Guest Editors' Introduction

Securitization for Sustainability of People and Place

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Security and securitization can be defined in numerous ways. For example, an all-hazards approach to (national) security has been considered in the literature whereby we may refer to economic, environmental, and energy security [1], in addition to other nonmilitary facets inclusive of food-, health-, demographic-, informational-, and resource-related aspects [2]. Furthermore, the literature points to various sectors of securitization [3], which collectively denote a broad-ranging perspective. Securitization, based on this wider view, implies "survival across a number of dimensions" [4], and as a necessary offshoot, across numerous academic disciplines. As such, there is the need to turn our attention to transdisciplinary perspectives of securitization to explore the nature of such perspectives and the various streams or tracks that are encompassed within, particularly within the context of complex socio-technical systems, and when considering the implications of technology, in general.

The purpose of this special issue is to explore and address complex securitization-related challenges, from a broader perspective and across various dimensions and sectors, that transcend disciplinary boundaries, focusing on the role of technology relevant to the securitization of *people* and *place*, while also considering the *transdisciplinarity* and

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the *socio-historical originals of securitization*. This special issue was inspired by, and is an outcome of, the IEEE International Symposium on Technology and Society 2022 (ISTAS22) co-located workshop on the Social Implications of National Security 2022 (SINS22). The workshop, in its 15th year, was centered on the broad theme of "Securitization for Sustainability of People and Place: A Call to Transdisciplinarity," in which securitization was considered from a multifaceted perspective, and in view of the explicit link to the investigation, analysis, and (re) design of complex socio-technical ecosystems. This special issue presents select workshop outcomes.

In this special issue

The first article [A1] is led by Peter Lewis, the Canada Research Chair in Trustworthy Artificial Intelligence at Ontario Tech University, Canada. P. Lewis is an associate professor in the Faculty of Business and Information Technology and studies advances in foundational and applied aspects of trustworthy, reflective, and socially intelligent systems, alongside co-researchers, Stephen Lewis, Sue Lewis, A. M. Gaudet, and A. Ottley. In "Reimagining Digital Public Spaces and Artificial Intelligence for Deep Cooperation," Lewis et al. [A1] explore the dynamics and tensions involved as people increasingly transition from physical spaces to digital spaces, including the effects that ever more pervasive AI technology has over these spaces. Lewis et al. [A1] argue that space is a key resource where communities can feel empowered through self-organization practices toward collective action and that space makes groups of people self-assembling feel a sense of security and purpose. Lewis et al. [A1] have a unique approach to understanding the role of the cyber–physical (digital and physical) space and how it can impact the use of standalone physical spaces. They ask the question, if our digital spaces where communities gather (e.g., shopping malls) are owned privately, then how might space be perceived as a public good? What are the limits of self-organization in private spaces, both digital and physical? Furthermore, Lewis et al. [A1] pose the argument, "that rather than support community action, the digital transformation of place is threatening the existence of essential public spaces." They go on to elaborate that pervasive AI can act to "dehumanize" and disempower if not used appropriately and can negatively impact the ability to engage in collective action. They argue that while contemporary digital spaces typically present opportunities for richer and more accessible self-organization, they can also subtly change relations, perceptions, and boundaries, leading to limitations, risks, and missed opportunities. Lewis asks his readers to reimagine digital public spaces through decentralization and deep cooperation, providing a case study to support his thesis from an ongoing project with a community of inner-city nurses. The article explores notions of ownership, power, and affordances with respect to expectations of rights (of collective action, self-determinism, democracy, and so on). Drawing on the example of self-organization to tackle food insecurity, the article concludes by identifying opportunities for a more public-space-oriented use of AI, in support of collective action. The lead author's blog can be found at https://www.petelewis.com/ and further reading is also available [5], [6], [7].

