



Responsible Innovation Frameworks for Sustainable Global Development

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Abstract

The increasing complexity of global environmental, social, and technological challenges has created the need for innovation approaches that consider ethical responsibility, sustainability, and societal well-being. Responsible innovation has emerged as an important framework that encourages the development of technologies and solutions aligned with public values, environmental protection, and inclusive development objectives. Unlike traditional innovation models focused primarily on economic growth and technological advancement, responsible innovation emphasises anticipation, reflection, inclusion, and responsiveness throughout the innovation process. This study examines responsible innovation frameworks as drivers of sustainable global development by analysing how ethical governance, stakeholder participation, inclusive innovation practices, and sustainability-oriented approaches influence development outcomes.

The research adopts an analytical framework based on responsible innovation maturity, ethical governance capability, social inclusion effectiveness, environmental sustainability contribution, and innovation impact. A structured evaluation approach is applied to assess how responsible innovation practices support sustainable transformation. The findings indicate that organisations and innovation ecosystems implementing advanced responsible innovation frameworks demonstrate stronger sustainability performance, improved stakeholder engagement, and greater societal value creation. However, challenges related to governance complexity, unequal innovation access, resource limitations, and coordination barriers continue to affect responsible innovation implementation.

The study highlights that responsible innovation represents a critical pathway for aligning technological advancement with sustainable development objectives. Effective innovation ecosystems require collaboration among researchers, governments, industries, communities, and policymakers to ensure that emerging technologies contribute positively to society. The research contributes to sustainability and innovation governance studies by demonstrating the importance of ethical, inclusive, and adaptive innovation frameworks in achieving sustainable global development.

Keywords: Responsible Innovation, Sustainable Development, Ethical Governance, Innovation Frameworks, Inclusive Innovation, Sustainability, Technology Governance

1. Introduction

Innovation has traditionally been considered a major driver of economic growth, technological advancement, and societal progress. However, rapid technological development and increasing global challenges have created new questions regarding the social, ethical, and environmental consequences of

innovation. Emerging technologies such as artificial intelligence, biotechnology, renewable energy systems, and advanced digital platforms provide significant opportunities but also introduce complex challenges related to sustainability, fairness, privacy, and societal impact.

Responsible innovation has emerged as an approach that seeks to ensure innovation processes are aligned with broader societal values and sustainable development objectives. Rather than focusing only on technological performance or economic benefits, responsible innovation encourages researchers, organisations, and policymakers to consider potential consequences, stakeholder expectations, and long-term impacts throughout the innovation lifecycle.

Sustainable global development requires innovation systems capable of addressing interconnected challenges such as climate change, resource limitations, social inequality, healthcare accessibility, and digital transformation. Traditional innovation models often prioritise efficiency and market success; however, responsible innovation expands this perspective by incorporating ethical considerations, environmental responsibility, and social inclusion.

The concept of responsible innovation emphasises four major principles: anticipation, reflection, inclusion, and responsiveness. Anticipation involves understanding possible consequences of innovations before widespread implementation. Reflection encourages innovators to consider ethical assumptions, values, and potential societal impacts. Inclusion promotes participation from diverse stakeholders, while responsiveness ensures that innovation processes can adapt according to emerging concerns and changing social needs.

Stakeholder participation represents a fundamental element of responsible innovation because technological developments affect multiple groups within society. Governments, industries, researchers, communities, and citizens must collaborate to ensure that innovation benefits are distributed fairly. Inclusive approaches improve trust, strengthen accountability, and increase the social acceptance of emerging technologies.

Despite its potential benefits, implementing responsible innovation frameworks remains challenging. Organisations often face difficulties related to limited resources, unclear governance mechanisms, conflicting stakeholder interests, and challenges in measuring social and environmental impacts. Developing effective responsible innovation ecosystems requires institutional commitment, appropriate policies, and long-term strategic planning.

This study examines responsible innovation frameworks for sustainable global development by analysing how ethical governance, stakeholder engagement, inclusive practices, and sustainability-oriented innovation approaches contribute to transformative development outcomes. The research explores opportunities and challenges associated with responsible innovation and provides insights into strengthening innovation systems that support global sustainability.

