who were replied to or mentioned in those tweets from Twitter on 27 February 2022. The tweets in the network were tweeted over the preceding 8-day period but because the dataset was so small, additional tweets that were mentioned in this dataset were also collected from prior time periods.

- Dataset 3 (DS3): Because the two Society 5.0 datasets were quite small, we used dominant terms in tweets in the datasets to also collect a dataset to see whether there are Twitter communities and conversations on related topics. The resulting dataset was collected from 9 226 Twitter users whose recent tweets contained "(IOT OR "Industry 4" OR AI) AND lang:en", or who were replied to or mentioned in those tweets, collected from Twitter on Monday, 07 March 2022 and a few hours prior. Again, additional tweets that were mentioned in this data set were also collected from prior time periods that expand the complete time period of the data. This dataset was substantially larger than DA1 and DS2.

The Clauset-Newman-Moore algorithm [7] was used to detect groups and graph metrics were calculated for each dataset including the number of vertices, unique edges and self-loops (summarized in Table 2). The top words, hashtags, and word pairs by frequency of mention were determined for the overall network and groups in the network.

Graph Metric	DS1	DS2	DS3
Vertices	329	148	9226
Unique Edges	482	149	16805
Edges with Duplicates	0	32	8639
Total Edges	482	181	25444
Self-Loops	97	75	2551

Table 2: Graph Metrics for the datasets

The graph was visualised using the Fruchterman-Reingold layout algorithm, which is a force-directed iterative algorithm that results in a layout where edges a relatively similar in length for visualization purposes, but edge length has no meaning [15]. For this analysis betweenness centrality was used for determining the top vertices since it possibly indicates more central, and arguably, more influential vertices [14]. The results of the analysis are discussed in Section 4.

3.2   Classical content analysis and word count analysis

For the analysis of the academic dataset, we executed a generic Google Scholar search using "Society 5.0" and "key concepts" as search terms obtaining a result set of 160 publications. After excluding non-English papers (one), as well as adding 7 papers post upward and downward snowballing, a total of 166 academic publications were uploaded for analysis into the Leximancer "select documents" step of the control panel. After the "generate concept seeds" step was executed, words such as "table" and "figure" were added to Leximancer's pre-populated stop word list (e.g. "and", "a", "the"). In addition, similar concepts were combined i.e. where a concept is shown in its singular

and plural form e.g. "innovation" and "innovations". Thesaurus was generated automatically followed by the generation of the concept map.

For the popular press analysis, we executed a generic Google search using "Society 5.0" as search term and collected the top 23 news articles and blogs (Google's relevance sorted output). The dataset for the word count analysis of popular articles was created by extracting the popular article text into an MS Word document. The collated popular press articles were imported into MonkeyLearn and the tag cloud generated. The results of the academic literature and popular press analyses are discussed in Section 4.

4 Results

4.1 SNA results

In the datasets (DS1 and DS2) about Society 5.0 we extracted surprisingly few tweets. In addition, the community conversations are very disjoint and does not even fully indicate the expected Brand conversation pattern, which are usually disjointed conversations about a brand, which is typically when a new term such as *Society 5.0* is adopted on Twitter. A brand cluster pattern depicts fragmented groups with many isolates, which are mentions or conversations about well-known brands, topics or celebrities. Groups are small and interconnected with limited exchange of ideas between members of a group or between groups. Hashtags about the brand can be shared between groups and information about the topic is just passed on [20, 48].

As mentioned, DS1 and DS2 were collected approximately a year apart and were extracting tweet containing the term "Society 5.0". Surprisingly few results were collected, only 329 tweets and 148 tweets respectively. In addition, the tweets spanned quite a long period, which means limited Twitter activity as indicated in Figure 1 below.

