Guest editorial: Human factors in business technology management

Background

Research in business technology management (BTM) aims to connect the BTM world. It offers a unique perspective on the use of information technology to understand and optimize business processes. From an academic perspective, considerable attention has been dedicated to technological issues confronting businesses; however, relatively little attention is geared toward human factor issues at the interplay of BTM research. Understanding and addressing human factors-related issues within BTM can be advantageous to organizational sustenance and growth. Therefore, the objective of this special issue is three folds, as described as follows.

First, to point out the significance of human factors in BTM. In particular, developing an understanding of how physical and psychological human factors influence socio-technical issues is needed, for instance, by exploring the design characteristics that enhance information systems' user experience in organizational contexts (Hornbæk and Hertzum, 2017). Similarly, testing the design of technology artifacts from humanistic and user-centered perspectives and understanding the design, development and evaluation of persuasive (Fogg, 1997) and gamified applications leads to behavior change in organizational contexts (Liu *et al.*, 2017), understanding e-leadership and leaders' characteristics and motivations in the digital environment in the organizational context (Amichai-Hamburger, 2017; Gazit, 2021; Yavetz, 2021).

Second, to understand how human factors lead to exploring different design thinking lifecycles and decision tools (Kolko, 2015). Design thinking approaches help address wicked problems and offer businesses a competitive advantage through strategic foresight (Buchanan, 1992). Investigating how insights drawn from design-thinking approaches can drive innovation and guide superior business decision-making (Nakata and Hwang, 2020) is critical.

Third, using human factors to rethink contemporary moral and privacy-related issues within BTM research (Gray *et al.*, 2018). Given the ubiquity of man–machine interaction and evolving symbiotic relationship between humans and machines, it is vital to examine privacy concerns and considerations (Licklider and Joseph, 1960), especially in the new era when meaningful information is published on the social network sites (Eitan and Gazit, 2021) and threatens to infringe on the privacy of users (Zlatolas *et al.*, 2015), for instance, examining dark patterns in interaction design (Gray *et al.*, 2018), understanding issues concerning algorithmic transparency (Rader *et al.*, 2018), investigating ethical and societal challenges concerning social robots (Čaić *et al.*, 2019) or studying the communication privacy management perspective in social media platforms (Avizohar *et al.*, 2022).

Human factors and business technology management (BTM)

BTM is a set of processes and services that synchronize, align and combine an enterprise's BTM (Technopedia, 2013). In its very core, BTM addresses issues that have initially been discussed by scholars in the research field of socio-technical system design (Cherns, 1976). In this understanding, business management aspects are either a part or supplement the socio-lens in STS. If we discuss BTM from a socio-technical perspective, the importance of the human factor for BTM becomes inevitably clear. Still, we struggle to understand the complex

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drivers and mechanisms at the business–technology nexus. And still we aim to provide effective and efficient solutions for development processes and development environments in a world of tremendous technological change. Thus, BTM research derives its ultimate right to exist from the necessity to increase the value creation at the interfaces of business and technology. Consequently, the TBM Council (www.tbmcouncil.org) highlights in its principles the value-creating nature of BTM throughout the organization (White, 2019). Without a doubt, the "human factor" as a provider of needs, development capacity and the fact of being the final user and customer plays a pivotal role in the creation of value through BTM.

To better understand value creation through BTM, especially with regard to the influence of the human factor, the knowledge base in the field of the Service Dominant Logic (SDL) and co-creation should be considered: In their seminal article, Vargo and Lusch (2004) proposed a paradigm that promotes the concept of "value-in-use" over the traditional concept of "value-in-exchange." In doing so, they promised a better fit to environments that are characterized by "intangible resources, co-creation of value, and [complex] relationships" (p. 1). Although intensively discussed in the following years, service (understood as a process not as an output) is still considered in SDL to be the fundamental basis of the exchange of value (Vargo and Lusch, 2016). What was changed in the SDL framework in the course of time, however, is the fact that the recent revision of the fundamental premises acknowledges the role of "multiple actors" (not just customers) as co-creators of value and that the framework takes more account of the context of service development (e.g. value-in-context), i.e. the service ecosystem (Chandler and Vargo, 2011; Vargo and Lusch, 2016).

