

Strengthening The Innovation Ecosystem in Surakarta: Analysis of Barriers and Practical Recommendations

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ABSTRACT

The City of Surakarta holds significant potential for innovation development; however, its growth has thus far been hindered by the lack of optimal engagement from various stakeholders, such as local government agencies, academia, and the private sector. The background of this study is to identify the factors that obstruct innovation growth and to formulate strategies that can improve the city's innovation score. The objective of this research is to develop policy recommendations that can strengthen the innovation ecosystem, as well as to draft a comprehensive roadmap to guide the effective implementation of innovation initiatives. The analysis shows that suboptimal engagement, lack of coordination among stakeholders, and limited capacity in human resources and technological infrastructure are the main challenges. The conclusion of this study emphasizes the importance of building a structured collaboration platform, developing human resource capacity, and preparing a clear innovation roadmap to achieve sustainable innovative growth. The implications of these recommendations include the need for adequate budget allocation, strengthened coordination among stakeholders, and intensive training to enhance skills in technology and innovation management. The novelty of this research lies in the integration of cross-sector collaboration strategies with technology and human capacity development into a holistic approach, along with the emphasis on active community participation in the innovation process. By implementing these recommendations, it is expected that the City of Surakarta can create an inclusive and sustainable innovation environment, which will ultimately support local economic growth and the achievement of the Sustainable Development Goals (SDGs).

Keywords: Innovation, Cross-Sector Collaboration, Technology, SDGs.

Abstrak

Kota Surakarta memiliki potensi yang signifikan dalam pengembangan inovasi; namun, pertumbuhannya hingga saat ini masih terhambat oleh belum optimalnya keterlibatan berbagai pemangku kepentingan, seperti perangkat daerah pemerintah, akademisi, dan sektor swasta. Latar belakang penelitian ini adalah untuk mengidentifikasi faktor-faktor yang menghambat pertumbuhan inovasi serta merumuskan strategi yang dapat meningkatkan skor inovasi kota. Tujuan penelitian ini adalah menyusun rekomendasi kebijakan yang dapat memperkuat ekosistem inovasi, sekaligus merancang peta jalan (roadmap) yang komprehensif untuk memandu implementasi inisiatif inovasi secara efektif. Hasil analisis menunjukkan bahwa keterlibatan pemangku kepentingan yang belum optimal, kurangnya koordinasi antar pihak, serta keterbatasan kapasitas sumber daya manusia dan infrastruktur teknologi merupakan tantangan utama. Kesimpulan penelitian ini menekankan pentingnya membangun platform kolaborasi yang terstruktur, mengembangkan kapasitas sumber daya manusia, serta menyiapkan peta jalan inovasi yang jelas guna mencapai pertumbuhan inovasi yang berkelanjutan. Implikasi dari rekomendasi tersebut mencakup perlunya alokasi anggaran yang memadai, penguatan koordinasi antar pemangku kepentingan, serta pelatihan intensif untuk meningkatkan keterampilan di bidang teknologi dan manajemen inovasi. Kebaruan penelitian ini terletak pada integrasi strategi kolaborasi lintas sektor dengan pengembangan teknologi dan kapasitas sumber daya manusia dalam suatu pendekatan yang holistik, serta penekanan pada partisipasi aktif masyarakat dalam proses inovasi. Dengan menerapkan rekomendasi tersebut, diharapkan Kota Surakarta dapat menciptakan lingkungan inovasi yang inklusif dan berkelanjutan, yang pada akhirnya akan mendukung pertumbuhan ekonomi lokal serta pencapaian Tujuan Pembangunan Berkelanjutan (Sustainable Development Goals/SDGs).

Kata Kunci: Inovasi, Kolaborasi Lintas Sektor, Teknologi, SDGs.

1. INTRODUCTION

Despite showing significant potential in the field of innovation, the City of Surakarta faces various challenges that hinder innovation progress at the regional level. One of the main issues is the lack of coordination between government institutions and relevant stakeholders, which results in fragmented innovative efforts and resource wastage. The suboptimal use of technology and data also exacerbates this situation, as many innovation initiatives are not effectively integrated into existing systems. As a result, although there are numerous efforts to promote innovation, the outcomes often fall short of the existing potential (Hayuningtyas et al., 2020).

In addition, resistance to change across various sectors has become a major barrier in the innovation process in Surakarta. Many parties are reluctant to abandon old practices and adopt new technologies, thus hampering modernization and efficiency improvements (Werang et al., 2025). The lack of technical capacity in several sectors further aggravates this issue, where many staff members and related stakeholders are not yet well-trained in managing and utilizing the latest technologies (Purnomo & Khabibi, 2025). This results in delays in the implementation of innovative solutions that could improve city services and infrastructure.

Another challenge that needs to be addressed is the lack of consistent and well-planned policy support from the local government. Although there are various policies and programs supporting innovation, their implementation is often poorly coordinated and not backed by adequate funding. This leads to many innovation programs—designed to improve the quality of public services and infrastructure—facing difficulties in achieving optimal results. Therefore, it is important to formulate more solid and sustainable policy strategies (Head, 2011; Prasetya & Kussudyarsana, 2020).

