


İktisat Politikası Araştırmaları Dergisi Journal of Economic Policy Researches




Submitted 03.03.2025
Revision Requested 12.06.2025
Last Revision Received 21.07.2025
Accepted 31.07.2025

Reserach Article

 Open Access

Reframing SDG 11 Through the Triple Helix Model: Rethinking Urban Sustainability and Institutional Synergy



Özcan Garan¹  & İrem Güneş¹  

¹ Istanbul University, Faculty and Department of Economics, İstanbul, Türkiye

Abstract

This paper reframes SDG 11 (Sustainable Cities and Communities) through the lens of the triple helix model, exploring how institutional synergy and stakeholder interaction contribute to sustainable urban governance. It addresses the relationship between the Sustainable Development Goals (SDGs) and innovation ecosystems from both theoretical and practical perspectives and argues that SDG 11 can be implemented more effectively through the triple helix model. The triple helix model provides a framework for understanding knowledge generation and innovation, emphasizing the interactions among universities, industry, and government. This study analyzes how this model intersects with urban sustainability goals, focusing on stakeholder engagement and institutional contributions to SDG 11. Through a literature analysis and conceptual review, this study reinterprets the triple helix model within sustainable urban governance, integrating policy, innovation, and institutional transformation.


Based on qualitative content analysis of the Marmara Urban Forum (MARUF21) documents, the research critically evaluates how urban forums function as intermediaries for collaboration, knowledge-sharing, and policy dialogue. The analysis process incorporated triangulation across researchers, including multiple readings and collaborative coding sessions, to enhance interpretive coherence and reduce bias. The findings indicate that universities lead in innovation-driven proposals, industry focuses on pragmatic solutions, and government engagement remains limited beyond policy discussions. Moreover, the study highlights the role of digital transformation in enhancing collaboration, as MARUF21's digital platform facilitated international participation and cross-sectoral exchange. These results underscore the need for more integrated and institutionalized collaboration mechanisms, reinforcing urban forums as evolving and dynamic triple helix intermediaries for sustainable cities. These findings also emphasize the importance of institutional synergy, highlighting how coordinated actions across university, industry, and government actors remain critical for advancing urban sustainability goals.

Keywords

Triple Helix Model · Sustainable Cities and Communities · Institutional Economics · Innovation Governance · Institutional Synergy



Citation: Garan, Ö. & Güneş, İ. (2025). Reframing SDG 11 through the triple helix model: Rethinking urban sustainability and institutional synergy. *İktisat Politikası Araştırmaları Dergisi–Journal of Economic Policy Researches*, 12(2), 528-549. <https://doi.org/10.26650/JEPR1650031>

 This work is licensed under Creative Commons Attribution-NonCommercial 4.0 International License. 

© 2025. Garan, Ö. & Güneş, İ.

 Corresponding author: İrem Güneş iremgunesist@gmail.com



Reframing SDG 11 Through the Triple Helix Model: Rethinking Urban Sustainability and Institutional Synergy

In the process of transforming scientific knowledge and research into products, certain stages and methods are followed. The role of universities in science and technology, the product process and end product of industry, and the role of the government in resource transfer are left behind; due to the changing landscape influenced by scientific and technological advancements, there has been a rise in more interconnected product and service development processes. One of the emerging innovation systems and innovation management models is the triple helix model based on university-industry-government collaboration. Developed by Henry Etzkowitz and Loet Leydesdorff in the 1990s, this model aims to contribute to technological development and innovation processes by developing the triple relationship involving defined rules and weak communication within a certain framework (Etzkowitz ve Leydesdorff, 1995, 2000).

In the model, the three stakeholders engage in research relationships, and as the interaction between their respective roles increases, each adopts certain characteristics of the others, leading to the emergence of intermediary institutions, networks, and new hybrid organizations (Etzkowitz and Leydesdorff, 1998; 2000; Leydesdorff and Etzkowitz, 1998). In addition to these organizations that arise as a result of increased relationships, the consensus space evaluating and discussing designs and plans to develop interinstitutional relationships in order to progress toward a knowledge and innovation-based system, bringing together the actors of the triple helix (Etzkowitz, 2008; Ranga and Etzkowitz, 2013).

The existence of a gap that hinders or disrupts consensus spaces toward the innovation process can lead to the emergence of new independent intermediary organizations. Furthermore, due to the ongoing institutional isolation of each helix of university, industry, and government, the design and practices of efficient legal mediation practices and organizations are of great importance (Metcalf, 2010). Therefore, the intermediation based on the triple helix is proposed to overcome the long-standing institutional separation and resistance to innovation and transformation between the helices (Tuunainen, 2002). On the other hand, it is worth examining whether the advantages proposed in theory can be realized in practice.

In this context, this study aims to reconceptualize SDG 11 through the triple helix model, focusing on how inter-institutional synergy contributes to urban sustainability efforts. SDG 11 encompasses various targets ranging from affordable housing to climate resilience and access to public spaces. These targets require coordinated action from different sectors, highlighting the relevance of the triple helix model in addressing complex urban challenges. While the model has typically been applied to technological innovation, this research explores its potential for shaping sustainable urban development policies and fostering collaborative governance mechanisms.

Methodologically, the study employs qualitative content analysis, using the MARUF21 report as its primary case. The forum brings together actors from the university, industry, government, and beyond, thus offering a unique platform to observe the dynamics of triple helix collaboration. Content analysis enables the identification of discursive patterns, actor profiles, and solution proposals linked to the first seven targets of SDG 11.

The findings of the study suggest that while universities play a dominant role in producing innovation-oriented proposals, industry actors tend to emphasize pragmatic urban solutions, and government participation is relatively limited beyond policy-level engagement. Moreover, the digital nature of the MARUF21 platform facilitated international participation and knowledge exchange, underscoring the role of digital transformation in building inclusive urban forums. These results reinforce the idea that urban forums

can evolve into hybrid intermediary platforms within the triple helix framework, offering new avenues for stakeholder interaction and institutional coordination.

Emerging of the Triple Helix Model

The triple helix model, which goes beyond presenting the framework of inter-organizational interactions, provides an innovation system that encompasses the structural and functional concepts of innovation systems. It consists of (1) institutional domains such as university, industry, and government, each with a wide range of actors; (2) relationships between the components (such as technology transfer, collaboration and conflict management and networking); and (3) a set of functions that demonstrate the performance capabilities of the system components. Its main function is highly diverse, encompassing the production, dissemination, and use of knowledge and innovation, and it includes both institutional and individual roles. This function is realized not only through the techno-economic capabilities in the innovation system theory but also through the entrepreneurial, societal, cultural, and policy competencies embedded in the knowledge, innovation, and consensus spaces referred to as the triple helix spaces. The system illuminates differences in innovative performance by examining the progress and interconnectedness of these spaces (Ranga and Etzkowitz, 2013: 238).

In the process of innovation, the increase in inter-institutional interaction and relations for the balanced triple helix model creates hybrid structures. The hybridization of the three institutions requires a systemic framework for the effective production, dissemination, and use of knowledge. This is achieved through the blurring and overlapping boundaries between traditional universities, industry, and government institutions (Etzkowitz and Leydesdorff, 1998; Etzkowitz, 2011). According to this network of relationships, Etzkowitz (2008: 77) states that "the organizing effort to create a new hybrid entity is similar to a social movement, bringing together resources, people, and networks across the triple helix." The concept of hybridization today encompasses new forms of management theory, including networking, systems approach, and reflexivity (Etzkowitz and Leydesdorff, 2000; Farinha et al., 2014). However, examining and filling missing or weak factors, "gaps", serves to create balanced triple helices. The Regional Innovation Organizer (RIO) and the Regional Innovation Initiator (RII) have different yet interconnected capabilities to address these gaps. While the RII requires significant prestige and authority to bring together resources and initiate ventures, the RIO takes on the declaration of a development goal and coordinates collaboration among organizations to achieve it, successfully bringing together various stakeholders (Etzkowitz, 2008: 20 and 82). Innovation Organizers (IO) possess the skills to unite participants from various sectors, harmonize diverse viewpoints, foster agreement, and manage conflicting interests. They facilitate the integration of expertise, foster the enhancement of stakeholders' capabilities to address specific challenges, stimulate transformations in both theoretical and practical realms, and create fresh avenues for the exchange of knowledge (Ranga and Etzkowitz, 2013). In relation to these structures, the knowledge, consensus, and innovation spaces stand out in the formation and evolution of an ideal triple helix model (Etzkowitz, 2008; Ranga and Etzkowitz, 2013).