On the one hand, the insights from SDL correspond with essential ideas of BTM: Technological and business foundations are integrated through the application of skills and capabilities and create valuable outcomes (cf. www.btm-forum.org). The outcomes, however, could be specific developments (i.e. products) or other forms of created business value (e.g. processes and risk reduction). SDL also reflects the need to integrate different domains of knowledge into an actual service or product as we find it, for example, in design science research (Gregor and Hevner, 2013; Hevner *et al.*, 2004). On the other hand, SDL also points BTM research toward aspects of value co-creation and the necessity to provide respective environments and spaces (e.g. for co-specifications, co-development, co-testing and co-operations) in order to integrate "the human factor" and various stakeholder needs into the nexus of BTM (See Figure 1).

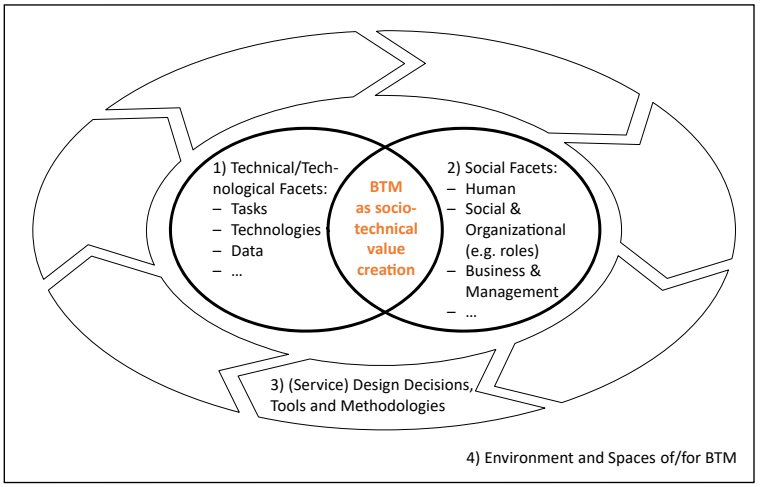

Figure 1.
BTM as socio-technical value creation activity/process

The idea of using human-centered design gained a lot of popularity in the last decade. It is believed to be a path that leads to the co-creation of ethical technologies. According to this idea, technology design incorporates the needs of humans, commonly referred as its users. According to Forlizzi (2018) and Cone (2018), a stakeholder-centric design approach provides superior outcomes by serving multiple stakeholders instead of one-person. However, stakeholders are defined as user, customer and beneficiaries (Cone, 2018). Although we feel that this is a step in the right direction, we contend that a broader list of stakeholders should be included. According to Freeman (1984), stakeholders are those "groups or individuals who can affect (or be affected) by their activities." Usually they are described as suppliers, customers, employees, financiers and communities (Freeman, 1984).

In technology products, there are even more stakeholders that play a role in its success or failure. For instance, media, civil society, governments and pressure groups can influence technological products' outcomes and steer technology companies in the direction of success or failure. Prior literature highlights the importance and relevance of using the stakeholder theory in the technology design process, which is driven by the idea of maximizing the value creation for multiple stakeholders and eliminating or limiting the trade-offs between them. For instance, Shah and Guild (2022, 2017) propose a stakeholder-centric policy to promote value creation for information and communication technology firms belonging to start-up, growth and mature organizational life stages. Similarly, Abbasi *et al.* (2021) also recommends using a stakeholder-centric design process to advance and promote an inclusive and sustainable games development model. Other studies stress the importance of stakeholder inclusion in designing software and hardware technologies for social robots (Shah and Iqbal, 2022; Albuquerque *et al.*, 2022), wearable devices (Shah *et al.*, 2020) and autonomous vehicles (Shah *et al.*, 2021, 2022) to cater to a wider audience, such as children, parents, seniors and people with special needs. The overarching theme in these articles has been around technology ethics, where multiple stakeholders, especially humans, remain in the core of designing sustainable technologies.

