INNOVATION DISTRICT BLUEPRINT

February 2026

The Research, Development
and Innovation Authority

INNOVATION DISTRICT BLUEPRINT

February 2026

Developed by the Research, Development & Innovation Authority (RDI)

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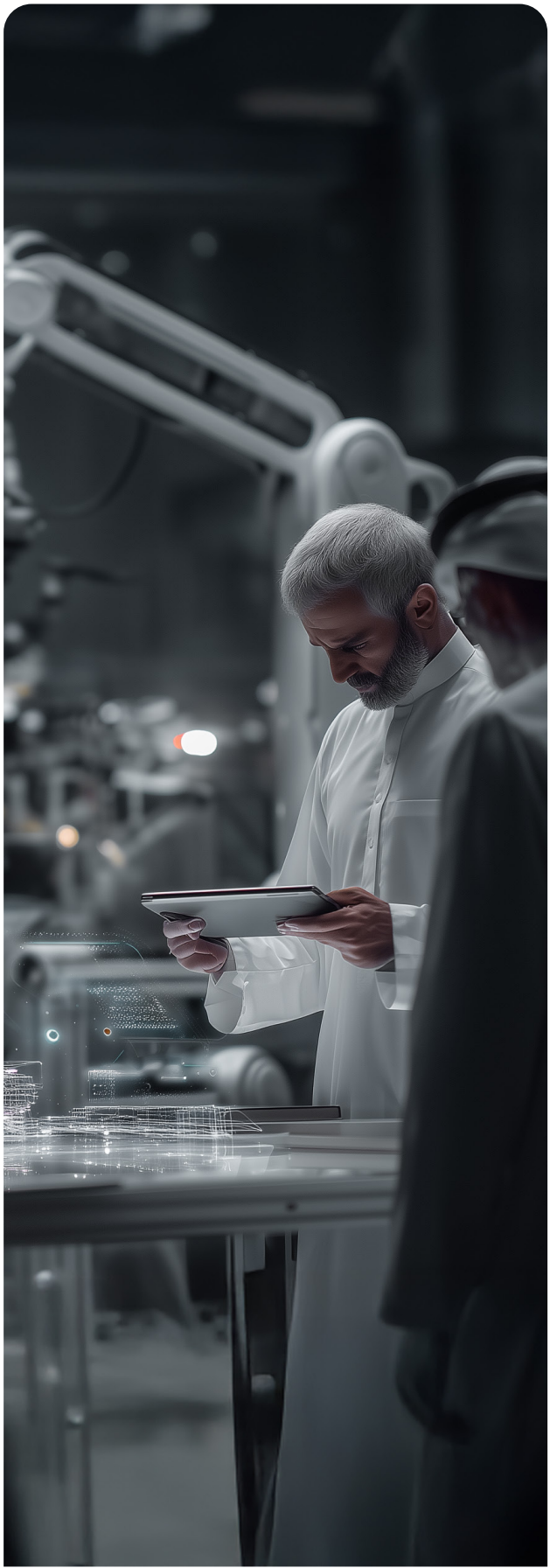
GLOSSARY OF ABBREVIATIONS

Acronym	Full Form
AI	Artificial Intelligence
BIM	Building Information Modeling
CEDA	Council of Economic and Development Affairs
CMA	Capital Market Authority
CST	Communications, Space & Technology Commission
DGA	Digital Government Authority
ECC	Essential Cybersecurity Controls
ESG	Environmental, Social and Governance
EV	Electric Vehicle
GIS	Geographic Information System
GIID	Global Institute on Innovation Districts
HRSD / MHRSD	Ministry of Human Resources and Social Development
ICT	Information and Communications Technology
ID	Innovation District
IDO	Innovation District Office
IoT	Internet of Things
IP	Intellectual Property
KPI	Key Performance Indicator
KSA	Kingdom of Saudi Arabia
LEED	Leadership in Energy and Environmental Design
MEP	Ministry of Economy and Planning
MEWA	Ministry of Environment, Water and Agriculture
MISA	Ministry of Investment of Saudi Arabia

GLOSSARY OF ABBREVIATIONS

Acronym	Full Form
MC	Ministry of Commerce
MODON	Saudi Authority for Industrial Cities and Technology Zones
MOMAH	Ministry of Municipalities and Housing
MOT	Ministry of Transport and Logistics Services
NCA	National Cybersecurity Authority
NCEC	National Center for Environmental Compliance
NDF	National Development Fund
NIDLP	National Industrial Development and Logistics Program
NWC	National Water Company
NTCS	National Technology Clusters Strategy
OE	Operational Excellence
PDPL	Personal Data Protection Law
PIF	Public Investment Fund
PPP	Public-Private Partnership
PRT	Personal Rapid Transit
R&D	Research and Development
RDI	Research, Development and Innovation Authority
SDAIA	Saudi Data & Artificial Intelligence Authority
SEC	Saudi Electricity Company
SME	Small and Medium Enterprise
STEM	Science, Technology, Engineering and Mathematics
TTO	Technology Transfer Office