Innovation projects that benefit from the consensus and knowledge spaces enhance these spaces and establish connections among them and along the triple helix (Champenois and Etzkowitz, 2018). When ideas and strategies generated within the triple helix of institutional sectors (university, industry, government) and the necessary resources to implement them are provided, the process of regional development advances (Etzkowitz, 2008). The existence of a consensus space is a prerequisite for a hybrid organization that promotes innovation in response to local conditions by harnessing the resources gathered in this space. Indeed, autonomous hybrid organizations often emerge within a consensus space (Etzkowitz, 2002; Etzkowitz, 2008; Ranga and Etzkowitz, 2013). This space serves as a platform that brings together relevant actors for new ideas, collaboration, brainstorming, problem analysis, and designing plans (Etzkowitz, 2008: 77). Without a

consensus space, there can be no process of assembling and organizing intermediary and transfer organizations and networks—the innovation space—which serve as breeding grounds for new knowledge-based clusters. As a result, the full potential of an existing knowledge space or innovation space cannot be realized (Ranga and Etzkowitz, 2013). To benefit from the advantages and opportunities provided by such a space, an organizational mechanism can be utilized to bring together actors with diverse institutional backgrounds and perspectives in a neutral environment to analyze problems and needs and develop solutions (Etzkowitz, 2008; Ranga and Etzkowitz, 2013). A structure that brings together different branches of the triple helix to develop and review strategies can also be associated with a range of intermediary roles and functions (expressing needs and requirements, information scanning, knowledge acquisition, identifying potential collaborative partners, scoping and filtering, selecting collaborative partners, facilitating the integration of knowledge from two or more partners, mediation and brokerage, and contract advisory) (Howells, 2006; Meyer et al., 2019). The resulting collaborative culture and the collective experience of diverse actors working together provide a secure foundation for developing an innovation strategy (Etzkowitz, 2008: 82). Based on this information, urban forums that facilitate the coming together and deliberations of different institutional sectors can provide a platform for the transformation of stakeholders' roles and relationships within the helix and foster mutual commitments for innovation.

The Triple Helix Model and Actors

The triple helix model, proposed by Etzkowitz and Leydesdorff (1995), consists of three institutional domains: university, industry, and government. It provides an important institutional framework to explore the dynamic interactions of these stakeholders in regional, national, and multinational innovation systems, focusing on innovation and entrepreneurship (Etzkowitz, 2008; Cai and Etzkowitz, 2020). The first step in the formation of the helix model is the collaboration among the three institutional domains, each fulfilling its traditionally defined role (Etzkowitz, 2008). This process typically begins with discussions and addresses a deficiency that arises due to an economic crisis or the implementation of a regional growth initiative in the regional innovation system (Svennson et al., 2012). Thus, the initial collaborative phase plays a crucial role in addressing systemic challenges and establishing the foundation for further hybridization and institutional restructuring. In the second step, intra-institutional restructurings emerge where existing institutions assume the responsibilities of the other and perform new tasks in addition to their traditional functions (Etzkowitz, 2008). For instance, the government, which has regulatory responsibility, supports new ventures through public venture capital (Mazzucato, 2013). This step is significant because it demonstrates how organizations begin to assume new duties and go beyond their traditional tasks. These modifications support the growth of cross-sector collaboration and hybrid structures, both of which are critical for innovation.

The balanced triple helix model (Etzkowitz and Leydesdorff, 2000) is a repeated overlapping of communication and dialogue between the institutional domains of the university, industry, and government. It creates a knowledge infrastructure where each overlapping institutional domain assumes the role of the other, and hybrid organizations emerge at the interfaces of these institutional domains to address implementation gaps and promote collaboration (Ranga and Etzkowitz, 2013). At this stage, newly formed hybrid organizations emerge as practical solutions to implementation challenges, marked by an increased exchange of knowledge across the domain boundaries. Thus, as part of the triple helix, multiple interactions constitute different types of partnership mechanisms. Communication and dialogue between the institutional domains proceed on a roughly equal basis. According to the model (Etzkowitz, 2003a), in the third stage where innovation occurs, the traditional basic roles of the university, industry and government disappear. However, innovation cannot occur effectively unless these institutions engage cooperatively in a non-hierarchical,

self-sustaining manner. This leads to the emergence of intermediaries and hybrid formations in the triple helix of innovation (Etzkowitz and Leydesdorff, 2000; Ranga and Etzkowitz, 2013). However, each institution retains its power and priority in its primary domain: the university continues to be the main source of knowledge production, the industry remains the primary vehicle for commercialization, and the government continues to fulfill its regulatory role (Etzkowitz, 2008).

The driving force of the triple helix model is not determined by a single factor (Etzkowitz, 2010). This multiplicity of driving forces—the intersection of academic research, market-driven forces in industry, and supportive public policies—fuels a system that adapts dynamically to external changes. However, it is observed that universities, especially entrepreneurial universities, have emerged as key players in developing innovation systems among institutions, particularly in the 20th century (Etzkowitz et al., 2000). This aspect of university-driven innovation highlights how institutions traditionally focused on knowledge generation are evolving into active agents of economic and social transformation in their regions. First, establishing policies to create and develop new triple helix structures in societies where institutional domains, such as industry, are lacking poses a significant struggle to innovation theory and practice. The role of universities in bridging the innovation gaps in such societies, by facilitating government-industry partnerships and fostering small enterprises, plays a pivotal role in regional growth. One reason for this is the recognition that universities play a leading role in accelerating regional growth in transitional and developing countries (Etzkowitz, 2003b). The increasing importance of knowledge and the role of technology-based firms in incubation have positioned universities as key institutional actors, with the entrepreneurial university actively involved in both knowledge utilization and the generation of academic knowledge (Etzkowitz, 2003a).

According to the interactive innovation model that emphasizes university-industry relationships in regions with low technology-intensive production (Etzkowitz, 2003a), university activities and interactions with the institutional environment complement the local production structure for innovation and development (involving crucial elements such as skilled human resources, entrepreneurship, business and academic networks, and innovation culture). Therefore, as new universities with broad roles are established in all societies, it has been expected that universities in developing countries would surpass the ivory tower model. This is because the next major transformation is expected to encompass all countries in promoting innovation through entrepreneurial universities within inter-institutional connections (Etzkowitz, 2003b). Indeed, the entrepreneurial university is another hybrid element defined by the capitalization of knowledge, the continuous development of relationships between the university, industry, and government, strong connections with industry and government, and a high degree of independence (Etzkowitz, 2008: 41). All of these relationships, while defining the university's relationship with its environment by changing its mission and social structure within society, also reveal how it affects regional development.

The important point in developing countries regarding the model is the extent to which universities can increase their effectiveness as agents of innovation, industrialization, and sustainable development (Etzkowitz and Dzisah, 2008; Saad et al., 2008). Saad and Zawdie (2011) demonstrate the need for a major policy initiative to promote the development of a sustainable triple helix culture in innovation and technology, rather than traditional technology transfer, in developing countries. Furthermore, when examining how the institutional logic in a non-Western society supports or hinders the development of the model, it is necessary to regulate certain elements of the institutional environment and be innovative in developing their unique triple helix modes to facilitate interactions among key innovation actors (Cai, 2014).

In this regard, the government's participation merits more explanation, especially in developing nations where innovation ecosystems and institutional capacity are still evolving. Beyond its conventional regulatory duties, the government serves as a strategic actor that establishes the institutional framework and

provides incentives to foster triple helix interactions. Through long-term policy orientation, public funding programs, and legal frameworks that promote knowledge exchange, it helps to institutionalize inter-sectoral collaboration. In societies with weak or fragmented industrial structures, proactive public actions are even more essential to mobilize innovation potential and stimulate entrepreneurial activity (Etzkowitz and Dzisah, 2008; Saad and Zawdie, 2011; Cai, 2014). This perspective aligns with the idea of mission-oriented innovation policies, where the government not only corrects market failures but also actively shapes innovation trajectories in high-risk domains (Mazzucato, 2013; 2018). As a result, the government plays a crucial role in innovation dynamics and is not merely a background facilitator. It can transform disjointed networks into cooperative platforms that support broader development goals. In developing economies, the government often acts as a transformative agent, reshaping the innovation landscape through targeted interventions and structural reforms (Etzkowitz, 2014; Kapetaniou and Lee, 2017).

The helix model facilitates the shift from a low-risk, low-reward development model, which is commonly found in various regions and countries and is conducive to slow, incremental innovation models with limited economic benefits, to a more high-risk, high-reward development model. It accomplishes this by offering a comprehensive understanding of how knowledge and resources flow within and among innovation actors' domains, identifying existing barriers and gaps, and enabling a broader perspective on the innovation process. It can promote radical innovations, the rapid establishment of new markets, growth opportunities, job creation, and skill development (Ranga and Etzkowitz, 2013). Despite the model not being considered suitable in non-Western societies, it is descriptive of the situation in developing countries and useful for planning policies. Indeed, while the knowledge society has created differences between advanced and developing societies, the possibility of using existing knowledge resources is present in almost all societies to overcome these differences (Etzkowitz, 2003b).

In essence, the evolution of the triple helix model—from clearly defined institutional roles to dynamic, hybrid interactions—illustrates the transformative interplay between academic, industrial, and governmental forces. This shift not only reflects the core principles of institutional economics in driving regional development but also emphasizes the pivotal role of entrepreneurial universities in fostering innovation. These theoretical insights provide the necessary framework to explore how such inter-institutional dynamics are operationalized in practice, as later examined in the analysis of the MARUF21 forum.

Intermediaries for the Triple Helix Model

With the rapid changes in society, the dynamic relationship between the university, industry, and government is also rapidly evolving, and in this context, new intermediary forms are emerging (Stählbröst and Holst, 2017). This provides opportunities for innovation at different scales and under different dynamics, leading to different outcomes. Today, as the number of innovation intermediaries increases, the focus of the literature in the field has shifted from examining the role of university incubators and science and technology parks in the model to exploring the role of intermediaries in facilitating sustainable transitions (Caloffi et al., 2023). On the other hand, while the triple helix framework has traditionally been applied to technological innovation, intermediary organizations that facilitate consensus and interaction activities in the formation of the helix model also have significant impacts on the process. The formation of the triple helix model is closely linked to the development of social capital that fosters trust among network actors. It is considered that when the environment and opportunities for corporate growth, networking, and the development of social capital are insufficient, the progress of innovation will also be limited (Ranga and Etzkowitz, 2013; Yokakul and Zawdie, 2009).