We know from the literature on collaborative innovation that designing, developing and testing technological artifacts requires co-creation and interaction with and among humans across different domains as well as across organizational boundaries. This collaboration needs to happen in both the virtual and physical space (Bogers *et al.*, 2017). The need for co-creation activities can be traced back to the "sticky knowledge" problem described by von Hippel (1994). We also find the demand for interaction in order to overcome the problem of sticky knowledge in tasks and goals in BTM: Engineering, synchronization, alignment, combination or integration (Gagnon, 2020; Technopedia, 2013) all imply co-creative activities and, hence, are heavily influenced by the human factor. Consequently, we find a broad stream in the collaborative innovation literature that deals with the design of environments and spaces in order to allow for co-creation among humans and, thus, facilitate stakeholder-centric development of services and innovations (Nyström *et al.*, 2014). The resulting environments and spaces have numerous labels and orientations (e.g. living lab, design lab, maker space, innovation intermediary, innovation platform and hackathons) (Nestle *et al.*, 2021) are established for internal and/or for external purposes and can have different characteristics (e.g. Nyström *et al.*, 2014: ambidexterity, reciprocity, temporality and multiplicity).

Interestingly, collaborative innovation and BTM share a number of similarities, especially in developing services. However, BTM has an extended scope as it also addresses issues in deployment, operations and optimization, which are not addressed by collaborative innovation research (e.g. user acceptance in deployment, serviced business models as operational mode and continuous customer feedback integration). Even though the scope is much wider in BTM, the additional fields are also characterized by co-creative tasks and successful value creation, which are highly dependent on successful interactions between

humans. Although BTM also finds the issue of facilitating value creating interactions at its very core and even extends it to operational parts of the organization, the human factors and explicitly the creation of spaces for value creation have received less consideration in research and practices so far. As a result, we often find the existing spaces devoted to or managed by innovation departments and not under the management of operational BTM entities. As a consequence, we find with Hossain *et al.* (2019) that there is a need for a deeper understanding of (a) the processes in such spaces and (b) the design and operations of these spaces with special regard to BTM requirements. In addressing this gap in human factor-centric research in BTM, we propose three avenues for future research:

(1) Extending the concept of collaborative co-creation spaces to BTM: The similarity between the nature of problems in collaborative innovation and BTM is obvious. Nonetheless, the scope of BTM raises much more "operational" issues considering, co-creation and the impact of the human factor, than those addressed by innovation research. We expect that BTM needs to design spaces that have much more frequent (or less temporary) usage than most innovation spaces (Nyström *et al.*, 2014). We also expect that there is a much higher intensity of integration and test aspects in BTM-driven spaces than we see in the field of innovation (Kareborn and Anna, 2009). Moreover, the question remains about how virtual and physical co-creation spaces are seamlessly connected (Bogers *et al.*, 2017). We propose this in full awareness that the BTM professionals already master the respective tasks on a daily basis. For example, the framework of leadership behavior in offline communities was also observed in online ones, focusing on strategies of content and team management and providing their communities with relevant content and personal stories to build a sense of community (Gazit and Bronstein, 2020). We advocate, however, that an active and conscious design and management of spaces for the interactions among professionals (humans) in BTM could unleash the so far concealed value creation potential in BTM.

(2) Determine BTM-specific configurations of spaces for BTM: There is no doubt that inspiring spaces, as we find them in innovation labs, will also have positive effects on humans in BTM. Thus, all the open issues on configurations of spaces with respect to the nature of collaboration, the stakeholders and supporting technologies (Enkel *et al.*, 2020) also apply to BTM. However, the specific situation and scope of BTM might require particular configurations for BTM-driven spaces. One starting point might be the work of Ramaswamy and Kerimcan (2018). They proposed a conceptionalization for value co-creation as being a complex interplay ("agencial assemblages") of "heterogeneous relations of artifacts, processes, interfaces, and persons" (p. 196). Their concept has also been applied to other, more operational settings of co-creation (e.g. Danzinger *et al.*, 2020) and appears general enough for a transfer to different contexts. We expect that new configurations, patterns and role models will arise in the BTM context, which might even suggest approaches to "new work" for future BTM professionals. Deliberate usage of spaces could, for example, affect the frequency and variety of sole-creating and co-creating (e.g. alignment or synchronization) phases or change the openness of BTM professionals towards other stakeholders.