In the both the result sets of DS1 and DS2 we see distinct hub-and-spoke patterns in groups (Figures 2 and 3), as well as several isolates. Ingoing hub-and-spoke patterns means users respond to a tweet but don't interact with each other as is often the case when there is an event (DS1 Group 1 and DS2 Group 3) or when users respond to a controversial tweet (DS2 Group 2 in Figure 3as well as Figure 4). We also see several isolates, which means users are tweeting about the topic without replying or mentioning somebody else or discussing the topic with other users.
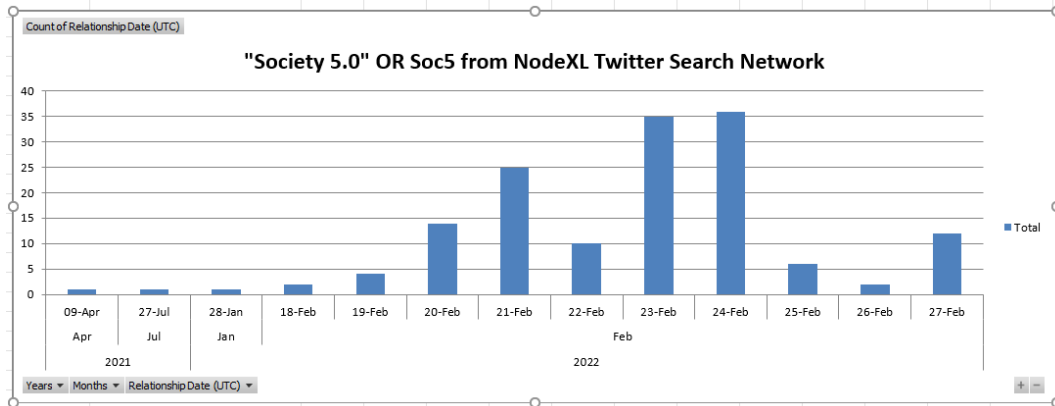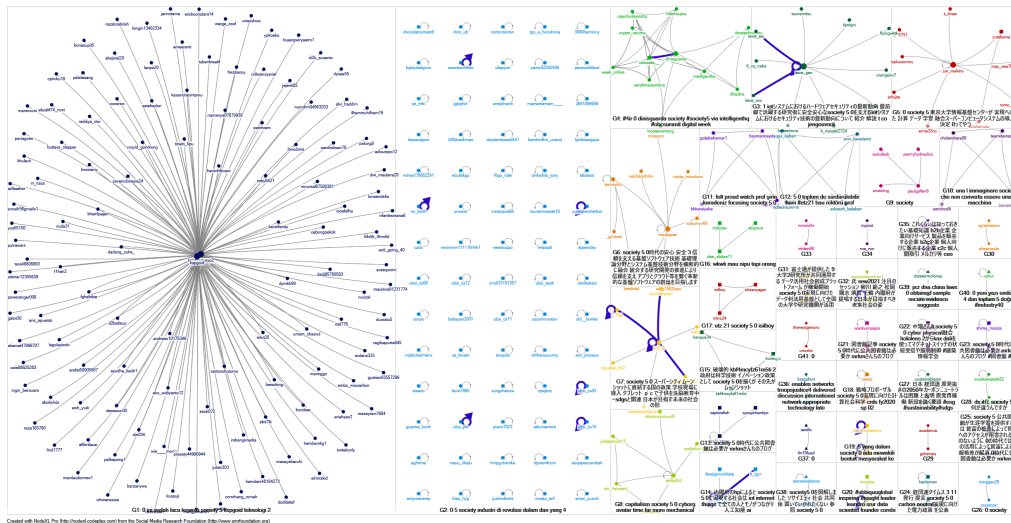