Three steps determine the creation process of such intermediary organizations: recognizing a gap, bringing together representatives of the triple helix to create a consensus, and designing a temporary conditional

solution (Champenois and Etzkowitz, 2018). On the other hand, the triple helix model involves a highly concentrated corporate initiative and brokerage challenge to optimize advanced triple helix hybrid organizations in mode 3. However, the current practices of triple helix intermediacy are insufficiently planned and institutionalized. The intermediary through triple networks in the helix has also been insufficiently examined (Metcalf, 2010; Suvinen et al., 2010; Reich-Graefe, 2016). Due to the distance and institutional isolation among helix actors, there is a need for effective intermediary practices and organizational design and implementation. There is a long-standing and widespread corporate divide referred to as a "pre-buffered space between firms and campuses" (Metcalf, 2010: 504). Efforts are needed to overcome this institutional separation, resistance to innovation and transformation among helices, and to develop a sustainable intermediation infrastructure encompassing intra-, inter-, and supra-helix interactions.

A critical intermediary structure with facilitating and intermediating functions enables the balance, stability, and synergy necessary for the long-term sustainability and innovative progress of triple-helix projects in practice by establishing multiple balances continuously and simultaneously within the triple helix (Van Lente et al., 2003). The sharing of knowledge, through the exploration, access, and transfer of inter-organizational or intra-organizational valuable information, also fosters cognitive proximity among the parties. Such collaboration between universities and industry transforms scientific knowledge into a language closer to the communication codes of firms (Champenois and Etzkowitz, 2018). Additionally, the formation and institutionalization of the triple helix model occur through regulatory, normative, and cognitive changes within individual triple helix actors (Cai, 2015). In line with the information mentioned above, the argument presented in this article is that urban forums, which facilitate triple helix cooperation for the transition to sustainable cities and communities, can enhance the interactions and shared visions among triple-helix actors, taking into account all strategic elements aligned with the goals of the global agenda. Therefore, we are evaluating the role and function of an independent intermediary that brings together and integrates the actors involved in the triple helix collaboration for the transition to sustainable cities and communities. In particular, by focusing on such an intermediary, we contribute new insights into the micro-foundations of the triple helix.

On the other hand, the independent and distant operations of scientific, economic, political, and educational domains, as well as the preference of social environments for certain elements, make it challenging to establish networks and integrate science into a broader social context. Most of these activities take place within organizations that deal with their surroundings in a strict formal format, inhibiting change and external influence (Poppen and Decker, 2018). Optimizing this collaboration and fostering open dialogue between fields can be achieved through an intermediary (Bellgardt et al., 2014; Howells, 2006). The intermediation role can be fulfilled by an individual (Frølund and Ziethen, 2014) or by an organization providing services and consultancy (Howells, 2006). When viewed in light of the triple helix concept, the ongoing institutional isolation of each helix (university, industry, and government) underscores the importance of efficient legal intermediation practices and the design and implementation of intermediary organizations (Metcalf, 2010).

Therefore, the triple helix-based intermediary is proposed to overcome the long-standing institutional divide and resistance to innovation and transformation between the helices (Tuunainen, 2002). In particular, autonomous intermediary organizations provide various opportunities: They adopt an integrative approach or combine elements from different triple helix domains rather than focusing solely on the benefit of a single institution. Thanks to this autonomy, they can identify and meet specific local needs to improve their triple helix interactions and innovation (Champenois and Etzkowitz, 2018). Alongside the advantages of intermediaries, there is a possibility of negative externalities arising from their role in network formation. Pahnke et al. (2015) point to "competitive information leakage" among intermediaries. When firms indirectly share connections through the same intermediary, knowledge may inadvertently leak to a competitor, hin-

dering innovation rather than supporting it. Therefore, the activities of the intermediaries involve significant qualitative differences.

In summary, the evolution of intermediary organizations within the triple helix framework reflects both the opportunities and challenges inherent in bridging the traditional gaps between universities, industry, and government. Autonomous intermediary organizations, defined by their ability to integrate diverse institutional perspectives, play a crucial role in fostering open dialogue and knowledge exchange. However, issues such as competitive information leakage highlight the complexity of their function. These insights lay the foundation for our subsequent analysis of urban forums, such as MARUF21, which serve as practical embodiments of these intermediary roles in facilitating sustainable urban development.

Sustainable Cities and Communities

Sustainability is commonly defined, following *Our Common Future*, as the ability to meet present needs without compromising those of future generations (World Commission on Environment and Development, 1987: 27). In the same report, sustainable development is described as a process of transformation in which the utilization of resources, investment choices, the trajectory of technological advancements, and institutional shifts are aligned with both current and future requirements (World Commission on Environment and Development, 1987). The sustainable development goals, whose origin goes to the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012 and whose final shape was taken in 2015 by the 2030 Agenda for Sustainable Development, aim to attain sustainable development by harmoniously and comprehensively addressing the economic, social, and environmental aspects. With this purpose, they include 17 goals and 169 associated targets (UN General Assembly, 2015). One of these sustainable development goals is Goal 11: Sustainable Cities and Communities, whose main target is to make cities and human settlements comprehensive, safe, strong, and sustainable. Generally, this goal aims to strengthen the readiness and ability of cities to withstand and recover from crises by investing in top-notch infrastructure and ensuring that everyone has access to fundamental services (UN DESA, 2022). There are 10 targets of Goal 11, which are listed in Table 1.

Table 1

Sub-targets of Goal 11: Sustainable Cities and Communities

11.1	Safe and affordable housing
11.2	Affordable and Sustainable Transport Systems
11.3	Inclusive and Sustainable Urbanization
11.4	Protect the World's Cultural and Natural Heritage
11.5	Reduce the Adverse Effects of Natural Disasters
11.6	Reduce the Environmental Impact of Cities
11.7	Provide Access to Safe and Inclusive Green and Public Spaces
11.8	Strong National and Regional Development Planning
11.9	Implement Policies for Inclusion, Resource Efficiency and Disaster Risk Reduction
11.A	Support Least Developed Countries in Sustainable and Resilient Building

Source: UN DESA, 2022

Among the targets listed above, some have been developed to be achieved by 2030. In this context, it is targeted to guarantee that everyone has access to suitable, secure, and reasonably priced housing and essential amenities while also improving impoverished urban areas. On the other hand, it will ensure that everyone has access to safe, affordable, and convenient transportation systems that are environmentally sustainable. Inclusive and sustainable urban development will be improved and promoted. A serious

decrease in the fatalities and the impacted population resulting from disasters will be achieved. The negative environmental impact per capita in urban areas will be reduced, with a particular focus on improving air quality and implementing effective waste management systems. It will be guaranteed that everyone, especially women, children, and disadvantaged groups, has equal and safe access to inclusive and accessible green areas and public spaces. Another target that is not specified to be achieved in a certain date is conserving the global cultural and natural heritage and developing initiatives that serve this purpose (UN DESA, 2022). Targets 11.8, 11.9, and 11.A can be seen as more inclusive and general targets that should progress in a relatively wide process. As will be seen in the content analysis, this study will focus on the first seven targets, which are more specific and observable.

With the efforts of the United Nations, governments and other international/national organizations, suggestions for the creation of sustainable cities have begun to become widespread in order to struggle with the problems caused by increasing urbanization, to combat climate change and to protect cultural and natural heritage (Gündoğdu and Aytakin, 2022; Karakurt Tosun, 2009). A sustainable city is defined by the synergistic implementation of policies that improve the quality of life while efficiently reducing resource consumption. These cities draw from their local regions to attain self-sufficiency and create a unified economic, social, and environmental system (Pinto et al., 2019; Rogers, 1997). Sustainable cities that are resilient to climate change and achieve energy self-sufficiency will have fewer negative environmental impacts through their activities. They also promote the sustainability of consumption and production patterns that align with their own social, economic, and cultural conditions. On the other hand, by protecting the culture that unites people, local cultures will be promoted, and the local businesses will be navigated (Fallah Shayan et al., 2022).

According to the report published by Arcadis in 2018, London is ranked as the most sustainable global city in the world. Stockholm and Edinburgh follow London on the list, while Istanbul ranks 82nd out of the 100 global cities (Arcadis, 2018). The report highlights that smaller European cities, which are reducing their environmental impact to some extent, excel in achieving a balance between well-being and economic performance. On the other hand, cities in America, Asia, and Africa, known for their rapid economic growth, encounter difficulties in achieving citizen-centric growth while diminishing broader environmental impacts (Arcadis, 2018). There are several significant challenges, even for developed countries, to achieve a high level of sustainability in their cities. This reality highlights the need for further action. In this context, various actors, including international organizations, governments, universities, local authorities, industries, and individuals, have distinct responsibilities. For instance, individuals can contribute by patronizing local shops and using public transportation. Governments are responsible for implementing environmentally friendly transportation systems, undertaking urban transformations, and monitoring industries, among other tasks. Industry also contributes by investing in sustainable infrastructure, developing green technologies, and supporting climate-resilient urban design. However, the collaborative efforts of these actors are crucial for the successful realization of this goal.

These global targets provide the analytical framework for this study, which focuses on the first seven specific and observable targets of SDG 11, as evidenced in the content analysis of MARUF21. This approach enables us to assess how effectively urban forums translate international sustainability goals into practical strategies for local urban development.