(3) Embedding spaces for BTM into the organization and larger ecosystems: To date, most devoted innovation spaces are used for specific, non-recurring, non-routine projects. In order to create a constant flow of value creation in BTM, the interactions in these spaces need to be fully implemented into the organization's processes and ecosystems. Ramaswamy and Kerimcan (2018) label this integration effort

"structuring organizations" and "agencing engagements" and suggest that a successful integration allows for the constant development and increase of an organizations' (BTM) capabilities. Thus, we agree with Bogers *et al.* (2017) in their call for more research on the integration and institutionalization of co-creation spaces and also want to stress the importance for BTM spaces. We are fully aware that this might be the hardest challenge for enterprises. However, the operational nature of BTM activities might produce valuable insights and more integrated forms of organizational co-creation spaces.

There is a clear demand from users to use technologies that protect their rights and create value for them. For that, we need solutions that enable technology companies and developers to address complex ethical issues, and one way to do that is by addressing the needs of customers, employees, financiers, supplies and other communities to create sustainable value. By aligning the interests of various stakeholders, technology companies can offer products or services to customers that transcend user-centric needs. Instead, they should strive to maximize value for all stakeholders and promote a broadly defined stakeholder-centric innovative design process, which may be achieved by properly capitalizing on the co-creation spaces in technology organizations.

Conclusion

This special issue aims to fill the research gap by attracting innovative and practical solutions to a variety of human factor concerns. In addressing the gaps in human- or user-centric research in BTM, we focused on these three avenues for future research: (1) extending the concept of collaborative co-creation spaces to BTM, (2) determining BTM-specific configurations of spaces and (3) embedding spaces for BTM into the organization and larger ecosystems. The special issue covers a range of critical topics and offers theoretical, empirical and experimental studies that present a solution-focused understanding and advancement of human factors research in the BTM space. It is an effort to showcase the role that BTM, as a discipline, plays in shaping the future of technological advancements.

Umair Rehman
Department of Computer Science, Faculty of Science, University of Western Ontario, London, Canada

Muhammad Umair Shah
Department of Management Sciences, Faculty of Engineering, University of Waterloo, Waterloo, Canada

Frank Danzinger
Faculty of Business, Augsburg University of Applied Science, Augsburg, Germany

Tali Gazit
Department of Information Science, Faculty of Humanities, Bar-Ilan University, Ramat Gan, Israel

Patrick C.K. Hung
Faculty of Business and Information Technology, Ontario Tech University, Oshawa, Canada, and

G. Zeynep Gurkas Aydin
Department of Computer Engineering, Faculty of Engineering, Istanbul University-Cerrahpasa, Istanbul, Turkey

References

Abbasi, A.Z., Shah, M.U., Rehman, U., Hlavacs, H., Ting, D.H. and Nisar, S. (2021), "The role of personality factors influencing consumer video game engagement in young adults: a study on generic games", *IEEE Access*, Vol. 9, pp. 17392-17410.

Albuquerque, O.D.P., Fantinato, M., Hung, P.C., Peres, S.M., Iqbal, F., Rehman, U. and Shah, M.U. (2022), "Recommendations for a smart toy parental control tool", *Journal of Supercomputing*, Vol. 78 No. 8, pp. 11156-11194.

Amichai-Hamburger, Y. (2017), *Internet Psychology: The Basics*, Routledge, London.

Avizohar, C., Gazit, T. and Aharony, N. (2022), "Facebook medical support groups: the communication privacy management perspective", *Aslib Journal of Information Management*. doi: 10.1108/AJIM-10-2021-0298.

Bogers, M., Zobel, A.-K., Allan, A., Almirall, E., Brunswicker, S., Dahlander, L., Frederiksen, L., Gawer, A., Gruber, M., Haefliger, S., Hagedoorn, J., Hilgers, D., Laursen, K., Magnusson, M.G., Majchrzak, A., McCarthy, I.P., Moeslein, K.M., Nambisan, S., Piller, F.T., Radziwon, A., Rossi-Lamastra, C., Sims, J., Anne, L. and Ter Wal, J. (2017), "The open innovation research landscape. Established perspectives and emerging themes across different levels of analysis", *Industry and Innovation*, Vol. 24 No. 1, pp. 8-40.