Figure 1: Time period of DS2

Figure 2: DS1 graph indicating an event in G1 with a distinct hub-and-spoke pattern, and isolates in G2.
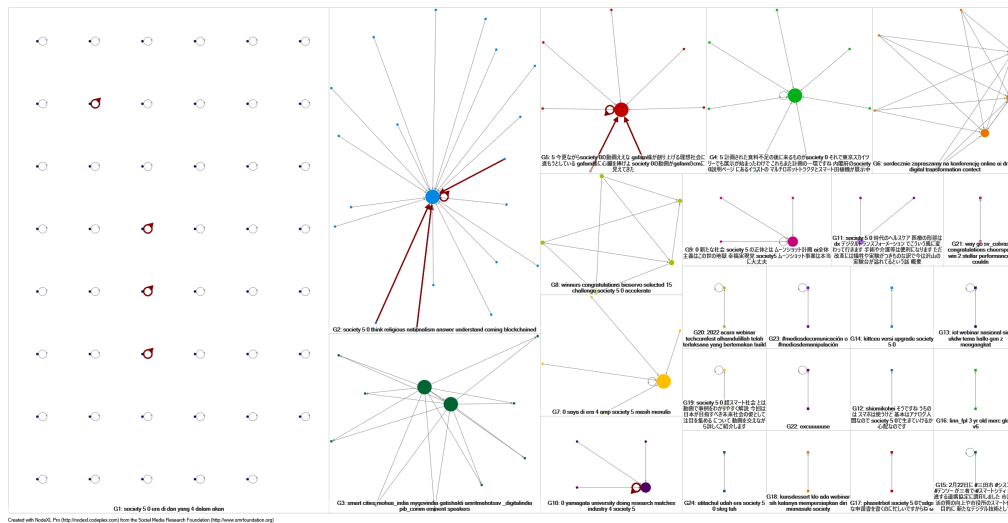

Figure 3: DS2 graph for" Society 5.0" with isolates in G1 and a controversial tweet in G2
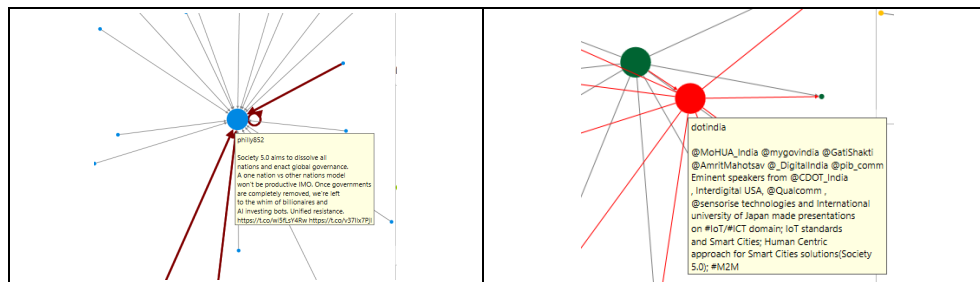

Figure 4: The controversial tweet eliciting responses on the left, and an event tweet with mentions on the right represented by typical ingoing hub-and-spoke patterns.

Because of the small datasets of DS21 and DS2, we analysed the tweet content and retrieved related topics to do a search for DS3. The terms were "IOT OR "Industry 4" OR AI" in English and tweets from 9 226 Twitter users were collected from a few hours on 07 March 2022. The resulting graph is depicted in Figure 5 below. The graph depicts the Brand conversation pattern, fragmented groups with many isolates, however, elements of the Community Clusters pattern are evident. Community Clusters resembles "a bazaar with different stalls, which is characterized by several even-sized groups rather than a crowd of mostly unconnected nodes" [50]. The Community Clusters pattern are characterized by medium-sized groups or hubs each with an "own audience, influencers, and sources of information" [20, 49, 50], and it means the terms are adopted by communities as well as being discussed within and between communities. What these results indicate is that Twitter abounds with many communities, discussions and interactions given the related Society 5.0 topics, but very little is happening on Twitter regarding the term *Society 5.0* itself.
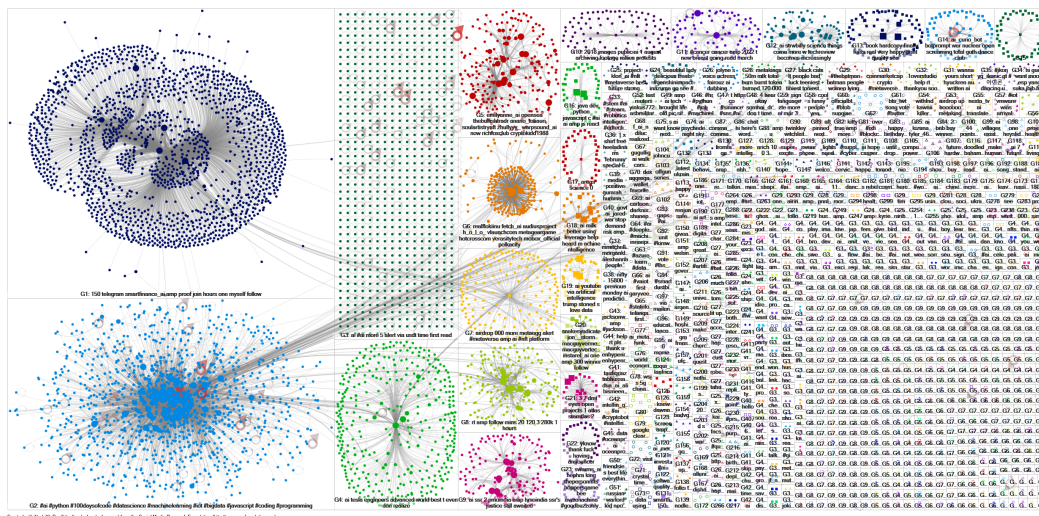

