CALL FOR PAPERS

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Cognitive Biases and Heuristics in the New Product Development Process: A Call for More Empirical Evidence

Guest Editors

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Overview

New Product Development (NPD) is a complex process requiring significant investment in resources, time, and effort [1]. The success of NPD projects depends on various factors, including the ability of project teams to make informed decisions based on available data and information and create a shared vision among team members [2][3]. However, human beings and the decision-making processes are prone to cognitive biases and heuristics that can lead to errors in judgment and decision-making [4], highlighting the importance of a cognitive perspective in the NPD context [5]. The NPD process is inherently complex, involving numerous decisions based on incomplete information and uncertain outcomes [6]. In such a context, cognitive biases can significantly influence decision-making and potentially lead to suboptimal outcomes, such as over featuring, overconfidence bias, anchoring bias, planning fallacy, and sunk-cost fallacy [6][7].

Team members, including managers and employees, may have different backgrounds, characteristics, traits, and visions, [8] which can further complicate decision-making processes and increase the risk of errors due to cognitive biases and heuristics [4]. These biases and heuristics are innate characteristics of human thinking that can affect how people interpret and process information, leading to systematic errors in thinking that can result in errors in judgment [9][4]. Thus, it is key for NPD project teams to recognize and mitigate the effects of cognitive biases and heuristics by promoting open communication, collaboration, and objective data and analysis to inform decision-making processes.

For example, Over featuring describes a set of tendencies that can harm the success of the NPD process. Over featuring happens when a product or service is developed beyond what is needed by the users, market or plans, and what is feasible within the firm's resources. It can be driven by various cognitive and emotional variables, such as biases in decision-making, emotions, and the behavior of project managers, engineers, developers, and R&D managers [6]. Moving to specific cognitive biases, Overconfidence refers to the tendency for individuals or teams to overestimate their abilities or the likelihood of success [7]. In NPD teams, this bias can lead to insufficient market research or testing, leading to an overreliance on assumptions not grounded in reality. For example, a team may be overconfident in understanding customer needs and preferences, leading to product features that do not resonate with the target market.

Anchoring bias occurs when individuals rely too heavily on the first piece of information they receive when making decisions [7]. In NPD teams, anchoring bias can lead to overestimating or underestimating the costs, time, or resources required to develop a new product based on an initial estimate. This bias can limit creativity and exploration of alternative solutions. For instance, a team may anchor on an initial estimate of production costs, leading to decisions that do not fully consider alternative production methods or suppliers.

Planning fallacy is the tendency to underestimate the time or resources required to complete a task or project [7]. In NPD teams, this bias can lead to unrealistic timelines or budget estimates for product development. This bias can lead to a lack of contingency planning, resulting in unexpected delays and additional costs. For example, a team may plan to launch a new product within a short time frame without fully considering the time required for product testing or regulatory compliance. Sunk-cost fallacy refers to the tendency for individuals or teams to continue to invest resources in a project, even when it is unlikely to succeed [7]. In NPD teams, this bias can lead to a reluctance to abandon a project, leading to continued investment of resources even when market research or testing suggests the product is not viable. This bias can result in a waste of resources and a missed opportunity to pursue more promising product development opportunities.

On the other hand, the NPD process involves making numerous decisions based on incomplete or uncertain information. In such a context, heuristics can guide decision-making, allowing for quick and efficient decisions without extensive analysis [10][11]. However, it is important to acknowledge the potential biases and limitations of heuristics in the context of NPD. One common heuristic observed in the NPD process is the availability heuristic, which involves relying on easily available or memorable information to make decisions. For example, a firm may rely on customer feedback that is easily accessible to make decisions about product features or marketing strategies. However, this heuristic may lead to a biased representation of the customer base if the feedback is not representative or if other relevant factors are overlooked. Another heuristic commonly observed in NPD is the anchoring heuristic, which involves using an initial piece of information as a reference point for subsequent decisions [12]. While developing new products, firms may anchor on an initial estimate of the cost of production or potential market size to make subsequent decisions about product features or pricing. However, this heuristic may lead to an over-reliance on initial estimates and limit the exploration of alternative solutions. Furthermore, the representative heuristic may be used in NPD, whereby past successful product launches are used as a reference point for making decisions about new products. This heuristic may lead to assumptions about customer preferences or demands not representative of the current market.

As a result, these biases and heuristics can significantly impact NPD processes, leading to poor decision-making, wasted resources, and even project failure. Therefore, it is crucial for project teams to be aware of these biases and heuristics and implement strategies and tools to mitigate their effects. This can include incorporating diverse perspectives and data sources, using structured decision-making frameworks, and regularly reviewing assumptions and hypotheses to test for bias [13]. By understanding and addressing these cognitive biases and heuristics, project teams can improve their decision-making and increase the chances of success in NPD processes.

Therefore, it is crucial to identify and mitigate these biases and heuristics in NPD

processes. Identifying and mitigating biases and heuristics in NPD processes is essential to enhancing firm performance and fostering innovation. By doing so, firms can create a more conducive environment for serendipitous discoveries [14], which can be a significant driver of success in today's dynamic business landscape.

Scope of this special issue

The IEEE Transactions on Engineering Management invites submissions for a special issue on Cognitive Biases and Heuristics in NPD Processes. This special issue aims to explore the role of cognitive biases and heuristics in NPD processes and the strategies and tools that can be used to address these biases and heuristics.