Bridging SDG 11 and the Triple Helix Model

Distinct technical solutions are not sufficient to achieve SDG 11. By definition, urban sustainability entails a systemic change that necessitates long-term collaboration, institutional alignment, and adaptability from various actors. The triple helix model offers a conceptual framework for analyzing and directing this kind of change in this situation. It moves the focus from designing policies to institutional processes, where

governments, industries, and universities collaborate to produce and control knowledge. The model places more emphasis on changing institutional configurations than on static models of innovation. The objective is structural co-evolution rather than just actor interaction. The goals of SDG 11, from participatory planning to affordable housing, are interrelated problems that call for shared accountability. Through intermediary platforms such as urban laboratories, innovation hubs, and participatory councils, the triple helix model facilitates the transition of actors from parallel initiatives to co-produced outcomes (Diaz-Sarachaga, 2024; König et al., 2020). These platforms serve as venues for coordination, bringing disparate groups together to work toward shared urban objectives.

What sets the model apart in the context of SDG 11 is its ability to mediate between the strategic and operational levels. While urban policy is frequently project-based or abstract, the triple helix model encourages long-lasting partnerships. As important players, local governments take on the role of "first users," integrating urban innovations into authentic environments and legitimizing them (van Geenhuizen & Nejabat, 2023). Their responsibilities go beyond funding and regulation to include institutional broking and policy orchestration. Universities are also repositioned under the concept. Through strategic research collaborations and living laboratories, they have evolved from being traditionally seen as knowledge producers to being urban experimenters (Bonenberg & Angoneze-Grela, 2023). Industries, on the other hand, are now scalable solution suppliers rather than ancillary stakeholders. These redesigned roles contribute to the development of feedback systems that are necessary for systemic innovation.

The EDIT Poznań project exemplifies this dynamic. It demonstrates how spatial planning becomes a shared field where actors co-develop and test sustainable interventions through iterative collaboration (Bonenberg & Angoneze-Grela, 2023). Similarly, local triple helix model networks can hasten the market adoption of radical sustainable energy breakthroughs created by university spin-offs, as demonstrated by Van Geenhuizen and Nejabat (2023). However, their results also highlight the disarray and lack of focus in municipal support systems. Knowledge valuation and risk-sharing in these ecosystems are made possible by early-stage collaboration, intermediary organizations, and consistent policies.

Intermediary platforms that facilitate the conversion of the triple helix model interactions into concrete sustainability outcomes include planning councils, urban labs, and multi-stakeholder forums (Cai, 2022; Cai & Etzkowitz, 2020). These platforms promote mutual accountability, mediate between actor interests, and lower coordination costs. This extension is further supported by recent urban revitalization case studies from Barcelona and São Paulo, which show how the Quintuple Helix and Knowledge-Based Urban Development frameworks help to institutionalize sustainability goals in innovation districts over the long term (Pique, Miralles, & Berbegal-Mirabent, 2020). Effective coordination, however, necessitates platforms that bridge institutional logics in addition to role recognition. Treating intermediaries as system builders rather than as auxiliary agents is what makes the triple helix model very effective. According to Gebhardt & Pique Huerta (2024) and Chatzinikolaou (2025), these actors are essential for urban change under SDG 11 because they stabilize expectations, improve institutional reflexivity, and facilitate collaborative learning. Without these safeguards, knowledge runs the risk of being confined or underutilized.

Nevertheless, there are several restrictions on how the model can be applied. The disregard for regulatory frameworks is a serious flaw. According to Emeis and Fallmann (2022), there is a "regulatory trap" whereby strict laws prevent innovations from being adopted. Because of fragmented or antiquated planning regimes, municipalities find it difficult to combine scientific knowledge and technological capacity, even when they are accessible. This realization shows that without regulatory flexibility, institutional coordination is essential but insufficient. To account for power imbalances and governance realities, the triple helix model

needs to be expanded. Moreover, the realization of SDG 11 demands not only institutional interaction but also complex configurational alignments between technology, ecology, and governance (Su & Fan, 2022).

There have been recent improvements made in response to these restrictions. Zhou and Etzkowitz (2021) separate growth-oriented (U–I–G) and justice-oriented (U–P–G) logics in their "Triple Helix Twins" model. For SDG 11, which blends efficiency objectives with equity ideals, this distinction is particularly pertinent. As social justice and citizen participation are viewed as structural rather than symbolic elements, it represents a conceptual shift toward more inclusive and democratic forms of government. Furthermore, the model's efficacy is very context-dependent. According to Bonenberg and Angoneze-Grela (2023), outcomes are determined by actor symmetry and local government cultures. Municipalities might be active policy entrepreneurs in some situations or passive implementers in others. This variation suggests that the triple helix model is a reflective instrument whose effectiveness depends on intentional institutional design rather than a permanent solution. This opinion is supported by a recent systematic review conducted by Zadegan et al. (2025). Although the triple helix model is still the most frequently used model in innovation studies on the SDGs, its application to urban government sometimes lacks systemic coherence. Few studies present integrative viewpoints, and many rely on sectoral or actor-specific interpretations. In addition to highlighting the model's systemic perspective and receptiveness to cross-sectoral discussion, the assessment also points out conceptual uncertainty, inadequate measurement methods, and challenges in involving underrepresented groups. These observations necessitate a more thorough operationalization of the model that goes beyond technocratic versions or driven by elites.

Notwithstanding these difficulties, the triple helix model is still a very useful paradigm for governance. Its focus on reciprocal accountability, co-evolution, and institutional translation aligns with SDG 11's complex requirements. The model can be used as a diagnostic and prescriptive tool, particularly in the Global South, where capacity gaps and institutional fragmentation are more noticeable. This demonstrates that urban sustainability is an ongoing, collaborative effort rather than just a technological end-state. The triple helix model approach reframes urban sustainability as a shared institutional journey by emphasizing interconnectedness and co-governance.

Research Method

The urban forum MARUF21, which serves as the case study for our research, is organized by the Marmara Municipalities Union (MMU). Headquartered in Istanbul, MMU holds the distinction of being Türkiye's first municipal union. It operates on a regional scale across 11 provinces—Balıkesir, Bilecik, Bursa, Çanakkale, Edirne, Istanbul, Kırklareli, Kocaeli, Sakarya, Tekirdağ, and Yalova—including six metropolitan municipalities. In total, MMU encompasses 188 member municipalities. With the motto "Cities Developing Solutions," MARUF aims to bring together the global agenda and local needs and priorities, and engage in a collective effort to find solutions with all city stakeholders. In this context, it seeks to create a platform for sharing knowledge, experiences, and opportunities among public institutions, local governments, the private sector, universities, and other relevant stakeholders and to evaluate different approaches to urban services and urban management. To contribute to the implementation of the New Urban Agenda, it brings together local and international knowledge and experience, opening up issues for discussion with alternative perspectives.

The Marmara Urban Forum (MARUF) is a gathering place for everyone who thinks about the city and contributes to its development. It convenes urban thinkers for passionate debates on how to make cities more livable, sustainable, resilient, creative, inclusive, innovative, and healthy. The forum brings together diverse stakeholders, including professionals from cities, national, regional, and local governments, the private sector, NGOs, universities, and others who play a crucial role in the design, transformation, and governance of cities. Among the objectives of MARUF are: (1) to examine the economic, political, social,

and ecological changes and challenges arising from the urbanization process in the lives of individuals and communities and in the city, as well as their solutions, in solidarity and cooperation at local, regional, national, and international levels; (2) to strengthen the role of local governments and cities in crisis and humanitarian mobility situations; (3) to enhance awareness about secure, inclusive, resilient, and sustainable urbanization; (4) to contribute to the creation of a more livable and equitable world of cities; and (5) to facilitate the flow of information and support networks among cities (Marmara Urban Forum, 2023).

MARUF is an event organized by the Union of Marmara Municipalities (MMU) and has been held internationally every two years since 2019. The study employs the MARUF21 event, organized in 2021, and the subsequent report as its primary data source. As the report offers rich and layered textual content, the study adopts a qualitative content analysis method to explore the contextual meanings and underlying patterns embedded in the data. In this regard, the analytical process was informed by an interpretive perspective, emphasizing meaning-making rather than quantification (Roller, 2019; Schreier, 2012). This methodological framework aligns with the research objectives of the study, as the MARUF21 report provides in-depth documentation of forum activities conducted under the motto "Cities Developing Solutions," and reflects a diverse range of institutional, social, and policy perspectives (Marmara Municipalities Union, 2022). By doing so, the study aims to reveal the latent structures, semantic connections, and institutional framings related to the urban sustainability discourse.

Qualitative content analysis, as one of the widely used methods in the analysis of formal and structured texts, has been increasingly applied to policy documents and institutional narratives (Mayring, 2014; Schreier, 2012). In line with Schreier's (2012) emphasis on systematic and transparent category development, a codebook was developed inductively during the first readings and iteratively refined in the subsequent phases. To support the analytical rigor and consistency, MAXQDA Analytics Pro 2022 software was employed for the systematic coding and visualization of the data.