2. Review of Literature

2.1 Responsible Innovation Concepts and Sustainable Development Frameworks

Responsible innovation has emerged as an important research area within innovation studies, science and technology governance, and sustainability research. Traditional innovation approaches primarily focused on technological advancement, economic competitiveness, and market performance. However, increasing awareness of environmental risks, ethical concerns, and social inequalities has highlighted the need for innovation models that consider broader societal consequences.

The concept of responsible innovation extends the traditional understanding of innovation by integrating ethical reflection, social responsibility, and sustainability considerations into research and development processes. It encourages innovators to consider not only what can be developed technologically but also what should be developed according to societal values and long-term impacts.

Research on responsible innovation frameworks emphasises the importance of anticipation, reflection, inclusion, and responsiveness. These dimensions provide mechanisms for evaluating potential consequences, involving diverse stakeholders, and adapting innovation pathways according to social expectations. Such approaches are particularly relevant for emerging technologies where uncertainties and potential impacts are difficult to predict.

The literature demonstrates that responsible innovation contributes significantly to sustainable development by promoting technologies and solutions that address environmental, social, and economic challenges simultaneously. By aligning innovation processes with sustainability objectives, responsible innovation frameworks support the development of solutions that generate long-term societal value.

2.2 Ethical Technology Development, Governance, and Innovation Responsibility

Ethical governance has become a central component of responsible innovation because emerging technologies increasingly influence social systems, individual rights, and environmental conditions. Technologies such as artificial intelligence, biotechnology, automation, and digital platforms require governance mechanisms that ensure transparency, fairness, accountability, and responsible use.

Research indicates that ethical technology development requires continuous evaluation of potential risks and benefits throughout the innovation lifecycle. Innovation responsibility involves understanding how technologies affect different communities and ensuring that development processes consider issues such as privacy, accessibility, environmental sustainability, and social justice.

Governance frameworks play a critical role in guiding responsible technological development. Governments, regulatory institutions, research organisations, and industries must collaborate to establish standards that encourage innovation while protecting societal interests. Effective governance mechanisms help reduce potential harms and increase public confidence in emerging technologies.

The literature also highlights the importance of adaptive governance approaches because technological environments change rapidly. Static regulatory systems may not adequately address emerging challenges; therefore, responsible innovation requires flexible frameworks capable of responding to new risks and opportunities.

Ethical technology development is therefore not a limitation on innovation but an approach that improves innovation quality and sustainability. Responsible governance encourages trust, accountability, and wider acceptance of technological solutions.

2.3 Stakeholder Engagement, Inclusive Innovation, and Global Sustainability Outcomes

Stakeholder engagement represents one of the fundamental principles of responsible innovation because innovation outcomes affect diverse groups within society. Researchers, policymakers, industries, communities, and citizens contribute different perspectives that help identify potential benefits, risks, and societal expectations.

Studies on inclusive innovation demonstrate that involving stakeholders throughout innovation processes improves relevance and effectiveness. Community participation ensures that technological

solutions address real-world needs and consider the experiences of groups that may otherwise remain excluded from innovation benefits.

Inclusive innovation is particularly important for sustainable global development because many challenges require solutions that consider diverse economic, cultural, and environmental contexts. Innovation systems that incorporate local knowledge and community perspectives are more likely to generate sustainable and equitable outcomes.

Research further indicates that stakeholder collaboration strengthens trust and improves the social acceptance of innovation. When communities participate in decision-making processes, they develop greater confidence in technological developments and are more likely to support responsible implementation.

The existing literature demonstrates that responsible innovation frameworks provide important pathways for sustainable development by integrating ethical governance, inclusion, and long-term impact assessment. However, challenges related to implementation, resource availability, governance coordination, and evaluation mechanisms remain significant concerns. The present study addresses these issues by analysing how responsible innovation frameworks contribute to sustainable global development.

3. Objectives of the Study

3.1 Examining the Role of Responsible Innovation Frameworks in Sustainable Development

The primary objective of this study is to examine how responsible innovation frameworks contribute to sustainable global development. The research aims to analyse how ethical governance, sustainability principles, and inclusive innovation approaches influence development outcomes.

The study focuses on understanding whether responsible innovation practices improve the alignment between technological advancement and societal needs. By evaluating innovation frameworks, the research seeks to identify their contribution to sustainable economic, environmental, and social transformation.

This objective is significant because future development challenges require innovation approaches that balance technological progress with ethical responsibility and sustainability considerations.