EXECUTIVE SUMMARY



The Innovation District Blueprint serves as a comprehensive framework for designing, developing, and managing innovation-driven urban ecosystems across the Kingdom. Developed under the guidance of the Research, Development & Innovation Authority (RDI), it consolidates global best practices and aligns them with Saudi Vision 2030 to enable a transition toward a diversified, knowledge-based economy. The blueprint provides actionable guidance for transforming existing science parks, techno valleys, and urban areas into thriving, interconnected innovation districts that foster research, entrepreneurship, and sustainable growth.

Methodology

Built on a rigorous, multi-phase approach, the Blueprint draws from an in-depth analysis of Saudi Arabia's innovation ecosystem and benchmark studies of leading global models. As part of the benchmarks, the top 30 GIID-ranked countries were analyzed and 8 were shortlisted and assessed. Culminating in the selection of 3 countries for detailed insights on innovation district performance and governance. These selected benchmarks — 22@Barcelona (Spain), Masdar City (UAE), and Kendall Square (USA) — illuminate pathways to success through integrated governance, vibrant talent ecosystems, and commercialization excellence, offering lessons adaptable to the Saudi context. Additionally, the Blueprint is informed by the NIDLP's National Technology Clusters Strategy (NTCS), whose findings provide critical reference points across its governance, infrastructure, and innovation enablement components.

Purpose of Blueprint

At its core, the Blueprint aims to catalyze socio-economic transformation through innovation. It provides structured direction across six critical dimensions. Governance and management, infrastructure, talent attraction, R&D collaboration, technology transfer, and performance monitoring, ensuring that every district is purpose-driven and future-ready. This framework is not a prescriptive manual but a strategic reference adaptable to the unique context of each district.

Who Will Benefit

This blueprint directly benefits a broad coalition of stakeholders:

- Techno valleys and science parks aspiring to evolve into fully integrated and operational innovation districts.
- Government and policymakers, who gain a model for governance, regulation, and policy mechanisms that align innovation districts with national development and economic

diversification strategies.

- Academic and research institutions, which can serve as anchors for innovation and technology transfer.
- Private sector entities and investors, who can access structured ecosystems that de-risk innovation and open commercialization pathways.
- Communities and citizens, who benefit from inclusive, sustainable, and vibrant urban environments offering quality jobs and improved livability.

Relevance to the Kingdom

Innovation Districts are vital engines of economic diversification, job creation, and global competitiveness. They integrate physical, digital, and institutional infrastructure to create hubs where universities, startups, and corporates co-exist and collaborate. Beyond economic impact, these districts act as living labs for sustainability, digital transformation, and social inclusion — enabling the Kingdom to become a regional and global leader in research-driven innovation.

Through strong governance, sustainable funding mechanisms, and adaptive management, the Blueprint establishes a roadmap to ensure that every Innovation District contributes meaningfully to Saudi Arabia's long-term ambition to become a global hub for innovation, technology, and human capital excellence.

Disclaimer:

This Blueprint is intended as a guiding reference that outlines best practices and strategic considerations for the establishment and operation of Innovation Districts. It does not constitute a binding document and should be adapted to the specific context, priorities, and regulatory requirements of each district while ensuring alignment with national RDI and Vision 2030 objectives.

Developed in: December 2025

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PURPOSE OF INNOVATION DISTRICT BLUEPRINT

1.1 Objective and Scope

The purpose of this blueprint is to provide guidance on the best practices for establishing and operating Innovation Districts. It is not intended to be a comprehensive or definitive answer to all questions related to district development and management. Instead, it functions as an initial framework for stakeholders within the Kingdom—such as established techno valleys, science parks, government agencies, universities, research institutions, private sector partners, and investors—who aim to collaborate on or develop or evolve as Innovation Districts. Even though this blueprint compiles leading global practices, benchmarking insights, and strategic considerations, it should be used as a guide and adapted to the specific context, priorities, and aspirations of each district, while remaining aligned with national innovation and economic diversification goals.