To increase the credibility, transferability, and confirmability of the findings, the study employed methodological triangulation, which is understood not merely as the inclusion of multiple data sources, but more broadly as the integration of various analytical perspectives, coding strategies, and interpretive processes (Carter et al., 2014). In this regard, the MARUF21 report was examined through multiple iterative readings by three researchers. Each researcher initially conducted a separate open coding phase, followed by joint sessions in which emergent themes and category systems were compared, discussed, and consolidated. This process fostered inter-coder dialogue, enhancing analytical coherence and increasing interpretive depth. Diverging views were treated not as inconsistencies but as opportunities for reflexive engagement, which contributed to minimizing potential researcher bias. Moreover, systematic memoing and documentation of coding decisions were maintained to ensure the transparency and traceability of the analytical process.

The choice of the MARUF21 report as a single-case source is methodologically justified due to its comprehensive and multi-actor documentation of forum activities, reflecting both the global and local dimensions of sustainable urban development. The report provides rich, contextual material suitable for interpretive policy analysis and discourse-based approaches. This aligns with Yin's (2018) conceptualization of a holistic case study design, where the unit of analysis is not fragmented but understood in its complexity and embeddedness within institutional and socio-political structures. Although the reliance on a single document may raise concerns regarding external validity and empirical saturation, such limitations were addressed by applying rigorous within-case triangulation, collaborative coding, and prolonged engagement with the text. These measures enhanced the trustworthiness of the findings and enabled the study to produce meaningful insights into the discursive construction of urban sustainability.

Content Analysis of MARUF21

In the study, the content of the MARUF21 report was analyzed within the framework of the 11th main goal titled "Sustainable Cities and Communities," which is among the 17 Global Goals committed to sustainable development worldwide, along with its sub-targets. Additionally, forum participants were classified according to the stakeholders of the triple helix model, which is a collaboration model, and this classification was considered in the analysis of the text. Out of 78 sessions conducted during the forum, 55 were related to the 7 sub-targets under the main goal of "Sustainable Cities and Communities" (Figure 1). These sessions were examined according to the analytical categories derived from the SDG 11 sub-targets, even though these are not direct session titles. Notably, the highest number of sessions was found under "Inclusive and Sustainable Urbanization," whereas the fewest sessions addressed "Ensuring Access to Safe and Inclusive Green and Public Spaces."

Figure 1

Distribution of Forum Sessions among the Sub-Targets of the 11th Global Goal

 11.1. Safe and Affordable Housing	4
 11.2. Affordable and Sustainable Transport Systems	6
 11.3. Inclusive and Sustainable Urbanization	16
 11.4. Protect the World's Cultural and Natural Heritage	7
 11.5. Reduce the Adverse Effects of Natural Disasters	8
 11.6. Reduce the Environmental Impact of Cities	11
 11.7. Provide Access to Safe and Inclusive Green&Public Spaces	3
 Others	23

Source: Compiled from content analysis.

The analyzed report in the study includes summaries of all sessions held during the urban forum and the solution proposals expressed by speakers in each session. Based on this report, a word cloud was created to provide information on the concentration of forum content on different topics (Figure 2). The agendas of speakers participating in MARUF21, organized by the Marmara Municipalities Union, prominently revolve around the themes of "urban" and "local." Given the regional context—the Marmara Region and Turkish municipalities—it is understandable that Türkiye and Istanbul feature prominently. However, it is significant that the focus was more on "solutions" and "proposals" rather than problems, with sustainability being a central theme. Moreover, topics like "social," "public," and "global" perspectives dominated the discussions. Particular attention was paid to critical issues such as "climate," and the pressing issue of "transportation" within Istanbul and the entire Marmara Region. Additionally, discussions of governance and planning were integrated into the problem-solving strategies. A consistent consensus emerged about the need to achieve "the new" and "different" collaboratively, and the role of the "economy" was highlighted both in defining the problems and in addressing potential solutions. An interesting insight from the analysis shows a clear emphasis on "solutions" and actionable proposals, a shift from the more traditional problem-focused discussions found in other similar forums. This not only highlights the practical orientation of the MARUF21 discussions but also suggests potential contributions to policy frameworks aiming for effective sustainable urbanization.

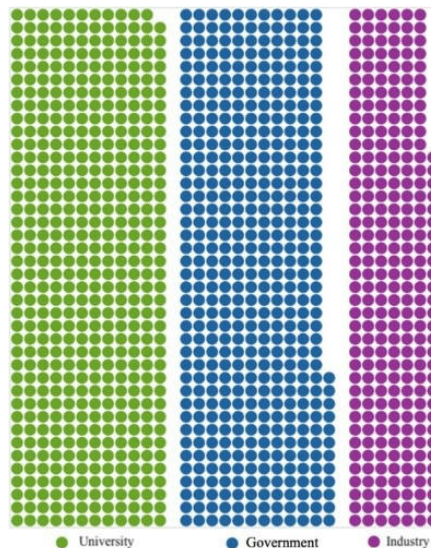
Figure 2
Word Cloud of Forum Sessions



Source: Compiled from content analysis.

Building on the theoretical framework of the triple helix collaboration model, the analysis categorized MARUF21 forum participants into three main groups-"university," "industry," and "government"-to differentiate the fundamental dynamics and underscore both the theoretical and practical advantages of the model (Cai and Etzkowitz, 2020). In addition, participants not fitting into these traditional categories (e.g., representatives from international organizations, civil society organizations, media, and independent individuals) were grouped as a separate "fourth group." Notably, the government emerged with the highest participation (123 participants), closely followed by the university (112 participants), while the industry accounted for 92 participants (see Figure 3). These figures suggest that although all three institutional domains are comparably engaged, the government exhibits slightly higher involvement, an insight that raises questions about its role in the later stages of collaboration.

Figure 3
Distribution of the Participants



Source: Compiled from content analysis.

Transitioning to the origins of these participants, MARUF21 stands out for its significant national and international representation. The analysis indicates that, out of 327 participants, 198 represent national institutions and 129 represent international institutions (Figure 4). Within the university category, 71 participants were national, and 41 possessed international affiliations, meaning that over half of the academic

contributions were enriched by a global perspective. Similarly, the government sector includes 87 national participants and 36 international ones, reflecting an openness to integrating international policy insights. In the industry sector, 40 national and 52 international participants illustrate a balanced degree of international engagement.

These findings not only highlight robust participation from both local and global actors but also reveal a noteworthy integration of diverse perspectives—an element that may contribute to more comprehensive policy-making and innovation processes. In turn, this empirical evidence provides crucial insight into our research question regarding how the triple helix model facilitates multi-level collaboration in urban forums, potentially enhancing inter-institutional knowledge exchange and consensus-building.

Figure 4
Participant Profile of the Forum

Code System	State	Industry	University
<ul style="list-style-type: none"> <ul style="list-style-type: none"> Triple Helix Partners Government Industry University <ul style="list-style-type: none"> Origins of Participants National International 			
	87	40	71
	36	52	41

Source: Compiled from content analysis.

Within the MARUF21 forum, 815 solution proposals emerged across all sessions. These proposals were analyzed within the framework of 7 targets under the 11th Global Goal titled "Sustainable Cities and Communities" (Figure 5). Building on these quantitative insights, our analysis reveals that "Inclusive and Sustainable Urbanization" garnered 164 proposals, followed closely by "Reduce the Environmental Impact of Cities" with 172 proposals—indicating a strong focus on urban transformation and environmental concerns. In contrast, "Provide Access to Safe and Inclusive Green and Public Spaces" attracted only 27 proposals, which may suggest a potential gap in addressing public space accessibility. Additionally, it is not surprising that "Reduce the Adverse Effects of Natural Disasters" received 101 proposals, given the earthquake-prone nature of the Marmara Region. The region's rich historical heritage appears to elevate the importance of "Protect the World's Cultural and Natural Heritage," recording 60 proposals, while "Affordable and Sustainable Transport Systems" and "Safe and Affordable Housing" accounted for 58 and 45 proposals, respectively. The remaining areas, falling outside the scope of these seven targets, were not further detailed.

Figure 5
Distribution of Solution Proposals across the Sub-Targets of the 11th Global Goal

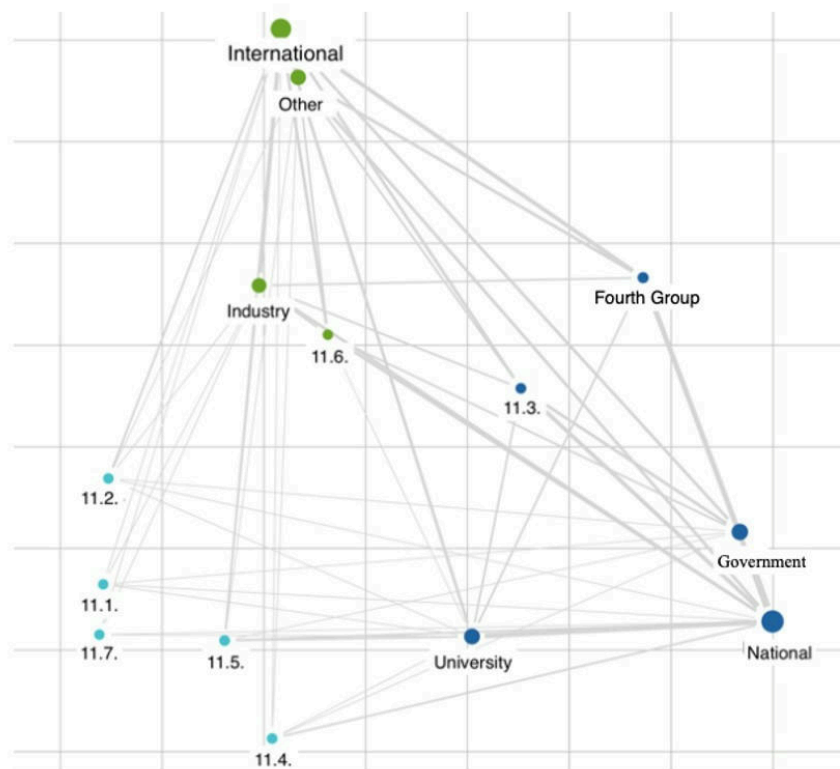
Code System	Solution Offers
<ul style="list-style-type: none"> <ul style="list-style-type: none"> Target 11: Sustainable Cities and Communities 11.1. Safe and Affordable Housing 11.2. Affordable and Sustainable Transport Systems 11.3. Inclusive and Sustainable Urbanization 11.4. Protect the World's Cultural and Natural Heritage 11.5. Reduce the Adverse Effects of Natural Disasters 11.6. Reduce the Environmental Impact of Cities 11.7. Provide Access to Safe and Inclusive Green&Public Spaces 	
	45
	58
	164
	60
	101
	172
	27

Source: Compiled from content analysis.