Topics of interest for this special issue include, but are not limited to:

- How can heuristics be leveraged to improve decision-making processes in NPD, and what are the key heuristics associated with positive and negative effects on NPD performance?
- How can a project management framework be designed to account for common biases and heuristics? What strategies can be implemented within the stage gate process to mitigate the impact of cognitive biases and heuristics in decision-making, and ensure that project teams make objective, data-driven decisions?
- How can cognitive biases and heuristics be identified and addressed in the early stages of NPD, and what strategies can be integrated into the Agile and Stage-Gate methodologies to mitigate their impact?
- What are the NPD practices that could reduce the negative role of cognitive biases and negative heuristics in the NPD process? How to prevent an excessive number of features, such as Overfeaturing? How Stage-Gate and Agile approaches could favour a reduction of cognitive biases?
- How does team diversity, including managers and employees with different backgrounds, characteristics, traits, and visions, impact decision-making processes in NPD, and what measures can be taken to mitigate the potential risks of cognitive biases and heuristics?
- How can design methods (e.g. Design Thinking, Entrepreneurship as Design) be used to foster a more human-centric approach to NPD and mitigate the effects of cognitive biases and heuristics on the design process?
- How do digital technologies (e.g. generative artificial intelligence, big data, virtual reality, augmented reality) affect the cognitive biases (e.g. over featuring) in NPD processes?
- How can the innovation culture be improved by mitigating cognitive biases and knowledge asymmetries, and what strategies can organizations implement to foster a culture of innovation that is more objective, data-driven, and inclusive of diverse perspectives and experiences?

- What role do cognitive biases and heuristics play in fostering or hindering serendipitous outcomes in NPD processes, and how can serendipity be leveraged to generate breakthrough ideas in such contexts?
- What microfoundational mechanisms can be employed to mitigate the impact of cognitive biases and knowledge asymmetries on innovation outcomes, and how can these mechanisms be integrated into the NPD process?

Authors are encouraged to submit original research papers (quantitative, qualitative, experimental), addressing missing empirical evidence on the topic of this call. **Review papers are not encouraged for the present special issue.**

All submissions will be subject to a rigorous peer-review process to ensure high-quality publications.

Manuscript submission information

As indicated in the 'Guide for Authors' on the IEEE Transactions on Engineering Management website, solely original manuscripts may be submitted.

To receive informal feedback from the guest editors', interested authors are invited to submit extended abstracts of no more than 2,000 words all included, comprising a brief literature review, research question, methodology, and preliminary or expected results. Extended abstracts should be sent to all the four guest editors' emails, available on the present call, before the 31st of August 2023.

In your cover letter, kindly specify the name of the Special Issue and ensure that your paper is earmarked for this Special Issue in the Editorial Manager system.

All submissions will undergo a rigorous peer-review process in line with the established policies and procedures of the journal. The final selection of papers for publication will be contingent upon the outcome of the peer-review process and the evaluations of the Guest Editors.

Proposed timeline

- Extended Abstract Submission Period (optional but suggested): 1st of May 2023-31st of August 2023
- Full Paper Submission Period Start: 1st of October 2023
- Full Paper Submission Deadline: 30th December 2023
- Expected Publication Date: between Q4 2024 and Q1 2025

If you have any inquiries related to this special issue or wish to discuss the suitability of your research idea or paper for the special issue, kindly email the guest editors assigned to oversee the special issue.

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Short bios

Giacomo Marzi is Assistant Professor (Tenured) of Management at IMT School for Advanced Studies Lucca (Italy). Previously he was Senior Lecturer in Strategy and Enterprise at the University of Lincoln (UK), Department of Management where he now holds a Visiting Fellow position. He received a PhD in Management from the University of Pisa, School of Economics and Management, Italy. His primary research fields are Innovation Management, New Product Development, Bibliometrics, and Survey-based Research. Author of three books and several papers appeared in journals such as Technovation, Journal of Business Research, IEEE Transactions on Engineering Management, Human Resource Management Journal, International Journal of Production Research, and Scientometrics among the others. He is an active member of the Academy of Management and European Academy of Management and also a member of IEEE Transactions on Engineering Management editorial board.

Marco Balzano is PhD Student at the Department of Management, Ca' Foscari University of Venice (Italy). He received an International PhD scholarship to attend the Double PhD degree with the SKEMA Business School (France). He got a MsC cum laude in Strategic Management at the University of Trieste. He has published conference articles and chapters in edited books, as well as articles in journals such as Journal of Small Business Management, Multivariate Behavioral Research, and Management Decision. He presented the results of his research activity in international conferences. His research interests deal with imitation strategies, competitive dynamics, business model innovation, and organizational agility.

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Jeanne Liedtka is the UTC Professor of Business at the University of Virginia's Darden Graduate School of Business. Beginning her career as a strategy consultant for the Boston Consulting Group, Jeanne has also served as Chief Learning Officer at United Technologies, and as the Senior Associate Dean of Darden's MBA Program. With interests at the intersection of strategy and design, Jeanne has written eight books and many articles on the subject of strategy, innovation, and design thinking, and consulted with a diverse set of organizations including IBM, Samsung, NASA, The United Nations, and the government of Singapore. Her most recent book, Experiencing Design: The Innovator's Journey was published in July, 2021. Forthcoming in 2023 is The Experimentation Primer.

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