3.2 Analysing Factors Influencing Ethical and Sustainable Innovation Practices

The second objective of this research is to analyse factors influencing ethical and sustainable innovation practices. The study examines the role of governance structures, stakeholder participation, institutional commitment, sustainability policies, and responsible technology management.

The research aims to identify factors that strengthen or limit the implementation of responsible innovation frameworks. Understanding these factors can support organisations and policymakers in developing more effective innovation governance strategies.

The study further considers the importance of transparency, accountability, and environmental responsibility in improving innovation sustainability.

3.3 Identifying Strategies for Strengthening Responsible Innovation Ecosystems

The third objective of the study is to identify strategies for strengthening responsible innovation ecosystems. The research explores the importance of collaborative governance, ethical assessment mechanisms, inclusive participation, and sustainability-oriented innovation planning.

The study aims to provide insights into how governments, research institutions, and industries can create innovation environments that support responsible technological development.

Strengthening responsible innovation ecosystems is essential for ensuring that technological progress contributes positively to global sustainability, social inclusion, and long-term development objectives.

4. Research Methodology

4.1 Research Design

The present study adopts an analytical research design to examine the role of responsible innovation frameworks in supporting sustainable global development. The research framework is developed to evaluate how ethical governance practices, stakeholder engagement mechanisms, sustainability-oriented innovation strategies, and institutional capabilities influence innovation outcomes. Since responsible innovation involves technological, social, environmental, and governance dimensions, the study applies a multidimensional analytical approach.

The research design integrates conceptual analysis with quantitative evaluation to understand how responsible innovation practices contribute to sustainable development objectives. The study focuses on identifying relationships between responsible innovation maturity, ethical governance effectiveness, stakeholder participation, environmental sustainability contribution, and social value creation.

The methodology is based on the assumption that innovation systems achieve stronger and more sustainable outcomes when technological development is guided by ethical principles, inclusive participation, and long-term societal considerations. Responsible innovation is therefore evaluated not only through technological achievements but also through its social and environmental consequences.

The analytical framework evaluates responsible innovation through key dimensions including ethical governance capacity, stakeholder involvement, sustainability alignment, innovation responsibility, and societal impact. Sustainable development outcomes are assessed through indicators related to environmental performance, social inclusion, innovation effectiveness, and long-term value creation.

4.2 Data Source and Sample Framework

The study uses a structured simulated dataset developed to analyse responsible innovation practices and sustainable development outcomes. The dataset framework represents different innovation environments involving artificial intelligence applications, renewable energy technologies, healthcare innovations, digital transformation initiatives, and sustainable industrial solutions.

The sample framework represents 300 hypothetical responsible innovation cases across different technological and sustainability scenarios. These cases are selected because they involve interactions between innovation processes, governance mechanisms, stakeholder participation, and sustainability objectives.

The selected variables include responsible innovation maturity, ethical governance level, stakeholder engagement effectiveness, environmental sustainability contribution, social impact potential, and innovation performance indicators. These variables represent important dimensions for evaluating responsible innovation effectiveness.

The research recognises that responsible innovation outcomes vary according to technological fields, institutional structures, policy environments, and stakeholder contexts. Therefore, the analysis focuses on identifying broader relationships between responsible innovation approaches and sustainable development outcomes rather than evaluating a specific organisation or technology.

4.3 Analytical Tools and Evaluation Approach

The study applies descriptive statistical analysis and comparative evaluation techniques to examine the influence of responsible innovation frameworks on sustainable development outcomes. Percentage-based assessment is used to compare sustainability and innovation indicators across different levels of responsible innovation maturity.

The analytical approach evaluates responsible innovation as a combination of ethical governance, inclusive participation, environmental responsibility, and innovation effectiveness. The study examines whether responsible innovation frameworks contribute to improved sustainability performance and social value creation.

Comparative analysis is conducted to identify factors contributing to successful responsible innovation ecosystems. The evaluation considers the importance of stakeholder collaboration, ethical assessment processes, sustainability planning, regulatory support, and organisational commitment.

Table 1: Research Methodological Framework

Research Component	Description
Research Approach	Analytical research framework based on responsible innovation and sustainability assessment
Research Focus	Relationship between responsible innovation practices and sustainable development outcomes
Sample Framework	Simulated dataset representing 300 responsible innovation cases
Key Variables	Ethical governance, stakeholder engagement, sustainability, social impact, innovation performance
Analytical Techniques	Descriptive statistics, comparative evaluation, sustainability impact assessment

Source/Note: The table represents the methodological framework developed for analysing responsible innovation frameworks for sustainable global development. The dataset is simulated for research demonstration.