Figure 5: The graph network on related Society 5.0 topics, which depicts a developed Brand cluster pattern, or even the more mature Community cluster pattern.

4.2   Classical content analysis results

In the academic dataset, we extracted 13 themes collated from 41 concepts. The most relevant themes based on the visualization shown in Figure 6 are "infrastructure", "development" and "services", also highlighted in Table 3.

The first 7 themes are compound themes. *Infrastructure* refers to the requirement that structures need to keep up with the growing needs of Society 5.0 and that citizen engagement is key to creating a truly sustainable environment [11]. Structures refer to urban structures e.g. multimodal transport of people and goods, adequate water infrastructure, smart city, etc. [43], technology development [29], mobility enablement due to rapid urbanization [41, 53], project management, value engineering, improved social systems [11] - all concerned with ubiquitous life and the creation of new opportunities for jobs, education, wealth and humans' needs [11]. The *development* theme points to aspects relevant to achieving sustainable people, planet, profit development while balancing economic success and quality of life – a key trait of Society 5.0 [16]. Ubiquitous computing impacts several developmental aspects of life including, learning, shopping, banking, etc., ultimately influencing sustainable development [37]. As far as the development of a smart city goes, an environment that attends to people's needs, rational resources management, sustainable development and economic sustainability,

must be considered [17]. *Services* as a theme highlights the usefulness of digital technologies according to their potential to aid organizational transformation through reducing fragmentation and integrating and improving interoperability [38]. Smart governance requires that smart administrators manage technology trends and use these technologies in an appropriate manner for government- and private services, and to connect people [29, 30, 43]. All these aspects indicate a dynamic relationship between citizens and government as the delivery of efficient digital public services requires a multi-level transformation [24, 31]. The *data* theme collates all aspects of, and technologies utilized for the collection, processing, analyses and application of useful and required information, all at a high speed [22, 57]. Technologies such as artificial intelligence, neural networks and machine learning, combined with big data (structured and unstructured), enable the automatic collection and categorization of data, creating knowledge encyclopedia networks and enabling multiple outcomes such as passenger and automobile movements, reducing environmental impact, increasing safety, improving healthcare, energy consumption, network traffic, and more [2, 18, 24, 51]. *Social* denotes facets related to humanizing technology [55] and includes social conditions [57], defining relationships among stakeholders [36], organizational decision-making [4] and socio-technological considerations [6, 23, 55], based on the analyses of social and physical information [57]. Furthermore, the improvements of collaborative technologies enables collaboration at different levels of virtuality e.g. chat platforms, wikis, video conferencing, blogs, enterprise social media, podcasts, messaging and file sharing platforms [4, 6]. *Model* as a theme represents work process execution with consideration of input- and output events, as well as composite process models [56]. Composite process models may also include tasks executed in several machines [33], feedback processes, integration processes and evaluation processes [1]. The theme *future* emphasizes the importance of future global competitiveness and the fact that the young generation is important contributors to economic and social development e.g. flexible work arrangements that may play a key role in the future [4]. Additionally, the future may also define a new place and role for institutions and people responsible for preparing future members of society to co-create and participate in Society 5.0. Digitalization may introduce the teacher-machine persona accountable for a student's scientific development process, while the teacher-human will take care of a student's social development [40, 51]. In addition, sustainable future growth rely on the ability to embrace entrepreneurship and innovation [30, 43].