Transitioning from solution proposals to participant engagement, the concentration of thematic focus during the MARUF21 sessions was also analyzed (Figure 6). In this context, the university plays a predominant role across nearly all targets, with a particular emphasis on "Protect the World's Cultural and Natural Heritage" and "Reduce the Adverse Effects of Natural Disasters." Conversely, the industry appears to focus primarily on "Reduce the Environmental Impact of Cities." Notably, "Inclusive and Sustainable Urbanization" is a common interest shared by universities, industry, and government, and even attracts significant attention from the fourth group (international organizations, civil society, media, and independent individuals). Furthermore, while the industry emphasizes both "Affordable and Sustainable Transport Systems" and "Safe and Affordable Housing," the government tends to maintain a relatively distant stance on most targets, except for its active involvement in "Inclusive and Sustainable Urbanization." An unexpected insight is that, despite varied roles, all stakeholder groups demonstrate similar thematic interests overall, with a discernible pattern of higher national participation observed particularly in the government and university sectors. These findings not only enrich our understanding of stakeholder dynamics within the triple helix model but also directly address our research argument regarding how effectively urban forums such as MARUF21 align and integrate diverse stakeholder interests for sustainable urban development.

Figure 6
Distribution of Participator Groups across the Sub-Targets of the 11th Global Goal



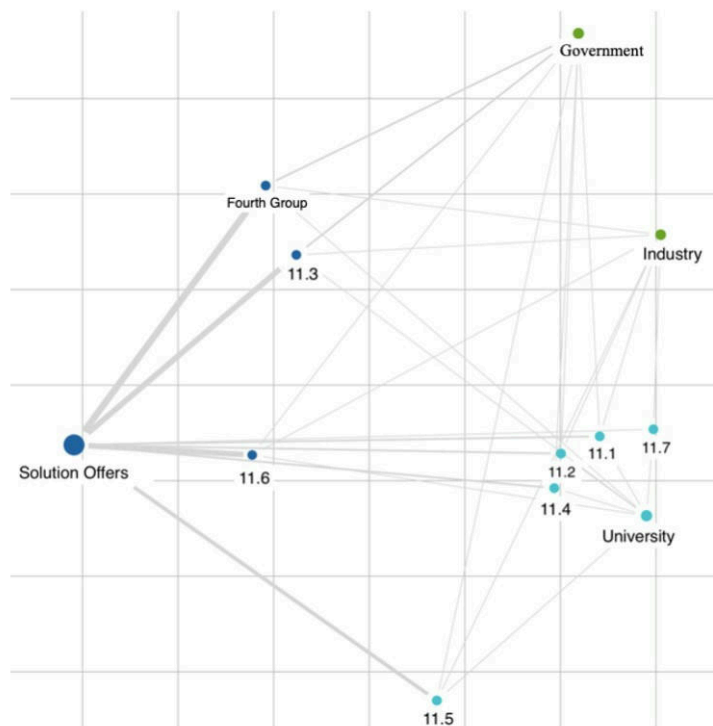
Source: Compiled from content analysis.

In the study, analyses were conducted on the concentration of solution proposals put forward by participants representing the stakeholders of the triple helix model during MARUF21 sessions across the sub-target headings of the 11th Global Goal (Figure 7). The findings reveal that university stakeholders demonstrate a markedly greater interest in SDG 11-related solution proposals compared to other groups. For instance, the sub-targets of "Safe and Affordable Housing," "Affordable and Sustainable Transport Systems," "Protect the World's Cultural and Natural Heritage," and "Provide Access to Safe and Inclusive Green and Public Spaces" have witnessed predominantly solution-oriented approaches by academic participants. In contrast,

"Inclusive and Sustainable Urbanization" has been primarily shaped by suggestions from government representatives and, notably, by the fourth group. In fact, all participant groups exhibited a strong solution-oriented mindset regarding urbanization and "Reduce the Environmental Impact of Cities." Moreover, the industry—alongside universities—tends to concentrate on sub-targets such as "Safe and Affordable Housing," "Affordable and Sustainable Transport Systems," "Reduce the Adverse Effects of Natural Disasters," and "Provide Access to Safe and Inclusive Green and Public Spaces," whereas the government primarily focuses on "Inclusive and Sustainable Urbanization," "Safe and Affordable Housing," and "Affordable and Sustainable Transport Systems."

Figure 7

Distribution of Solution Proposals across the Stakeholders of the Triple Helix Model



Source: Compiled from content analysis.

Furthermore, the analysis indicates that actors within the triple helix model engaged across all seven sub-target headings, with notable partnerships observed between university-industry, government-industry, and university-government in several instances. More importantly, in certain thematic areas, all three stakeholders came together, demonstrating the potential for multi-actor engagement in addressing sustainable urban development challenges. While such comprehensive collaborations remain relatively limited, their occurrence suggests that the discussions surrounding SDG 11 and its sub-targets were both detailed and inclusive. The MARUF21 sessions successfully facilitated a structured and diverse environment in which institutional stakeholders could exchange perspectives and develop solution-oriented approaches. Despite the existing gaps, the forum provided a valuable platform for consensus-building, strengthening cross-sectoral dialogue, and generating proposals for sustainable cities and communities. These findings reaffirm our research argument that urban forums can serve as effective intermediaries for fostering collaboration within the triple helix framework, with the potential for further development and deeper institutional integration.

Conclusion

This study explored the potential of the triple helix model as a framework for fostering sustainable urban development, particularly in the context of SDG 11. By analyzing the MARUF21 report, we examined how urban forums can serve as intermediaries, facilitating collaboration among universities, industry, and government to address urban sustainability challenges. The findings indicate that MARUF21 successfully functioned as a platform for multi-actor engagement, knowledge exchange, and consensus-building, offering valuable insights into the role of intermediary organizations in urban governance.

The results highlight that while all three stakeholders of the triple helix model—university, industry, and government—actively participated in MARUF21, their engagement levels and focus areas varied. Universities played a leading role in contributing to discussions on cultural heritage preservation and environmental sustainability, while industry stakeholders were more inclined toward pragmatic, action-oriented solutions in housing and transportation. The government although involved in discussions on urban sustainability, showed limited engagement beyond specific policy-oriented targets. Notably, the presence of a “fourth group” comprising NGOs, media, and international organizations suggests that urban forums can expand stakeholder participation beyond the traditional triple helix model structure. This inclusion broadens the scope of collaboration and highlights the need for more flexible and adaptive intermediary mechanisms.

Furthermore, this study emphasizes the importance of rethinking SDG 11 implementation through the triple helix model. Rather than viewing SDG 11 as a static policy goal, our findings suggest that it should be integrated into innovation ecosystems, enabling cities to become more adaptive, knowledge-driven, and systematically innovative. The study also underscores the role of digital transformation in shaping new forms of urban governance and stakeholder interactions. MARUF21, with its digital platform and wide international participation, serves as an example of how digital tools can eliminate institutional and geographical barriers in the knowledge-sharing process, making the triple helix model collaboration more dynamic, accessible, and resilient.

Despite its contributions, the study acknowledges certain limitations. While our analysis provides valuable insights into how urban forums can act as triple helix model intermediaries, further research is required to assess the long-term impact of such platforms. Future investigations should focus on the longitudinal monitoring of collaborations, measuring how knowledge transfer and institutional interactions evolve. Additionally, there is a need for research linking triple helix model frameworks with broader global governance structures to enhance the policy relevance of intermediary institutions such as MARUF21.

To ensure the long-term sustainability and institutional effectiveness of urban forums as intermediaries, policymakers should consider integrating them into formal governance structures. Establishing a legal framework for intermediary organizations such as MARUF21 could strengthen their role in shaping urban policy, fostering cross-sectoral collaboration, and ensuring the implementation of the proposed solutions. Additionally, regulatory mechanisms that promote continuous stakeholder engagement, such as mandated policy feedback loops and structured partnerships between government, academia, and industry, could enhance the triple helix model’s impact in urban governance. These steps would help transform urban forums from informal discussion platforms into institutionalized decision-making bodies that drive sustainable urban development.

Clearly defining the roles and responsibilities of industry actors and academics is just as essential as integrating intermediary forums into formal governance frameworks. Universities should be encouraged to participate in these forums through the establishment of multidisciplinary urban research units and specialized liaison offices that translate academic knowledge into applicable urban solutions. Academic

incentives, such as recognition for societal impact or active policy engagement, can also motivate scholars to play a more involved role in collaborative urban policy processes.