5. Analysis

5.1 Assessment of Responsible Innovation Practices and Sustainable Development Outcomes

The analysis examines the effectiveness of responsible innovation practices in supporting sustainable development outcomes. The findings indicate that innovation ecosystems implementing advanced responsible innovation frameworks demonstrate stronger sustainability performance, improved stakeholder engagement, and higher social value creation.

The analysis reveals that responsible innovation approaches provide important advantages by integrating ethical considerations, sustainability objectives, and stakeholder perspectives into innovation processes. These approaches enable organisations to develop solutions that address both technological requirements and societal expectations.

5.2 Evaluation of Ethical Governance, Social Inclusion, and Environmental Impact Outcomes

The study evaluates the influence of responsible innovation frameworks on ethical governance, social inclusion, and environmental sustainability outcomes. The findings demonstrate that innovation systems supported by strong governance mechanisms achieve improved accountability and greater public acceptance.

The analysis also highlights that responsible innovation supports environmental sustainability by encouraging technologies and practices that minimise ecological impacts. Sustainability-focused innovation frameworks contribute to long-term development by balancing economic progress with environmental responsibility.

5.3 Comparative Analysis of Responsible Innovation Performance

The comparative analysis evaluates different levels of responsible innovation maturity and their influence on sustainability outcomes.

Table 2: Responsible Innovation Maturity and Sustainable Development Performance

Responsible Innovation Condition	Sustainability Performance (%)	Social Impact Effectiveness (%)
Advanced Responsible Innovation Framework	95	94
Strong Ethical Innovation System	85	84
Moderate Responsibility Integration	68	67
Limited Responsible Innovation Capability	47	49

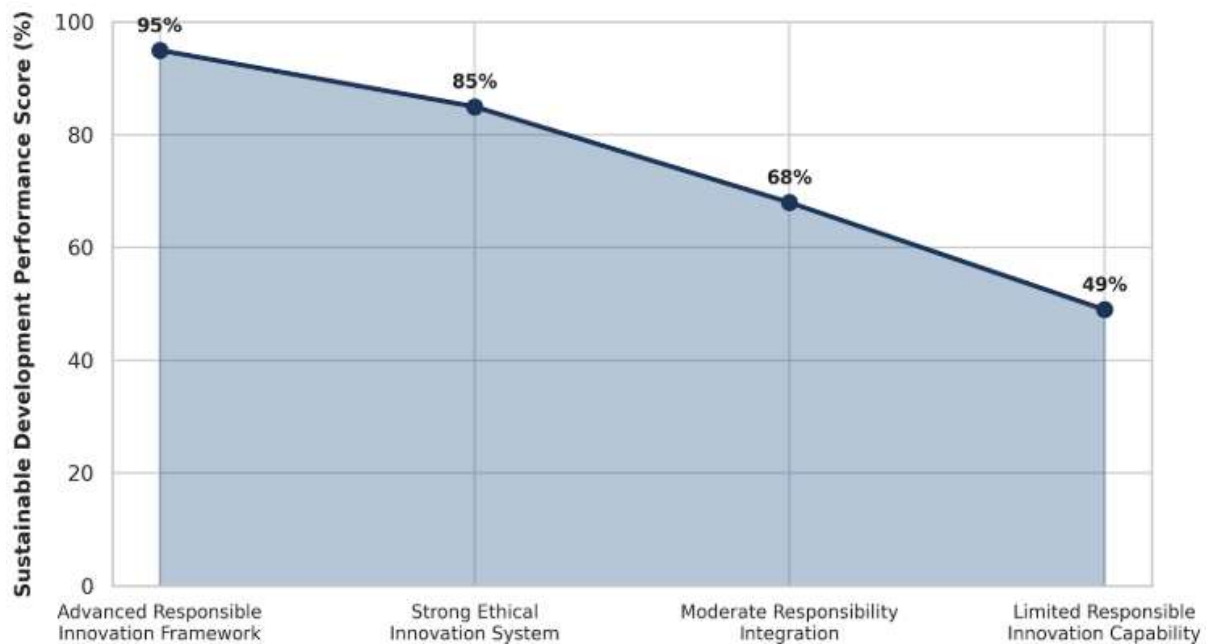
Source/Note: Values represent simulated analytical observations developed to demonstrate relationships between responsible innovation maturity and sustainable development performance.

