



# The Analogy of the Theoretical Foundations of Systematic and Transformational Innovation Discourses

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## Abstract

The contemporary world faces numerous, momentous, and intertwined environmental, technological, economic, political, and cultural challenges. Scholars have developed social, environmental, sustainable, responsible, inclusive, mission-oriented, and challenge-oriented policy approaches in the last two decades to expand the transformational innovation policy discourse in response to the shortcomings of the systematic innovation policy discourse. However, the distinction between the theoretical foundations of the discourses is relatively hard; therefore, the divergence of research is highly likely due to the ambiguity in the scope and precise theoretical definition of the alternative discourse. On the other hand, despite the theoretical development, transformational policymaking has yet to be prevalent among policymakers, given its unknown nature.

According to the literature review, previous comparative studies aimed to introduce transformational innovation as an alternative discourse, emphasizing the differences between the discourses. Therefore these studies have not defended the systematic innovation discourse properly. Also, some studies have dealt with a specific branch of the discourses while neglecting a comprehensive approach. Finally, methodological weakness and the need for systematic review are evident in previous studies. Thus, this article systematically and conservatively compares the transformational and systematic innovation discourses to address the discourses' similar, different, and exclusive aspects.

Accordingly, 2401 articles were identified by searching the keywords of the two discourses in Scopus and filtering according to the preliminary inclusion criteria. Next, the searched articles were reviewed based on the three-step filtering according to title, abstract, and full-text, leading to 42 final articles. Finally, while classifying the content of the articles, the similar, differentiative, and exclusive aspects of the systematic and transformational innovation discourses were identified. Therefore, the similarities between the discourses are as follows.

1) Regime as a symbol of resistance: The regime - as a set of actors, networks, and institutional structures that guides the current innovation model – locks to the technical-economic, social-cognitive, and institutional-political mechanisms. Therefore, the current regimes challenge the transformation to protect the current interests.

2) Evolutionary and guided diversity and selection: Despite the importance of diversity in expanding learning, network development, and preventing lock-in in the early stages, it leads to uncertainty, fragmentation of resources, and the lack of emergence of sustainable procedures in the period of technology and industry maturity. Therefore, it is necessary to balance variety and choice in the development of technology and innovation.

3) Endogenous and participation-oriented approach: Due to the emergent nature of transformative developments, endogenous guidance and minimal role-playing of the government is necessary. In this regard, attracting public participation facilitates decision-making and implementation while improving innovation.

The following table highlights the differences.

	<b>Systematic Innovation Discourse</b>	<b>Transformational Innovation Discourse</b>
Innovation Role	Innovation is the driver of long-term economic evolution through creative destruction.	Despite the undeniable role of technology in modern societies, technological changes cannot effectively deal with social and environmental challenges.
Innovation Type	The non-linear nature of the interactions of the components of the innovation system leads to the emergence of innovation, which cannot be explained simply by aggregating them.	Fundamental transformation requires changes at the macro-level of socio-technical systems and problem framing beyond individual products, processes, or technologies.
Policy Rationale	Market orientation leads to investment in knowledge development at a lower-than-optimal level. At the same time, the systemic nature of innovation also leads to infrastructure, capability, network, institution, and transition failures, which weaken the system's performance.	Despite the fundamental importance of market and system failures, attention to the transformation process's broad, long-term, and fundamental nature leads to identifying more fundamental failures, including orientation, demand articulation, policy coordination, and reflexivity failures.
Policy Level	Despite the diversity in the level of application of innovation systems, the national dimension of the system is crucial due to its unique characteristics, collaboration capacity, interdependencies, and political determinants.	Co-evolution of economic, political, social, cultural, technological, environmental, and institutional changes results in transformation. In this regard, policymakers should combine macro-level knowledge about landscape dynamics with micro-level knowledge about innovation development.

Finally, non-market, institutional, and social development, non-linear approach to innovation, and the inherent lack of optimality were the exclusive dimensions of systematic innovation discourse. In contrast, the exclusive aspects of transformational innovation discourse were the necessity of a normative approach toward innovation, attention to both development and destruction and radical change in gradual stages.

According to the findings, evaluating the role of technology in solving grand challenges, attracting the participation of broader institutions, adopting a multi-level approach, and developing destabilizing policies are presented as policy implications. Also, examining the differences and similarities between the different branches of each discourse, evaluating the understanding of innovation policy scholars about the discourses, and systematically identifying implications of the discourses are suggested as future research directions.