On the industry side, structured mechanisms such as innovation challenge grants, pilot programs, or sustainability-oriented procurement schemes can foster sustained participation. Companies can be incentivized to engage in knowledge-sharing platforms and collaborate with both governmental and academic institutions, particularly in domains such as clean energy, transportation, and urban infrastructure. These approaches not only diversify stakeholder input but also strengthen the triple helix model's institutional capacity to support transformative and inclusive urban change.

Given its relatively recent establishment (with its second edition in 2021), we argue that MARUF21 and similar forums are still in a learning and evolutionary phase. The current lack of binding legal frameworks for implementing the proposed solutions limits their direct policy impact. However, as urban forums gain institutional maturity and credibility, it is plausible that governments and local authorities will integrate them into official decision-making structures. The Marmara Municipalities Union's leadership in sustaining and expanding MARUF21 suggests a strong foundation for institutionalization, which could serve as a model for other regional and international initiatives.

Looking ahead, we believe that MARUF21 can serve as an intermediary model for fostering sustainable cities, particularly in developing countries that seek to integrate academic knowledge, industrial innovation, and public policy into cohesive governance frameworks. As the need for urban resilience, digital governance, and cross-sector collaboration continues to grow, intermediary institutions such as MARUF21 will play a crucial role in bridging innovation gaps and shaping the future of sustainable urbanization.



Peer Review	Externally peer-reviewed.
Author Contributions	Conception/Design of Study- Ö.G., İ.G.; Data Acquisition- Ö.G., İ.G.; Data Analysis/Interpretation- Ö.G., İ.G.; Drafting Manuscript- Ö.G., İ.G.; Critical Revision of Manuscript-Ö.G., İ.G. ; Final Approval and Accountability- Ö.G., İ.G.
Conflict of Interest	The authors have no conflict of interest to declare.
Grant Support	The authors declared that this study has received no financial support.

Author Details

Özcan Garan

¹ Istanbul University, Faculty and Department of Economics, İstanbul, Türkiye

 0000-0001-8126-6473

İrem Güneş

¹ Istanbul University, Faculty and Department of Economics, İstanbul, Türkiye

 0000-0002-1443-2934  iremgunesist@gmail.com

References

- Arcadis. (2018). *Citizen centric cities the sustainable cities index 2018*. https://www.arcadis.com/campaigns/citizencentriccities/images/%7B1d5ae7e2-a348-4b6e-b1d7-6d94fa7d7567%7Dsustainable_cities_index_2018_arcadis.pdf
- Bellgardt, F., Gohlke, J., Haase, H. and Parzonka, R. (2014). Triple Helix and Residential Development in a Science and Technology Park: The Role of Intermediaries. *Triple Helix*, 1 (10). <https://doi.org/10.1186/s40604-014-0010-1>
- Bonenberg, A. and Angoneze-Grela, E. (2023). University–municipality–business (Triple Helix) cooperation model in practice–ecological district of innovation and technology in Poznan (EDIT Poznań). *Przestrzeń i Forma*, (56), 199-218. <http://doi.org/10.21005/pif.2023.56.C-02>



- Cai, Y. (2014). Implementing the I in a non-Western Context: An Institutional Logics Perspective. *Triple Helix*, 1 (1). <https://doi.org/10.1186/s40604-014-0001-2>
- Cai, Y. (2015). What Contextual Factors Shape “Innovation in Innovation”? Integration of Insights from the Triple Helix and the Institutional Logics Perspective. *Social Science Information*, 54 (3), 299-326. <https://doi.org/10.1177/0539018415583527>
- Cai, Y. (2022). Neo-triple helix model of innovation ecosystems: integrating triple, quadruple and quintuple helix models. *Triple Helix*, 9 (1), 76-106. <https://doi.org/10.1163/21971927-bja10029>
- Cai, Y. and Etzkowitz, H. (2020). Theorizing the Triple Helix Model: Past, Present, and Future. *Triple Helix*, 7 (3), 189-226. <https://doi.org/10.1163/21971927-bja10003>
- Caloffi, A., Colovic, A., Rizzoli, V. and Rossi, F. (2023). Innovation Intermediaries' Types and Functions: A Computational Analysis of the Literature, *Technological Forecasting and Social Change*, 189. <https://doi.org/10.1016/j.techfore.2023.122351>
- Carter, N., Bryant-Lukosius, D., DiCenso, A., Blythe, J., and Neville, A. J. (2014). The use of triangulation in qualitative research. *Oncology Nursing Forum*, 41(5), 545-547. <https://doi.org/10.1188/14.onf.545-547>
- Champenois, C. and Etzkowitz, H. (2018). From Boundary Line to Boundary Space: The Creation of Hybrid Organizations as a Triple Helix Micro-Foundation. *Technovation*, 76, 28-39. <https://doi.org/10.1016/j.technovation.2017.11.002>
- Chatzinikolaou, D. (2025). On Smart Cities and Triple-Helix Intermediaries: A Critical-Realist Perspective. *Smart Cities*, 8 (3), 74. <https://doi.org/10.3390/smartcities8030074>
- Diaz-Sarachaga, J.M. (2024). Integration of the Triple Helix Model in Sustainability Research. ISOSCAN as Case Study. In: Leal Filho, W., Salvia, A.L., Portela de Vasconcelos, C.R. (eds) *An Agenda for Sustainable Development Research*. (pp. 503-519). World Sustainability Series. Springer, Cham. https://doi.org/10.1007/978-3-031-65909-6_28
- Etzkowitz, H. (2002). Networks of Innovation: Science, Technology and Development in the Triple Helix Era. *International Journal of Technology Management & Sustainable Development*, 1(1), 7-20. <https://doi.org/10.1386/ijtm.1.1.7>
- Emeis, S. and Fallmann, J. (2022). Unsatisfying transfer of climate research to urban planning: The regulatory trap in the triple helix. *Triple Helix*, 9 (3), 275-295. <https://doi.org/10.1163/21971927-bja10035>
- Etzkowitz, H. (2003a). Innovation in Innovation: The Triple Helix of University-Industry-Government Relations. *Social Science Information*, 42 (3), 293-337. <https://doi.org/10.1177/05390184030423002>
- Etzkowitz, H. (2003b). *Learning From Transition: The Triple Helix As Innovation System*. [Conference Presentation] Knowledge Based Society: A Challenge for New EU and Accession Countries, Zagreb, Croatia. https://www.pilar.hr/wp-content/images/stories/dokumenti/zbornici/27/z_27_039.pdf
- Etzkowitz, H. (2008). *The Triple Helix: University-Industry-Government Innovation in Action*. London and New York: Routledge.
- Etzkowitz, H. (2010). University-Industry-Government: The Triple Helix Model of Innovation. *51st EOQ Congress 2007* (51-73). European Organization of Quality.
- Etzkowitz, H. (2011). Normative Change in Science and the Birth of the Triple Helix. *Social Science Information*, 50 (3-4), 549-568. <https://doi.org/10.1177/0539018411411403>
- Etzkowitz, H. (2014). The contribution of university-industry-government interactions to creative entrepreneurship and economic development. *Handbook of research on entrepreneurship and creativity*, Edward Elgar Publishing, 323-359.
- Etzkowitz, H. and Dzisah, J. (2008). Rethinking Development: Circulation in the Triple Helix. *Technology Analysis & Strategic Management*, 20 (6), 653-666. <https://doi.org/10.1080/09537320802426309>
- Etzkowitz, H. and Leydesdorff, L. (1995). The Triple Helix-University-Industry-Government Relations: A Laboratory for Knowledge-Based Economic Development. *EASST Review*, 14 (1), 14-19. <https://ssrn.com/abstract=2480085>
- Etzkowitz, H. and Leydesdorff, L. (1998). The Endless Transition: A “Triple Helix” of University-Industry-Government Relations: Introduction. *Minerva*, 203-208.
- Etzkowitz, H. and Leydesdorff, L. (2000). The dynamics of innovation: from National Systems and “Mode 2” to a Triple Helix of university-industry-government relations. *Research Policy*, 29 (2), 109-123. [https://doi.org/10.1016/S0048-7333\(99\)00055-4](https://doi.org/10.1016/S0048-7333(99)00055-4)
- Etzkowitz, H., Webster, A., Gebhardt, C. and Terra, B. R. C. (2000). The Future of the University and the University of the Future: Evolution of Ivory Tower to Entrepreneurial Paradigm. *Research Policy*, 29 (2), 313-330. [https://doi.org/10.1016/S0048-7333\(99\)00069-4](https://doi.org/10.1016/S0048-7333(99)00069-4)
- Fallah Shayan, N., Mohabbati-Kalejahi, N., Alavi, S. and Zahed, M. A. (2022). Sustainable development goals (SDGs) as a framework for corporate social responsibility (CSR). *Sustainability*, 14 (3), 1222. <https://doi.org/10.3390/su14031222>
- Farinha, L., Ferreira, J. and Gouveia, B. (2016). Networks of Innovation and Competitiveness: A Triple Helix Case Study. *Journal of the Knowledge Economy*, 7 (1), 259-275. <https://doi.org/10.1007/s13132-014-0218-3>
- Frølund, L. and Ziethen, M. (2014). The Hermeneutics of Knowledge Creation in Organisations. *Philosophy of Management*, 13, 33-49. <https://doi.org/10.5840/pom201413316>