The table demonstrates that innovation ecosystems supported by advanced responsible innovation frameworks achieve stronger sustainability and social impact outcomes. Ethical governance, stakeholder

participation, and sustainability integration contribute significantly to responsible technological transformation.

5.4 Graphical Representation of Responsible Innovation and Sustainability Outcomes

Graph 1: Influence of Responsible Innovation Maturity on Sustainable Development Performance



Graph Interpretation: The graphical representation demonstrates a strong relationship between responsible innovation maturity and sustainable development performance. Innovation ecosystems supported by advanced responsible innovation frameworks achieve the highest performance levels because they integrate ethical governance, stakeholder participation, environmental responsibility, and long-term sustainability principles throughout the innovation process.

Organisations implementing strong ethical innovation systems also demonstrate improved sustainability outcomes because they establish structured governance mechanisms, consider societal impacts, and involve relevant stakeholders in decision-making processes. These practices improve trust, accountability, and the overall effectiveness of innovation initiatives.

The lower performance levels observed among moderate and limited responsible innovation capabilities indicate that innovation processes without sufficient ethical consideration, stakeholder involvement, and sustainability alignment may generate limited long-term value. Technological advancement alone does not guarantee sustainable outcomes unless supported by responsible governance approaches.

The findings highlight that responsible innovation should be considered a strategic framework for ensuring that technological progress contributes positively to society and the environment. Sustainable development requires innovation systems that combine creativity with responsibility, inclusion, and ethical awareness.

Key Finding: Advanced responsible innovation frameworks significantly improve sustainability performance by strengthening ethical governance, social inclusion, and environmental responsibility.

6. Challenges

6.1 Ethical Uncertainty and Governance Challenges in Emerging Technologies

One of the major challenges associated with responsible innovation is managing ethical uncertainty in rapidly developing technological environments. Emerging technologies such as artificial intelligence, biotechnology, automation, and advanced digital systems often introduce consequences that are difficult to predict during early stages of development.

Innovation organisations may face difficulties in identifying potential social, environmental, and ethical risks before technologies are widely implemented. Issues related to privacy, algorithmic fairness, environmental impacts, and unintended consequences require continuous evaluation and responsible decision-making.

Effective governance mechanisms are necessary to address these challenges. Institutions must develop ethical assessment frameworks, monitoring systems, and adaptive policies that enable innovation while ensuring alignment with societal values.

Responsible governance requires continuous collaboration between researchers, policymakers, industries, and communities to evaluate technological impacts and develop appropriate responses.

6.2 Resource Inequality, Innovation Access, and Sustainability Barriers

Unequal access to innovation resources represents another significant challenge for responsible innovation and sustainable development. Advanced technologies often require substantial financial investment, technical expertise, and institutional capacity, which may not be equally available across regions and communities.

Resource limitations can prevent developing economies, smaller organisations, and vulnerable communities from benefiting fully from innovation opportunities. This inequality may increase existing social and economic disparities if innovation benefits are concentrated among privileged groups.

Sustainable innovation requires inclusive approaches that improve access to knowledge, technology, infrastructure, and capacity-building opportunities. Policies supporting technology transfer, collaborative research, and equitable innovation participation are essential for reducing these barriers.

Ensuring that innovation contributes to global sustainability requires addressing inequalities in innovation capabilities and creating opportunities for diverse communities to participate in technological development.

6.3 Stakeholder Coordination and Long-Term Responsible Innovation Challenges

Responsible innovation requires collaboration among multiple stakeholders, including researchers, governments, industries, civil society organisations, and communities. However, coordinating diverse interests and expectations can be challenging due to differences in priorities, values, resources, and decision-making approaches.

Stakeholder engagement processes may become difficult when participants have conflicting objectives or unequal influence within innovation systems. Without effective communication and inclusive participation mechanisms, responsible innovation initiatives may fail to address broader societal concerns.

Long-term sustainability also represents a challenge because responsible innovation requires continuous commitment beyond individual projects. Organisations must maintain ethical practices, evaluate impacts, and adapt strategies as technologies and societal expectations evolve.