The second article [A2] is written by Adjunct Professor of Public Health Sciences Liselotte Schäfer Elinder of Karolinska Institutet, Sweden, and an affiliated postdoctoral researcher at the Department of Global Public Health, Patricia Eustachio Colombo, of the same institute and a visiting fellow at the University of Cambridge. In this work titled "Ensuring Food Security Through Meal Optimization," Schäfer Elinder and Eustachio Colombo graphically present the unsustainability of food production and consumption with respect to UN Sustainable Development Goals (SDG). Through an analysis of the diet of Swedish adolescents [8], they demonstrate that the "food supply chain" is a polycentric multivalue suboptimization problem; there are many stakeholders with decision-making authority, and each of them might have different societal values (or priorities on values) which might be competing or conflicting, and not all of them can be maximized at the same time. However, the authors maintain that it is possible, with AI-based decision support, for all the stakeholders' interests to be satisfied (i.e., to meet acceptable thresholds), if constraints are reasonably met. As a result, it is possible to produce adolescent diets that are economical, culinarily appealing, nutritionally adequate, and environmentally sustainable [A2].

The third article [A3] is on the shortage of global labor talent in the space of human–AI collaboration in digital recruitment and is written by industry practitioners Dr. Olena Linnyk and Ingolf Teetz of Milch &

Zucker AG. Dr. Linnyk is a physicist and AI specialist responsible for the development of AI solutions in the digital HR division of the company. She is also a private lecturer at the University of Giessen and a researcher at the Frankfurt Institute for Advanced Studies (FIAS). In "Counteracting the Global Labor Shortage Risk through Human–AI Collaboration in Digital Recruiting," Linnyk and Teetz [A3] focus their article on the crisis of human capital directly linked to megatrends such as demographic change. They begin by challenging three common perceptions, the most striking of which is, perhaps, the belief that AI will create mass redundancy, when in fact European countries face a chronic labor shortage. They argue that, in addition to creating a disturbing new "colonialism" in the form of labor extraction from the developing world, there is another "hidden problem" in that job advertisements use language that exhibits bias, in particular, gender bias, that deters (or worse, altogether excludes) some population segments from career opportunities or certain sectors of the labor market [9], [10]. While there are no immediate mitigating solutions, the researcher-practitioners provide a four-pronged approach to addressing the problem of a global shortage in human capital, pointing to 1) the potential for boosting productivity and effectiveness through innovation; 2) greater virtual collaboration over longer distances; 3) a rehaul of the entire recruitment process; and 4) increased labor participation among women and under-represented groups. The coauthors believe that big data and AI will play pivotal roles in the optimization of applicants in jobs and that chatbots, conversational AI, and the augmented neutral writing of job ads will be particularly important in the recruitment process. While technological augmentation can introduce new risks, the potential for rationality and neutrality will not be fulfilled by the AI, but ultimately by a human decision-maker who is in the loop. The authors conclude that the *security of place* risk exposed by labor shortages can be addressed by human–AI collaboration in the job specification, with the added side effect of increased inclusivity.

The fourth article in the special issue [A4] is written by Steven Mills and Holger Regenbrecht who are both with the University of Otago in New Zealand. The article is titled "Respecting and Protecting Cultural Values in an Indigenous Virtual Reality Project" and is an insightful reflection from a Security of Place perspective of their previous work [11], in co-designing and co-developing a virtual-reality-based storytelling and tele-co-presence project with an emphasis on the co-, crucially *with*—a Māori community of Aotearoa New Zealand. The co-developed application has gone through several iterations, creating a virtual environment in which "indigenous stories can be told in a culturally appropriate context to reconnect diasporic Māori communities back to their cultural roots" [A4]. The notion of "being there together" in 3-D, through a virtual experience in a realtime interactive way, is presented. The co-design approach developed is based on the "Tiriti o (Treaty of) Waitangi principles of partnership, participation, and protection." For those wishing to understand more about conducting research with indigenous communities, and the finer sensitivities such as the requirement for researchers to acknowledge cultural traditions and practices, this article is extremely informative, beyond its technical outcomes where there is respect for values and protocols that need to be managed, and cultural and spiritual practices that must be protected. This is a model resource for ways of embedding values into information technology-based projects. The article demonstrates not just the need to be respectful and protective of indigenous culture, but also how much, as found by other anthropological studies of indigenous cultures [12], [13], [14], can be learned from them, puncturing patrician "Western" pretensions of superiority. Indeed, as Regenbrecht has pointed out, Māori culture has a single word—*ako*—for both teaching and learning: every teacher is a learner, and every learner is a teacher [15]. This certainly contrasts with the more transactional model that, at the time of writing, seems to dominate "Westernized" educational institutions. Mills and Regenbrecht have complementary skillsets in computer science and information science, as well as rich backgrounds in geospatial research, computer vision, and reconstruction of 3-D scenes from multiple views, human–computer interaction, inclusive of virtual and augmented reality, psychological/cultural, and ethical aspects of mixed reality. For additional research by the authors, see the following references [16], [17], [18].