This Blueprint provides structured guidance to support the design, activation, and long-term success of Innovation Districts covering six key focus areas:

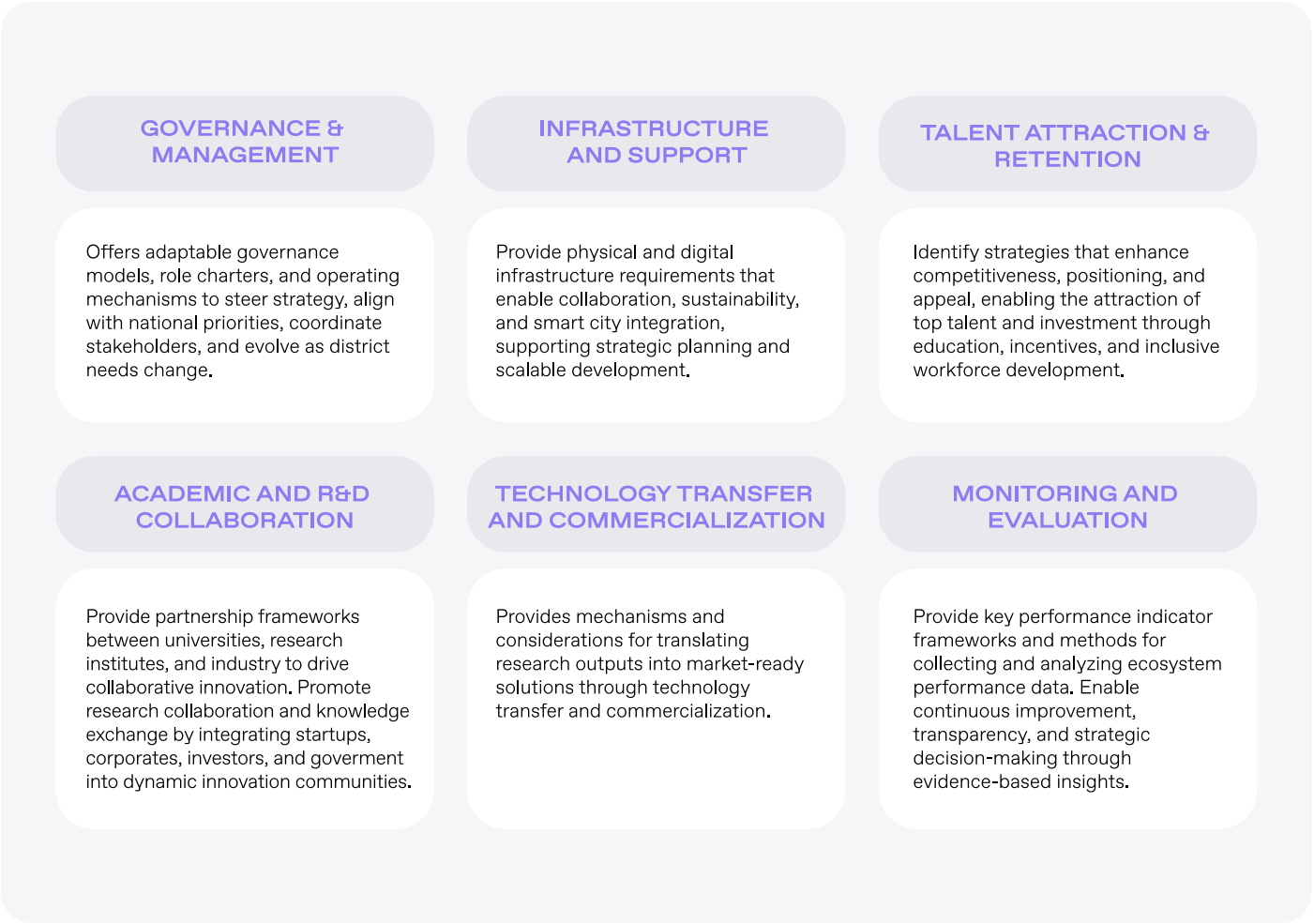
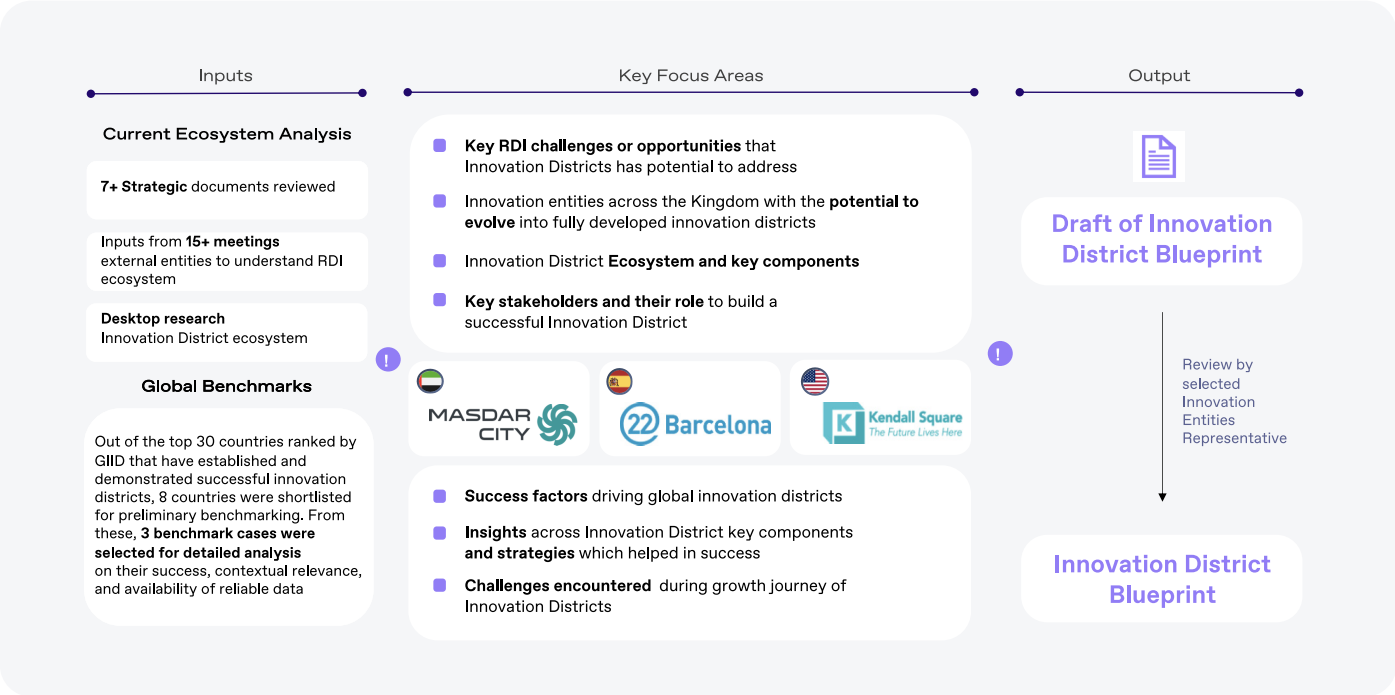