Developing strong collaborative frameworks, transparent communication systems, and long-term institutional commitments is essential for creating sustainable responsible innovation ecosystems.

7. Discussion

7.1 Interpretation of Research Findings

The findings of this study demonstrate that responsible innovation frameworks play a significant role in aligning technological advancement with sustainable global development objectives. The analysis indicates that innovation systems incorporating ethical governance, stakeholder participation, and sustainability principles achieve stronger social and environmental outcomes.

The research highlights that innovation should not be evaluated only through technological success or economic performance. Responsible innovation expands the evaluation perspective by considering broader consequences, including social value creation, environmental protection, and ethical responsibility.

The findings further suggest that successful responsible innovation requires integration of multiple governance dimensions. Ethical considerations, sustainability planning, and stakeholder engagement must be incorporated throughout the innovation lifecycle rather than added after technological development.

7.2 Comparison with Previous Research Perspectives

Previous research on responsible research and innovation has emphasised the importance of ethical reflection, public engagement, and sustainability-oriented technology development. The findings of the present study support these perspectives by demonstrating that responsible innovation approaches improve innovation quality and societal relevance.

Earlier studies have also identified governance complexity, resource limitations, and stakeholder coordination as important challenges. The current research aligns with these observations by showing that responsible innovation requires supportive institutional structures and collaborative approaches.

The study extends previous research by highlighting the relationship between responsible innovation and global sustainability outcomes. Innovation systems that integrate ethical responsibility and inclusiveness are better positioned to address complex environmental and social challenges.

7.3 Implications for Sustainable Innovation Governance

The findings have important implications for policymakers, research institutions, industries, and innovation leaders. Organisations should develop responsible innovation strategies that integrate ethical assessment, stakeholder participation, and sustainability objectives into research and development processes.

Governments and institutions should establish supportive policy frameworks that encourage responsible technological development while ensuring accountability and social inclusion. Innovation governance should focus on creating environments where technological progress contributes to collective well-being.

The research further indicates that responsible innovation frameworks can strengthen global sustainability efforts by ensuring that emerging technologies support environmental protection, social equity, and long-term development goals.

8. Conclusion

The present study examined responsible innovation frameworks as drivers of sustainable global development by analysing the role of ethical governance, stakeholder participation, inclusive innovation practices, and sustainability-oriented approaches in shaping innovation outcomes. The findings demonstrate that modern innovation systems must move beyond traditional approaches focused only on technological advancement and economic growth. Sustainable development requires innovation processes that consider social responsibility, environmental protection, ethical principles, and long-term societal impacts.

The research findings indicate that advanced responsible innovation frameworks significantly improve sustainability performance, social impact effectiveness, and innovation quality. Organisations and innovation ecosystems that integrate ethical governance mechanisms, stakeholder engagement strategies, and sustainability principles demonstrate stronger capacity to develop solutions aligned with global development objectives. Responsible innovation enables researchers, industries, governments, and communities to collaboratively address complex challenges while maintaining accountability and public trust.

The study further reveals that responsible innovation is not achieved solely through technological development but through the integration of governance, ethics, and inclusive decision-making processes. Anticipation of potential consequences, reflection on societal values, stakeholder inclusion, and adaptive responsiveness are essential elements for ensuring that innovation contributes positively to society. These principles help organisations manage uncertainty and create technologies that are socially acceptable and environmentally sustainable.

The analysis identifies several challenges affecting responsible innovation implementation, including ethical uncertainty, unequal access to innovation resources, governance complexity, stakeholder coordination difficulties, and limitations in measuring long-term impacts. These challenges highlight the need for stronger institutional frameworks, collaborative governance mechanisms, and policies that support inclusive participation in innovation processes.

The study concludes that responsible innovation frameworks represent an essential pathway for achieving sustainable global development. Future innovation strategies should integrate ethical governance, sustainability assessment, stakeholder collaboration, and equitable access to technological benefits. By adopting responsible innovation approaches, societies can ensure that scientific and technological progress contributes to inclusive development, environmental sustainability, and long-term global well-being.