Finally, the need to enhance innovation capacity in the City of Surakarta is urgent, considering the increasingly intense global and regional competition. The city must improve its innovation approaches and strategies in order to compete effectively and achieve inclusive and sustainable development goals. Through a deeper understanding of these obstacles, it is expected that appropriate solutions can be found to strengthen the innovation ecosystem and improve the city's competitiveness. The recommendations resulting from this study will serve as an important step in improving and optimizing innovation capacity in Surakarta.

2. METHODOLOGY

This study uses a descriptive qualitative approach. The aim is to gain a deep understanding of the challenges and potential in strengthening the innovation ecosystem in the City of Surakarta. Data were collected through document review, observation, and focused interviews (Khan et al., 2025; Morgan, 2022). Respondents included representatives from local government, academics, business actors, and community groups.

Document review was conducted using official government reports, innovation evaluation results, and other relevant documents (Wee & Banister, 2016). Observation focused on the implementation of innovation programs in the field. Interviews were semi-structured to allow flexibility while staying focused on the main issues.

Data were analyzed thematically. Information was grouped by topic and issue, then examined to identify patterns, barriers, and opportunities. Data validity was ensured through triangulation of sources and methods (Moon, 2019). Findings were cross-checked through small group discussions with relevant stakeholders.

The entire process followed participatory and ethical principles. All information was collected with consent and openness. The goal was to ensure that the findings reflect real conditions and serve as a shared reflection for improving innovation strategies and policies in the future.

3. ANALYSIS AND DISCUSSION

The City of Surakarta has demonstrated impressive achievements in innovation throughout 2023, with a total of 150 innovations submitted for the Innovative Government Awards (IGA) competition. Of this number, 38 innovations originated from 2022 and remain eligible for updates and resubmission this year. Additionally, 62 innovations were introduced by local government agencies, 10 innovations came from the Krenova competition, and 40 innovations resulted from the SMESKA program. SMESKA is a non-digital startup training program that focuses on end-to-end field mastery by a team (Sutriadi et al., 2022).

In 2023, Surakarta successfully implemented 62 new innovations, marking significant progress in addressing various societal challenges (Surakarta, 2024). These innovations involved various entities, including Local Government Organizations, sub-districts, schools, and community participation, reflecting broad collaboration in developing solutions. The primary focus of these innovations is on improving public services to be more efficient and inclusive, in line with the City of Surakarta's vision of becoming a modern and sustainable city. The integration of both digital and non-digital technologies in these innovations represents a strategic step in a broader transformation process.

The role of the Regional Research and Innovation Agency (BRIDA) is particularly vital in the development of innovation in the City of Surakarta, having submitted 12 innovations. In addition, the Health Office, the Population and Civil Registration Office, and the Education Office contributed with 11, 8, and 6 innovations respectively (Surakarta, 2024). This cross-sector collaboration demonstrates the strength of Surakarta's innovation ecosystem, where government, the private sector, and the community work together to create relevant and effective solutions (Indrayani et al., 2024; Kurniawati & Kustulasari, 2021). The diversity of contributions strengthens the city's capacity to face contemporary challenges in the digital era.

To assess the level of innovation in Surakarta, an index was used involving two main components: the Regional Government Unit (SPD) and the Regional Innovation Unit (SID). SPD consists of 15 indicators, while SID has 21 indicators, with a maximum SID score of 187. The maximum innovation score is 111, with an additional score of 76 depending on the number of innovations produced. The Innovation Quantity Indicator Score is calculated based on a weight of 0.38 from the total number of innovations, with a maximum score of 76. With 150 innovations submitted in 2023, the score for the innovation quantity indicator is 57 (Surakarta, 2024).

In terms of SID, there is a range of innovation scores between 96 and 111, with the average innovation score recorded at 101.23. The SID score is calculated by adding the average innovation score and a supplementary factor based on the number of innovations exceeding 100. The resulting SID score is 177.23, reflecting the high quality and impact of the innovations produced. The combined total of the Innovation Quantity Indicator Score and the SID score yields a total of 234.23, compared to the maximum possible score of 250 (Surakarta, 2024).

An independent calculation through simulation resulted in a score of 87.97, although this outcome may be subject to revision based on the Ministry of Home Affairs' review (Surakarta, 2024). An IID scale close to 88 indicates that Surakarta is categorized as "Highly Innovative." This reflects the city's strong potential to advance various aspects of life through innovation. With a high average innovation score and a total score approaching the maximum, Surakarta can be considered one of the most innovative cities at the local level.

This index also provides guidance for the local government to allocate further resources toward innovations that have a tangible impact on the community. Improvements in assessed indicators can help measure

progress and refine future innovation strategies. With this approach, Surakarta can continue to lead in innovation development, ensuring that innovation not only enhances administrative efficiency but also contributes to improving the quality of life of its citizens.