The last 6 themes are single concept themes, and we discuss them briefly. *Research* highlights the importance of scientific contributions informed by science and technology studies [34], while *society* examines to notion of a platform society driven to a large extent by data (big data) related to multiple role players e.g. individuals, small businesses, public bodies, civic society, etc. [42]. The *business* theme entails tailored business needs enabled by technologies for business automation, technologies for enterprise software business and business intelligence [52, 57] closely associated with the *innovation* theme involving structural empowerment as a condition for innovation and a necessary trigger to empower employees [32]. Finally, *computing* and *connectivity* highlight the necessity of sensitizing employees to the needs of online interfaces and the process of using technology to complete tasks [4, 45].
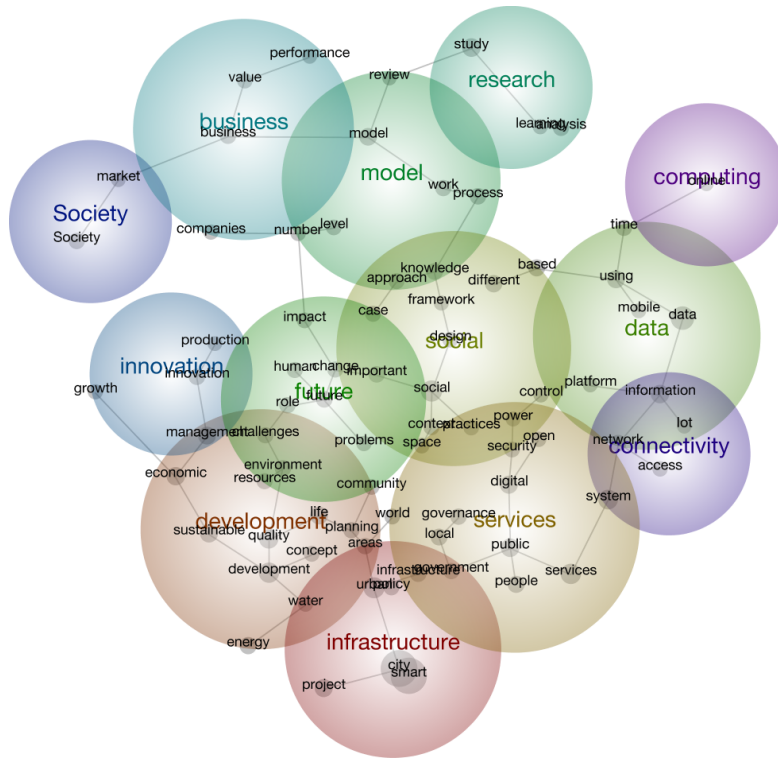
Figure 6: Leximancer content analysis of academic literature dataset

Theme	Hits	Concepts
Infrastructure	20688	City, smart, urban, project, infrastructure, areas
Development	19317	Development, quality, economic, sustainable, management, life, energy, environment, planning
Services	19221	Services, system, public, digital, people, local, governance, government
Data	15228	Data, information, using, network
Social	11721	Social, different, based, knowledge
Model	8233	Model, process, work
Future	6026	Future, important, role
Research	5260	Study
Society	4100	Society
Business	2867	Business
Innovation	2086	Innovation
Computing	1612	Online
Connectivity	1590	Access

Table 3: Leximancer content analysis of academic literature dataset

4.3   Word count analysis results

In the popular press dataset, the tag cloud generator detected collocations (words that often go together), as well as considering words in their root form (stemming process) and identified 5 tags with relevance higher than 0.5 as shown in Figure 7 and Table 3.