- Gebhardt, C. and Huerta, J. M. P. (2024). Integrating Triple Helix and Sustainable Transition Research for Transformational Governance: Climate Change Adaptation and Climate Justice in Barcelona. *Triple Helix*, 11 (1), 107-130. <https://doi.org/10.1163/21971927-bja10053>
- Gündoğdu, H. G. and Aytekin, A. (2022). İklim Değişikliği, Sürdürülebilir Şehirler ve Topuluklar Bağlamında Çok Kriterli Bir Değerlendirme. *İnsan ve İnsan*, 9 (33), 33-52. <https://doi.org/10.29224/insanveinsan.1104121>
- Howells, J., (2006). Intermediation and the role of intermediaries in innovation. *Research Policy*, 35 (5), 715-728. <https://doi.org/10.1016/j.respol.2006.03.005>
- Kapetanidou, C. and Lee, S. H. (2017). A framework for assessing the performance of universities: The case of Cyprus. *Technological Forecasting and Social Change*, 123, 169-180. <https://doi.org/10.1016/j.techfore.2016.03.015>
- Karakurt Tosun, K. (2009). Sürdürülebilirlik olgusu ve kentsel yapıya etkileri. *Paradoks, Ekonomi, Sosyoloji ve Politika Dergisi*, 10 (2).
- König, J., Suwala, L., Delargy, C. (2021). Helix Models of Innovation and Sustainable Development Goals. In: Leal Filho, W., Azul, A.M., Brandli, L., Lange Salvia, A., Wall, T. (eds) *Industry, Innovation and Infrastructure* (pp. 1-15). Encyclopedia of the UN Sustainable Development Goals. Springer, Cham. https://doi.org/10.1007/978-3-319-71059-4_91-1
- Leydesdorff, L. and Etzkowitz, H. (1998). The Triple Helix as a Model for Innovation Studies. *Science & Public Policy*, 25 (3), 195-203. <https://doi.org/10.1093/spp/25.3.195>
- Marmara Municipalities Union. (2022). MARUF21 Report (Marmara Municipalities Union Publication No: 150). <https://mbbkulturyayinlar.com/maruf21-report>
- Marmara Urban Forum (n.d.). Retrieved July 15, 2025 from <https://maruf21.marmaraurbanforum.org/>
- Mayring, P. (2014). *Qualitative Content Analysis: Theoretical Foundation, Basic Procedures and Software Solution*. Klagenfurt. Retrieved from <https://nbn-resolving.org/urn:nbn:de:0168-ssao-395173>
- Mazzucato, M. (2013). *The Entrepreneurial State: Debunking Public vs. Private Sector Myths*. London: Anthem Press.
- Mazzucato, M. (2018). Mission-oriented innovation policies: Challenges and opportunities, *Industrial and Corporate Change*, 27, (5), 2018, 803-815. <https://doi.org/10.1093/icc/dty034>
- Metcalfe, A. S. (2010). Examining the trilateral networks of the triple helix: Intermediating organizations and academy-industry-government relations. *Critical Sociology*, 36 (4), 503-519. <https://doi.org/10.1177/0896920510365920>
- Meyer, M., Kuusisto, J., Grant, K., De Silva, M., Flowers, S. and Choksy, U. (2019). Towards New Triple Helix Organisations? A Comparative Study of Competence Centres as Knowledge, Consensus and Innovation Spaces. *R&D Management*, 49 (4), 555-573. <https://doi.org/10.1111/radm.12342>
- Pahnke, E. C., McDonald, R., Wang, D. and Hallen, B. (2015). Exposed: Venture Capital, Competitor Ties, and Entrepreneurial Innovation. *Academy of Management Journal*, 58 (5), 1334-1360. <https://doi.org/10.5465/amj.2012.0777>
- Pinto, J. T., Morales, M. E., Fedoruk, M., Kovaleva, M. and Diemer, A. (2019). Servitization in Support of Sustainable Cities: What Are Steel's Contributions and Challenges? *Sustainability*, 11 (3), 855. <https://doi.org/10.3390/su11030855>
- Pique, J.M., Miralles, F. and Berbegal-Mirabent, J. (2020). Application of the Triple Helix Model in the Creation and Evolution of Areas of Innovation. In: Abu-Tair, A., Lahrech, A., Al Marri, K., Abu-Hijleh, B. (eds) *Proceedings of the II International Triple Helix Summit. THS 2018. Lecture Notes in Civil Engineering*, vol 43, (223-244), Springer, Cham. https://doi.org/10.1007/978-3-030-23898-8_17
- Poppen, F. and Decker, R. (2018). The Intermediary as an Institutional Entrepreneur: Institutional Change and Stability in Triple-Helix Cooperation. *Triple Helix*, 5 (1). <https://doi.org/10.1186/s40604-018-0063-7>
- Ranga, M. and Etzkowitz, H. (2013). 'Triple Helix Systems: An Analytical Framework for Innovation Policy and Practice in the Knowledge Society', *Industry and Higher Education*, 27 (4), 237-262. <https://doi.org/10.5367/ihe.2013.0165>
- Reich-Graefe, R. (2016). Intermediation in Intermediation: Triple Helix Innovation and Intermediary Legal Organisation. *Triple Helix*, 3 (10). <https://doi.org/10.1186/s40604-016-0041-x>
- Rogers, R. (1997). *Cities for a small planet*. Boulder.
- Roller, M. R. (2019). A Quality Approach to Qualitative Content Analysis: Similarities and Differences Compared to Other Qualitative Methods. *Forum Qualitative Sozialforschung Forum: Qualitative Social Research*, 20 (3). <https://doi.org/10.17169/fqs-20.3.3385>
- Saad, M. and Zawdie, G., eds. (2011). *Theory and Practice of the Triple Helix Model in Developing Countries: Issues and Challenges*. New York: Routledge.
- Saad, M., Zawdie, G. and Malairaja, C. (2008). The Triple Helix Strategy for Universities In Developing Countries: The Experiences in Malaysia and Algeria, *Science and Public Policy*, 35 (6), 431-443. <https://doi.org/10.3152/030234208X323316>
- Schreier, M. (2012). *Qualitative Content Analysis in Practice*. London: Sage.
- Ståhlbröst, A. and Holst, M. (2017). Reflecting on Actions in Living Lab Research. *Technology Innovation Management Review*, 7 (2), 27-34. <https://doi.org/10.22215/timreview/1055>

- Su, Y. and Fan, D. (2023). Smart cities and sustainable development. *Regional Studies*, 57 (4), 722-738. <https://doi.org/10.1080/00343404.2022.2106360>
- Suvinen, N., Konttinen, J. and Nieminen, M. (2010). How Necessary are Intermediary Organizations in the Commercialization of Research? *European Planning Studies*, 18 (9), 1365-1389. <http://dx.doi.org/10.1080/09654313.2010.492584>
- Svensson, P. Klofsten, M. and Etzkowitz, H. (2012). An Entrepreneurial University Strategy for Renewing a Declining Industrial City: The Norrköping Way, *European Planning Studies*, 20 (4), 505-525. <https://doi.org/10.1080/09654313.2012.665616>
- Tuunainen, J. (2002) Reconsidering the Mode 2 and the Triple Helix: A Critical Comment Based on a Case Study, *Science & Technology Studies*, 15 (2), 36-58. <https://doi.org/10.23987/sts.55144>
- United Nations General Assembly. (2015, October 21). *Transforming our world: The 2030 agenda for sustainable development*. Resolution adopted by the General Assembly on 25 September 2015, A/RES/70/1. <https://sdgs.un.org/sites/default/files/publications/21252030%20Agenda%20for%20Sustainable%20Development%20web.pdf>
- United Nations Department of Economic and Social Affairs. (2022). *The sustainable development goals report 2022*. United Nations. <https://unstats.un.org/sdgs/report/2022/>
- Van Lente, H., Hekkert, M. P., Smits, R. and Waveren, B. (2003). Roles of Systemic Intermediaries in Transition Processes. *International Journal of Innovation Management*. 07 (03), 247-279. <https://doi.org/10.1142/S1363919603000817>
- Van Geenhuizen, M. and Nejabat, R. (2023). Urban Policy Response to Radical Innovation in Sustainable Energy: The Case of University Spin-Offs and Local Triple Helix Interaction. *Advances in Environmental and Engineering Research*, 4 (1), 1-16. <https://doi.org/10.21926/aeer.2301007>
- World Commission on Environment and Development. (1987). *Our Common Future: Report of the World Commission on Environment and Development*. <https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf>
- Yin, R. K. (2018). *Case Study Research and Applications: Design and Methods*. 6th ed. Thousand Oaks, CA: Sage.
- Yokakul, N. and Zawdie, G. (2009). The Role of Triple Helix for Promoting Social Capital, Industrial Technology and Innovation in the SME Sector in Thailand. *Science Technology & Society*, 14 (1), 93-117. <https://doi.org/10.1177/097172180801400104>
- Zadegan, M. G., Ghazinoory, S., & Nasri, S. (2025). The Triple Helix Model of Innovation and Sustainable Development Goals: A Literature Review. *Sustainable Development*. <https://doi.org/10.1002/sd.70041>
- Zhou C and Etzkowitz H (2021) Triple helix twins: a framework for achieving innovation and UN sustainable development goals. *Sustainability*, 13 (12), 6535. <https://doi.org/10.3390/su13126535>