Buchanan, R. (1992), "Wicked problems in design thinking", *Design Issues*, Vol. 8 No. 2, pp. 5-21.

Čaić, M., Mahr, D. and Oderkerken-Schröder, G. (2019), "Value of social robots in services: social cognition perspective", *Journal of Services Marketing*.

Chandler, J.D. and Vargo, S.L. (2011), "Contextualization and value-in-context: how context frames exchange", *Marketing Theory*, Vol. 11 No. 1, pp. 35-49.

Cherns, A. (1976), "The principles of sociotechnical design", *Human Relations*, Vol. 29 No. 8, pp. 783-792.

Cone, T. (2018), "An introduction to stakeholder-centered design", available at: https://taylorcone.medium.com/an-introduction-to-stakeholder-centered-design-819d2d7c5d11 (accessed 12 May).

Danzinger, F., Schmidt, R., Memmert, F. and Pichlbauer, M. (2020), "Open lab functionalities in offline-retail – a step towards future retail?", in Fritzsche, A., Jonas, J.M., Roth, A. and Möslein, K.M. (Eds), *Innovating in the Open Lab*, pp. 49-70, De Gruyter Studies in Innovation and Entrepreneurship, 1, De Gruyter, Boston.

Eitan, T. and Gazit, T. (2021), "Leader behaviors in Facebook support groups: an exploratory study", *Current Psychology*. doi: 10.1007/s12144-021-02262-w.

Enkel, E., Bogers, M. and Henry, C. (2020), "Exploring open innovation in the digital age: a maturity model and future research directions", *R&D Management*, Vol. 50 No. 1, pp. 161-168.

Fogg, B.J. (1997), "Captology: the study of computers as persuasive technologies", *CHI'97 Extended Abstracts on Human Factors in Computing Systems*, ACM, p. 129.

Forlizzi, J. (2018), "Moving beyond user-centered design", *Interactions*, Vol. 25 No. 5, pp. 22-23.

Freeman, R.E. (1984), *Strategic Management: A Stakeholder Approach*, Pitman, Massachusetts.

Gagnon, S. (2020), "Business technology management as transdisciplinary IS-it competency framework", *ICIS 2020 Proceedings*.

Gazit, T. (2021), "Key motivations for leading Facebook communities: a uses and gratifications approach", *Aslib Journal of Information Management*, Vol. 73 No. 3, pp. 454-472, doi: 10.1108/AJIM-11-2020-0379.

Gazit, T. and Bronstein, J. (2020), "An exploration of the leadership strategies of Facebook community leaders", *Online Information Review*, Vol. 45 No. 1, pp. 99-117, doi: 10.1108/OIR-01-2020-0034.

Gray, C.M., Kou, Y., Battles, B., Hoggatt, J. and Toombs, A.L. (2018), "The dark (patterns) side of UX design", *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, pp. 1-14.

Gregor, S. and Hevner, A.R. (2013), "Positioning and presenting design science research for maximum impact", *MIS Quarterly*, Vol. 37 No. 2, pp. 337-355.

Hevner, A.R., March, S.T., Park, J. and Ram, S. (2004), "Design science in information systems research", *Management Information Systems Quarterly*, Vol. 28 No. 1, pp. 75-106.

Hippel, E.V. (1994), "'Sticky information' and the locus of problem solving: implications for innovation", *Management Science*, Vol. 40 No. 4, pp. 429-439.

Hornbæk, K. and Hertzum, M. (2017), "Technology acceptance and user experience: a review of the experiential component in HCI", *ACM Transactions on Computer-Human Interaction (TOCHI)*, Vol. 24 No. 5, pp. 1-30.

Hossain, M., Leminen, S. and Westerlund, M. (2019), "A systematic review of living lab literature", *Journal of Cleaner Production*, Vol. 213, pp. 976-988.

Kareborn, B.B. and Anna, S. (2009), "Living Lab. An open and citizen-centric approach for innovation", *International Journal of Innovation and Regional Development*, Vol. 1 No. 4, p. 356.