Figure 1. Surakarta Innovation Index Recapitulation for 2024

3.1. Discussion

To encourage an increase in the innovation score and to optimize the innovation ecosystem in the City of Surakarta, a number of strategies and policies must be implemented systematically and in a coordinated manner. These measures are expected to strengthen the role of all stakeholders and create a supportive environment for sustainable innovation. In this effort, several strategic recommendations are presented, covering cross-sector collaboration, capacity building, and necessary policy support.

3.1.1. Enhancing Cross-Sector Collaboration

More intensive collaboration among local government agencies, the private sector, academia, and the community is crucial for strengthening the innovation ecosystem. The establishment of a structured collaboration platform can facilitate the effective exchange of ideas and resources, reduce duplication of efforts, and accelerate the innovation process (Costa & Matias, 2020). Additionally, regulations that support inter-sectoral collaboration should be formulated to provide incentives for active participation, such as funding or formal recognition. Regular discussion forums and workshops involving at least 80% of stakeholders can serve as important platforms for building synergy and jointly formulating innovative solutions.

3.1.2. Strengthening Human Resource Capacity

Human resource development is key to improving the effectiveness of innovation implementation. Intensive training programs in technology and innovation management should be held regularly to enhance the skills and knowledge of innovation managers (Klimovskikh et al., 2023). Funding for these trainings needs to be allocated to ensure sufficient access for all involved parties. Certification in innovation management can further increase competence and professionalism, thereby supporting the successful implementation of more effective and sustainable innovations in the City of Surakarta.

3.1.3. Support and Facilitation for Startups and Innovators

Providing support and incentives to startups and individual innovators will stimulate the growth of the local innovation ecosystem. This facilitation may include seed funding, access to technology, and mentorship in product or service development. Incentives for inter-sector collaboration are also important to foster more productive partnerships (Haines, 2016; Pustovrh et al., 2020). Awarding or recognizing successful innovative initiatives can serve as an additional motivation for innovators to continue contributing to the city's development.

3.1.4. Improvement of Infrastructure and Information Technology

To effectively support innovation implementation, adequate infrastructure must be developed. This includes upgrading digital systems and improving technology literacy among stakeholders. Platforms such as *e-tanov*, which provide real-time monitoring dashboards, should be optimized to track innovation progress periodically. Promotional campaigns for innovative applications through social media and digital advertising should also be carried out to increase penetration and application usage, thereby maximizing the impact of the applied technologies (Marrucci et al., 2025; Ridley et al., 2006).

3.1.5. Regular Monitoring and Evaluation

A structured monitoring and evaluation mechanism must be implemented to ensure the effectiveness and consistency of innovation execution. Periodic evaluations of innovation projects are necessary to identify achievements and obstacles, as well as to make strategic adjustments when needed (Larrue, 2021; Rohracher et al., 2023). Transparent reports on evaluation results and improvement recommendations must be prepared and disseminated to enhance accountability and trust among all stakeholders. A comprehensive monitoring system will ensure that all projects proceed according to plan and meet established targets.

3.1.6. Public Promotion and Education on Innovation

Effective public education campaigns can raise awareness of the importance of innovation and its benefits for society. Organizing participatory events such as discussion forums and innovation workshops can provide spaces for the public to express ideas and participate in developing local solutions (Durbin & Filer, 2021; Mahardhani, 2023). Community training programs should focus on improving skills in creating and implementing innovative ideas. By actively involving the public, the City of Surakarta can build an inclusive innovation culture that supports sustainable growth.

3.1.7. Government Support and Policy

Support from the local government is essential for increasing innovation capacity. Innovation-supportive regulations must be strengthened, and budget allocations for innovation projects must be adjusted to reflect actual needs. The government should also consider providing additional incentives for projects with social and environmental impact (Haines, 2016; Iyelolu et al., 2024). Clear policies and adequate facility support will help create a conducive environment for the development of innovations that positively impact society.

3.1.8. Development of Strategic Partnerships

Strategic partnerships with the private sector, universities, and research institutions must be developed to promote research and the development of technologies relevant to local needs. Such collaboration can open up opportunities for applied research and the development of innovative products (Pandey et al., 2022). Through these partnerships, the City of Surakarta can leverage external resources and strengthen local capabilities in addressing ongoing challenges. Building a strong network of cooperation will accelerate technology and knowledge transfer and enhance innovation competitiveness at both local and national levels.

4. CONCLUSION

This study concludes that the innovation ecosystem in Surakarta holds strong potential but faces structural and capacity-related challenges. Strengthening cross-sector collaboration, improving human resource capabilities, and ensuring consistent policy support are key to advancing innovation efforts. The findings imply that local governments must adopt integrated and participatory approaches to foster sustainable innovation.

The novelty of this research lies in its holistic integration of stakeholder collaboration, technology development, and human capacity building, with a strong emphasis on community participation. Future research is recommended to explore quantitative measurement tools for innovation impact, as well as case studies that highlight best practices across regions for comparative learning.

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