Figure 7: MonkeyLearn tag cloud for popular press dataset

Word	Count	Relevance	Word	Count	Relevance
real world	36	0.999	industrie	35	0.346
physical space	37	0.943	new value	12	0.305
society	311	0.684	use of technology	7	0.291
driven society	21	0.555	information society	12	0.25
cyberspace	52	0.519	air conditioner	10	0.25
data	154	0.437	sustainable development goal	6	0.25
intensive society	15	0.416	knowledge	60	0.225
social problem	15	0.388			

Table 2: Word count and relevance for popular press dataset

The purpose of the keyword extraction is to identify themes in popular press as it relates to Society 5.0. Based on the visualisation, we extracted concepts that count higher than 25 i.e. "real world", "physical space", "society", "cyberspace", "data", "industrie" (refers to Industry 4), and "knowledge".

5 Discussion

We found that the term Society 5.0 is not well adopted on Twitter with very little detectable conversations or communities. When interactions are observed, it is usually around events advertised, and usually in Japan or Indonesia as was depicted by the network graphs of DS1 and DS2. However, there are many discussions, communities and interactions surrounding related topics of Society 5.0. This emphasizes the need for a cohesive vision and landscape overview about what Society 5.0 entails, so that we can set a research direction and agenda, and this was done by analyzing publications about Society 5.0. Emerging themes were detected from the academic and popular press datasets, and when these themes were combined, we identified particular concepts shown in Table 4. As stated, the main goal of this study was to create a conceptual landscape overview of Society 5.0, illustrated in Figure 8.

Society 5.0 concept	Themes from datasets analysed	Society 5.0 concept	Themes from datasets analysed
Foundation	Data, Big data, Connectivity	Technology	Cyberspace, Cyber model, Artificial intelligence, Internet of things, Computing
Impact	Information society, Information, Knowledge, Solutions, New business value, Economic development, Economic advancement, Quality of life, Sharing of knowledge, Research, Innovation, Future business model	Society	Physical space (grouped with Real world), Social conditions (grouped with Social problem), Smart city (grouped with Smart factory, Traffic signal, Infrastructure, Development, Services, Air conditioner), Future of education, Sustainable development
Industry 4.0	4th industrial revolution (grouped together Technological development, Industry 4.0, New technology)	Humanizing technology	Use of technology, Information integration architecture

Seven key concepts are incorporated into the model of Society 5.0 where data and connectivity are regarded as the foundation for Society 5.0. On the left-hand side in Figure 8 is the socio-technical considerations and on the right the impact. Overarching is the concept of Society 5.0 where the focus is on the humanizing of technology.

Foundations: There are two fundamental technologies mentioned in the foundations because we consider these two technologies as the basis of most of the technology breakthroughs that underpin Society 5.0 today. The first is the availability of data, and the second is connectivity that makes this collected data available to whomever or whatever needs it.

Technology: Many technologies are enabled by the growth in the foundational technologies namely the availability of data and the mechanisms that allow for the access to this data via connectivity. Artificial intelligence (AI) encapsulates in essence a number of intelligent algorithms that exploit available data to detect patterns and insights into the behavior of people, sensors and devices that are not detectable by the stakeholders that generated the data. Using data and computational intelligence, AI is able to detect patterns that are not visible to humans, and thus, learn from data, and predict outcomes or behaviors.

Socio-technical: The fourth industrial revolution or Industry 4.0 is marked by a fast-paced change in technologies that are altering the way we socialize, live, work and play. Disruptive technologies emerging from Industry 4.0 now present new ways in which organizations can conduct business and innovate value chains based on digitalization opportunities.

Society Domains: Society 5.0 influences different domains including for example Education, Health and Medicine. In each domain the impact will be different and the use of technology would create opportunities for the improvement of livelihood.

Impact of Society 5.0: Society 5.0, with all its different aspects, not only presents a technical challenge, but also significantly changes the structures and business processes of organizations. It requires leaders in an organization to consider a new level of socio-technical interaction and planning.