Kolko, J. (2015), "Design thinking comes of age", *Harvard Business Review*, Vol. 93 No. 9, pp. 66-71.

Licklider and Joseph, C.R. (1960), "Man-computer symbiosis", *IRE Transactions on Human Factors in Electronics*, No. 1, pp. 4-11.

Liu, D., Santhanam, R. and Webster, J. (2017), "Toward meaningful engagement: a framework for design and research of gamified information systems", *MIS Quarterly*, Vol. 41 No. 4.

Nakata, C. and Hwang, J. (2020), "Design thinking for Innovation: composition, consequence, and contingency", *Journal of Business Research*, Vol. 118, pp. 117-128.

Nestle, V., Glauner, P. and Plugmann, P. (2021), *Creating Innovation Spaces*, Springer International Publishing, Cham.

Nyström, A.G., Leminen, S., Westerlund, M. and Kortelainen, M. (2014), "Actor roles and role patterns influencing innovation in living labs", *Industrial Marketing Management*, Vol. 43 No. 3, pp. 483-495.

Rader, E., Cotter, K. and Cho, J. (2018), "Explanations as mechanisms for supporting algorithmic transparency", *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems*, pp. 1-13.

Ramaswamy, V. and Kerimcan, O. (2018), "What is co-creation? An interactional creation framework and its implications for value creation", *Journal of Business Research*, Vol. 84, pp. 196-205.

Shah, M.U. and Guild, P.D. (2017), "Toward an understanding of firms creating value for stakeholders: using the repertory grid technique for exploring differences among ICT-sector firms at various organizational life cycle stages", *Personal Construct Psychology at 60: Past, Present and Future*, Cambridge Scholars Publishing, pp. 359-389.

Shah, M.U. and Guild, P.D. (2022), "Stakeholder engagement strategy of technology firms: a review and applied view of stakeholder theory", *Technovation*, Vol. 114, 102460.

Shah, M.U. and Iqbal, F. (2022), "Assisting people of determination and the elderly using social robot: a case study", *Hawaii International Conference on System Sciences (HICSS-55)*, Honolulu, Hawaii.

Shah, M.U., Rehman, U., Iqbal, F., Wahid, F., Hussain, M. and Arsalan, A. (2020), "Access permissions for apple watch applications: a study on users' perceptions", *2020 International Conference on Communications, Computing, Cybersecurity, and Informatics (CCCI)*, IEEE, pp. 1-7.

Shah, M.U., Rehman, U., Iqbal, F., Hussain, M. and Wahid, F. (2021), "An alternate account on the ethical implications of autonomous vehicles", *2021 17th International Conference on Intelligent Environments (IE)*, IEEE, pp. 1-5.

Shah, M.U., Rehman, U., Iqbal, F. and Ilahi, H. (2022), "Exploring the human factors in moral dilemmas of autonomous vehicles", *Personal and Ubiquitous Computing*. doi: 10.1007/s00779-022-01685-x.

Technopedia (2013), "Business technology management (BTM)", Techopedia, May 2, available at: https://www.techopedia.com/definition/13766/business-technology-management-btm (accessed 27 September 2021).

Vargo, S.L. and Lusch, R.F. (2004), "Evolving to a new dominant logic for marketing", *Journal of Marketing*, Vol. 68 No. 1, pp. 1-17.

Vargo, S.L. and Lusch, R.F. (2016), "Institutions and axioms: an extension and update of service-dominant logic", *Journal of the Academy of Marketing Science*, Vol. 44 No. 1, pp. 5-23.

White, S.K. (2019), "What is TBM? A framework for driving value and innovation in IT", Electronic document, available at: https://www.cio.com/article/3339658/technology-business-management-tbm-defined.html (accessed 27 September 2021).

Yavetz, G. (2021), "Bibi and Mr. Prime Minister: do different Facebook identities imply different messages for political leaders?", *Online Information Review*. doi: 10.1108/OIR-01-2021-0004.

Zlatolas, L.N., Welzer, T., Heričko, M. and Hölbl, M. (2015), "Privacy antecedents for SNS self-disclosure: the case of Facebook", *Computers in Human Behavior*, Vol. 45, pp. 158-167.