References

1. Bessant, J., & Tidd, J. (2007). *Innovation and entrepreneurship*. John Wiley & Sons.
2. Blok, V., & Lemmens, P. (2015). The emerging concept of responsible innovation: Three reasons why it is questionable and calls for a radical transformation of the concept of innovation. In B. J. Koops, I. Oosterlaken, H. Romijn, T. Swierstra, & J. van den Hoven (Eds.), *Responsible innovation*

- 2: *Concepts, approaches, and applications* (pp. 19–35). Springer. https://doi.org/10.1007/978-3-319-17308-5_2
3. Burget, M., Bardone, E., & Pedaste, M. (2016). Definitions and conceptual dimensions of responsible research and innovation: A literature review. *Science and Engineering Ethics*, 23(1), 1–19. <https://doi.org/10.1007/s11948-016-9782-1>
4. Cao, X., Lv, D., & Xing, Z. (2020). Innovative resources, promotion focus and responsible innovation: The moderating roles of adaptive governance. *Sustainability*, 12(7), 2860. <https://doi.org/10.3390/su12072860>
5. D’Este, P., & Patel, P. (2007). University–industry linkages in the UK: What are the factors underlying the variety of interactions with industry? *Research Policy*, 36(9), 1295–1313. <https://doi.org/10.1016/j.respol.2007.05.002>
6. de Saille, S. (2015). Innovating innovation policy: The emergence of “Responsible Research and Innovation.” *Journal of Responsible Innovation*, 2(2), 152–168. <https://doi.org/10.1080/23299460.2015.1045280>
7. Deblonde, M. (2015). Responsible research and innovation: Building knowledge arenas for global sustainability research. *Journal of Responsible Innovation*, 2(1), 20–38. <https://doi.org/10.1080/23299460.2014.1001235>
8. Fisher, E., Mahajan, R. L., & Mitcham, C. (2006). Midstream modulation of technology: Governance from within. *Bulletin of Science, Technology & Society*, 26(6), 485–496.
9. Guston, D. H., & Sarewitz, D. (2002). Real-time technology assessment. *Technology in Society*, 24(1–2), 93–109.
10. Macnaghten, P. (2020). *The making of responsible innovation*. Cambridge University Press. <https://doi.org/10.1017/9781108871044>
11. Murphy, J., Parry, S., & Walls, J. (2016). The EPSRC’s policy of responsible innovation from a trading zones perspective. *Minerva*, 54(2), 151–174. <https://doi.org/10.1007/s11024-016-9294-9>
12. Owen, R., Bessant, J., & Heintz, M. (Eds.). (2013). *Responsible innovation: Managing the responsible emergence of science and innovation in society*. John Wiley & Sons. <https://doi.org/10.1002/9781118551424>
13. Owen, R., Stilgoe, J., Macnaghten, P., Gorman, M., Fisher, E., & Guston, D. (2013). A framework for responsible innovation. In R. Owen, J. Bessant, & M. Heintz (Eds.), *Responsible innovation: Managing the responsible emergence of science and innovation in society* (pp. 27–50). John Wiley & Sons. <https://doi.org/10.1002/9781118551424.ch2>
14. Scherer, A. G., & Vögtlin, C. (2020). Corporate governance for responsible innovation: Approaches to corporate governance and their implications for sustainable development. *Academy of Management Perspectives*, 34(2), 182–208. <https://doi.org/10.5465/amp.2017.0175>
15. Schomberg, R. von. (2013). A vision of responsible research and innovation. In R. Owen, J. Bessant, & M. Heintz (Eds.), *Responsible innovation: Managing the responsible emergence of science and innovation in society* (pp. 51–74). John Wiley & Sons.
16. Stilgoe, J., Owen, R., & Macnaghten, P. (2013). Developing a framework of responsible innovation. *Research Policy*, 42(9), 1568–1580. <https://doi.org/10.1016/j.respol.2013.05.008>
17. Voegtlin, C., & Scherer, A. G. (2017). Responsible innovation and the governance of corporations: A critical perspective. *Journal of Business Ethics*, 143(1), 1–15.



18. von Schomberg, R. (2011). *Towards responsible research and innovation in the information and communication technologies and security technologies fields*. European Commission.
19. Wiek, A., Withycombe, L., & Redman, C. L. (2011). Key competencies in sustainability: A reference framework for academic program development. *Sustainability Science*, 6, 203–218. <https://doi.org/10.1007/s11625-011-0132-6>
20. World Commission on Environment and Development. (2000). *Our common future: Report of the World Commission on Environment and Development*. United Nations.