The fifth article [A5] is provocatively titled "Why Do We Need "Transdisciplinarity?" by Prof. Emeritus Marcus Wigan of Edinburgh Napier University, who has numerous other past and present academic affiliations, including the University of Melbourne, Australia [19]. Wigan is a long-term contributor and

previous keynote speaker to the SINS series, having presented articles on a variety of topics including location-based services, surveillance, transportation, drones, artificial intelligence, and more. In the 2022 workshop, Wigan focused on the growing importance of the incorporation of multiple disciplines in the field of security, identifying that disciplinary cultures are not always harmonious and that we should be focusing on the gaps toward alignment as an area of emergent research. He provides a thoughtful explanation of transdisciplinarity involving the bringing together of two or more disciplines that are mutually affected to create a new perspective. He uses this definition to distinguish transdisciplinarity from other approaches such as disciplinarity, multidisciplinary, and interdisciplinarity. In his discussion, he highlights the importance of cultural abrasion to stimulate creativity as a key feature of transdisciplinarity. Wigan's article uses examples from policing, nursing, and security to highlight the value of transdisciplinarity as well as some of its challenges. They include organizational factors such as time and finance as well as human activity, while also considering issues of power, culture, and the psychology of working across disciplines. The article concludes by acknowledging the importance of mutual learning across humanities and sciences as a way to adapt to a context of accelerated change. Wigan uses examples of the application of transdisciplinarity which he claims has only received intermittent success, predominantly in the humanities [A5]. He ponders on what would make transdisciplinarity as a method and strategy successful and how we might be able to exploit the endeavor more effectively, by reducing barriers that exist between disciplines and encouraging greater productivity between different areas of academia, albeit a practice that is perceived to be fraught with risks.

The sixth article [A6] is by Mariana Zafeirakopoulos who has over 15 years of experience practicing and teaching in intelligence contexts in government and international organizations as well as private industry. Mariana is an academic at the University of Sydney's Design Lab and continues to teach strategic intelligence practice as an adjunct lecturer at Charles Sturt University. Her article is titled "Calling in the System: Rethinking Approaches to National Security and Intelligence." Zafeirakopoulos focuses her article on strategic intelligence as a key function of national security that grants support to decision-making processes in government. She ponders how public servants might be able to work on future emerging issues together more effectively through greater interconnections across government systems. The author postulates that to deal with emerging, complex, and future-oriented national security challenges, a transdisciplinary approach is required. Zafeirakopoulos draws from Ross's [20] justice practices of "calling in" rather than "calling out" behaviors. The "calling in" approach involves bringing together diverse people in an act of deep listening to uncover common values and ways forward. Zafeirakopoulos takes this inclusive approach and applies it to the national security context. The article offers more participatory and whole-of-system approaches to national security problems preferencing the Cynefin framework's "probing" approach over a reductive analytical approach [21]. It concludes with a suggested way forward, which aligns with transdisciplinarity as being most relevant for complex problems. Zafeirakopoulos draws on her own lived experience and applied observations as a consultant, encouraging the adoption of more relational and sensemaking practices. She notes, "we can begin to shift reductivist approaches that are synonymous with analysis towards more transdisciplinary ways of knowing [22] where different disciplines and ways of knowing (that include the realm of human experience as well as the realm of expertise) can create new knowledge, new ideas and new ways of generating securitization" [A6].

Tying together an exploration of transdisciplinarity in emerging contexts is the deeply human perspective captured in the article by Theresa Dirndorfer Anderson titled "Looking at Securitization as a Socio-Technical Activity: Lessons From a Cold War Past" [A7]. Anderson is a director and a social informaticist at Connecting Stones and was previously an associate professor and the inaugural director of the Master of Data Science and Innovation program at the University of Technology, Sydney [23], [24]. Anderson's personal narrative artfully unites places, human experience, history, and technology through storytelling. She demonstrates the power of autoethnography, telling her personal story in a way that seeks to bring lessons of theory and practice together. She sees securitization as a complex socio-technical system that can draw us deeper into that which we all seek as humans, communities, and society at large, the "perpetual nature of the pursuit of security." Anderson encourages us to step back and see ourselves in