Humanizing technology: Technology should not be the point of friction between product and people. Designers and software developers need to become more human-oriented to help users to streamline, simplify, evaluate and filter, and to better understand human needs, emotions and human behavior.

Society 5.0: Society 5.0 is the overarching topic of this article and is a human-centered approach to the future societies that follow previous societies. Technology will be used to enhance the way we live while it is interwoven in everything that we do and that we engage in.
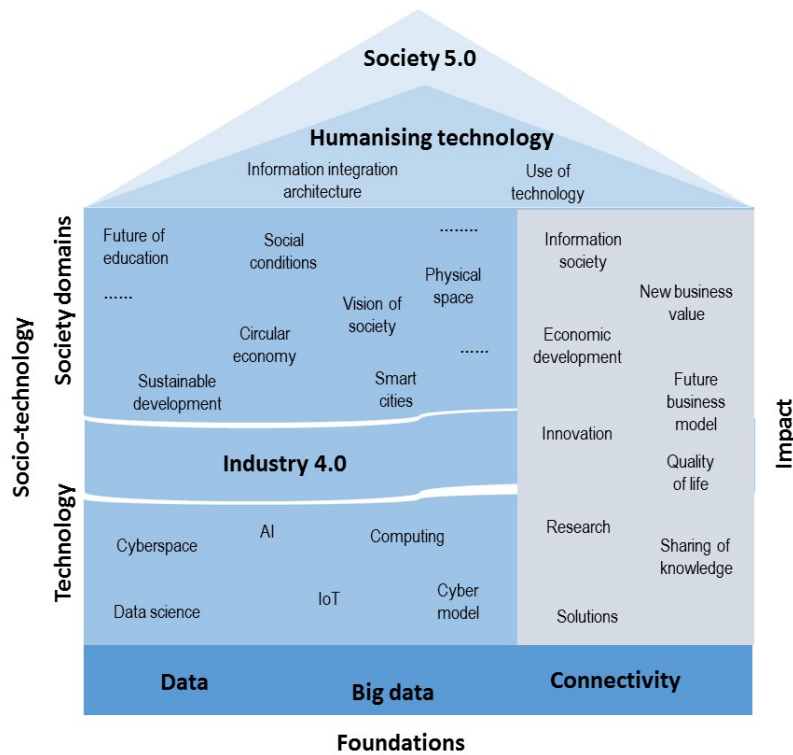

Figure 8: Conceptual landscape overview of Society 5.0

6 A Research Agenda for Society 5.0

From consideration of the different concepts that emerged from the analysis, it is clear that Society 5.0 is still in its infant shoes and there are often confusion on what exactly Society 5.0 entails and how it can contribute to the existing research being done in a field such as Information Systems. During our analyses we identified the following as emerging research questions to be considered:

- What are the different technologies, technology themes as well as the integration and relationships between technologies that will influence the future of Society 5.0?
- How can technology be humanized given the Society 5.0 vision?
- What is the impact of technology on society as a whole?

- What is the role of the human in an advanced Society 5.0?
- What are society considerations for Society 5.0 (e.g. ethics, governance, society vs individual rights and responsibilities)?

By identifying some research priorities, more successful research projects may be concluded, outlining a clearer framework for Society 5.0.

7 Conclusion

Society 5.0 is a relatively new concept that was introduced in Japan. More recently the socio-technical research communities adopted the term in order to investigate the impact on humans and society with regard to the impact of technologies in our daily lives and society at large.

In this paper, we considered 3 datasets from different perspectives i.e. Twitter feed to gauge the sentiment and conversation about Society 5.0, a systematic literature review of academic publications and a thematic analysis of popular press regarding Society 5.0. By integration these datasets, we created a conceptual landscape overview of Society 5.0 consisting of different domains: foundations (data, big data and connectivity) that impacts the technology and society domains, informing socio-technology domain that impacts the way on which technology is humanized in Society 5.0. Based on this conceptual landscape overview of Society 5.0, we propose an initial research agenda.

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