the unfolding story of our life, from a multiplicity of angles and viewpoints, and to unlock future visions of our local world through the application of transdisciplinary sensemaking, to allow us to know ourselves better, where we have come from and where we are going, and why things are the way they are [A7]. By emphasizing the human nature of technical challenges, Anderson highlights the limits of technology-led solutions and the importance of nurturing cultures of care and empathy. Anderson notes that the more vulnerable an individual feels during uncertain times, the more trust needs to be demonstrated by those in positions of accountability or influence. Anderson closes with a useful framework "SHARE," advocating for a need to build community, by sharing concerns and fears as a helpful way to experience the sensation of security. "Security" in its various manifestations, dynamic states of security, and levels of security that we require for survival thus becomes the central tenet of a life worth living. ■

Appendix: Related Articles

[A1] P. R. Lewis et al., "Reimagining digital public spaces and artificial intelligence for deep cooperation," *IEEE Technol. Soc. Mag.*, vol. 42, no. 2, pp. 29–37, Jun. 2023.

[A2] L. Schäfer Elinder and P. Eustachio Colombo, "Ensuring food security through meal optimization," *IEEE Technol. Soc. Mag.*, vol. 42, no. 2, pp. 38–41, Jun. 2023.

[A3] O. Linnyk and I. Teetz, "Counteracting the global labor shortage risk through the human–AI collaboration in digital recruiting," *IEEE Technol. Soc. Mag.*, vol. 42, no. 2, pp. 42–47, Jun. 2023.

[A4] S. Mills and H. Regenbrecht, "Respecting and protecting cultural values in an indigenous virtual reality project," *IEEE Technol. Soc. Mag.*, vol. 42, no. 2, pp. 48–52, Jun. 2023.

[A5] M. R. Wigan, "Why do we need 'transdisciplinarity?'" *IEEE Technol. Soc. Mag.*, vol. 42, no. 2, pp. 53–57, Jun. 2023.

[A6] M. Zafeirakopoulos, "Calling in the system: Rethinking approaches to national security and intelligence," *IEEE Technol. Soc. Mag.*, vol. 42, no. 2, pp. 58–61, Jun. 2023.

[A7] T. Dirndorfer Anderson, "Looking at securitization as a sociotechnical activity: Lessons from a Cold War past for AI Futures," *IEEE Technol. Soc. Mag.*, vol. 42, no. 2, pp. 62–70, Jun. 2023.

References

[1] J. J. Romm, *Defining National Security: The Nonmilitary Aspects*. New York, NY, USA: Council on Foreign Relations, 1993.

[2] P. Paleri, *National Security: Imperatives and Challenges*. New Delhi, India: McGraw-Hill, 2008, p. 521.

[3] B. Buzan, O. Wæver, and J. De Wilde, *Security: A New Framework for Analysis*. Boulder, CO, USA: Lynne Rienner Publishers, 1998.

[4] A. Castle, *Transnational Organized Crime and International Security*. Vancouver, BC, Canada: Inst. International Relations, Univ. British Columbia, 1997, p. 4.

[5] P. R. Lewis, S. Marsh, and J. Pitt, "AI vs 'AI': Synthetic minds or speech acts," *IEEE Technol. Soc. Mag.*, vol. 40, no. 2, pp. 6–13, Jun. 2021, doi: 10.1109/MTS.2021.3077052.

[6] P. R. Lewis and S. Marsh, "What is it like to trust a rock? A functionalist perspective on trust and trustworthiness in artificial intelligence," *Cogn. Syst. Res.*, vol. 72, pp. 33–49, Mar. 2022, doi: 10.1016/j.cogsys.2021.11.001.

[7] S. T. Powers, A. Ekárt, and P. R. Lewis, "Modelling enduring institutions: The complementarity of evolutionary and agent-based approaches," *Cogn. Syst. Res.*, vol. 52, pp. 67–81, Dec. 2018, doi: 10.1016/j.cogsys.2018.04.012.

[8] Å. Norman et al., "Psychometric properties of a scale to assess parental self-efficacy for influencing children's dietary, physical activity, sedentary, and screen time behaviors in disadvantaged areas," *Health Educ. Behav.*, vol. 45, no. 1, pp. 132–140, Feb. 2018, doi: 10.1177/1090198117699506.

[9] S. Böhm et al., "Analysing gender bias in IT job postings: A pre-study based on samples from the German job market," in *Proc. Comput. People Res. Conf. (SIGMIS-CPR)*, Jun. 2020, pp. 72–80, doi: 10.1145/3378539.3393862.

[10] S. Böhm et al., "KI im recruiting: Anwendungsfelder, entwicklungsstand und anwendungsbeispiele aus der praxis," in *Künstliche Intelligenz in der Anwendung*, T. Barton and C. Müller, Eds. Wiesbaden, Germany: Springer, 2021, ch. 11.

[11] H. Regenbrecht et al., "Ātea presence—Enabling virtual storytelling, presence, and tele-co-presence in an indigenous setting," *IEEE Technol. Soc. Mag.*, vol. 41, no. 1, pp. 32–42, Mar. 2022, doi: 10.1109/MTS.2022.3147525.

[12] B. Malinowski, *Argonauts of the Western Pacific: An Account of Native Enterprise and Adventure in the Archipelagoes of Melanesian New Guinea*. Long Grove, IL, USA: Waveland Press, 2013.

[13] J. Briggs, *Never in Anger: Portrait of an [Inuit] Family*. Cambridge, MA, USA: Harvard Univ. Press, 1970.

[14] H. Norberg-Hodge, *Ancient Futures: Learning From Ladakh*. London, U.K.: Rider, 2000.

[15] Te Aho Arataki Marau mō te Ako i Te Reo Māori—Kura Auraki, TKI, Ministry Educ., Auckland, New Zealand, 2008. [Online]. Available: https://tereomaori.tki.org.nz/Curriculum-guidelines/Teaching-and-learning-te-reo-Maori/Aspects-of-planning/The-concept-of-ako

[16] H. Regenbrecht, S. Zwanenburg, and T. Langlotz, "Pervasive augmented reality—Technology and ethics," *IEEE Pervasive Comput.*, vol. 21, no. 3, pp. 84–91, Jul. 2022, doi: 10.1109/MPRV.2022.3152993.

[17] N. Park et al., "Mixed reality co-design for indigenous culture preservation & continuation," in *Proc. IEEE Conf. Virtual Reality 3D User Interfaces (VR)*, Mar. 2022, pp. 149–157, doi: 10.1109/VR51125.2022.00033.

[18] S. Zollmann et al., "Augmented reality for sports spectating and coaching," in *Interactive Sports Technologies: Performance, Participation, Safety*, V. Tzankova and M. Filimowicz, Eds. New York, NY, USA: Routledge, 2022, pp. 96–111, doi: 10.4324/9781003205111-7.

[19] M. R. Wigan, "Rethinking IT professional ethics: Classical and current contexts," *Australas. J. Inf. Syst.,* vol. 24, pp. 82–86, Jun. 2020, doi: 10.3127/ajis.v24i0.2851.

[20] L. J. Ross. (Aug. 2021). *TED Don't Call People Out—Call Them in*. Accessed: Oct. 10, 2022. [Online]. Available: https://www.youtube.com/watch?v=xw_720iQDss

[21] D. Snowden, S. Blignaut, and Z. Goh, "Cynefin—Weaving sense-making into the fabric of our world," *Cogn. Edge*, 2022. [Online]. Available: https://www.amazon.com/Cynefin-Weaving-Sense-Making-Fabric-World/dp/1735379905Katina

[22] M. Zafeirakopoulos and M. van der Bijl-Brouwer, "Exploring the transdisciplinary learning experiences of innovation professionals," *Technol. Innov. Manage. Rev.*, vol. 8, no. 8, pp. 50–59, Aug. 2018, doi: 10.22215/timreview/1178.

[23] T. D. Anderson and N. Parker, "Keeping the human in the data scientist: Shaping human-centered data science education," *Proc. Assoc. Inf. Sci. Technol.*, vol. 56, no. 1, pp. 601–603, 2019.

[24] T. A. Dirndorfer and S. Knight, "Learning analytic devices – co-forming, re-forming, in-forming," *Inf. Res.*, vol. 22, no. 1, 2017, CoLIS paper 1633. [Online]. Available: http://InformationR.net/ir/22-1/colis/colis1633.html

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