Figure: key focus areas

1.2 Methodology for Blueprint Development

This Blueprint has been developed through a structured, multi-phase approach that began with an assessment of the Kingdom's current innovation ecosystem, followed by an international benchmarking exercise analyzing leading global innovation districts.

Current ecosystem analysis: A comprehensive methodology was employed, combining document analysis, stakeholder engagement, and desktop research. This included a review of strategic documents, along with insights gathered from over 15 meetings with external entities to better understand the



RDI sector. Additionally, desktop research was conducted to analyze local innovation entities. The approach also involved mapping existing innovation entities across the Kingdom, particularly techno valleys and science parks, which serve as foundational pillars for future districts. Techno valleys are integrated ecosystems designed to foster entrepreneurship and support a knowledge-based economy, while science parks are professionally managed organizations that promote innovation and competitiveness among businesses and institutions. These entities reflect Saudi Arabia's commitment to Vision 2030 and its innovation-led growth agenda. Adding to that stakeholder alignment around ecosystem components and their potential impact on Innovation Districts

Global Benchmarking: To complement the ecosystem analysis and inform the strategic development of Innovation Districts in Saudi Arabia, a targeted global benchmarking exercise was conducted. Out of the top 30 countries ranked by the Global Innovation Index Database (GIID), 8 countries were shortlisted for preliminary benchmarking that have successfully established innovation districts. From these, 3 benchmark cases were selected for detailed analysis based on their demonstrated success, contextual relevance, and the availability of reliable data. The selected benchmark cases were: 22@ Barcelona (Spain), Masdar City (UAE), and Kendall Square (United States). The benchmarking process aimed to extract insights and best practices that could be adapted to the Kingdom's unique innovation landscape. Among that evaluating governance models, talent strategies, infrastructure planning, stakeholder engagement, and Technology transfer and Commercialization. These cases provided valuable reference points for designing innovation districts that are globally competitive yet locally grounded, ensuring alignment with Saudi Arabia's Vision 2030 and national innovation priorities.

The findings from the current ecosystem assessment and global benchmarking were synthesized to develop a framework tailored to the Kingdom's context—leveraging international best practices while ensuring local relevance, resilience, and alignment with long-term innovation and economic development goals.

1.3 Target Audience

The Blueprint is designed for a diverse set of stakeholders whose active participation is essential to the success of Innovation Districts. Each plays a distinct role in shaping governance, enabling ecosystems, and ensuring that districts deliver both economic and societal impact.

- **Existing Technology Valley, Science Parks** are foundational innovation entities, these entities can transition into fully developed districts and anchor early ecosystem growth.
- **Policymakers, Regulatory Authorities, and Urban Development Professionals** are responsible for creating the enabling policy, regulatory, and urban planning frameworks that shape district development.
- **Academic Institutions, Research Organizations, and Innovation Leaders** serve as anchors of knowledge creation, talent development, and research collaboration within the district.
- **Private Sector Stakeholders, Investors, and Entrepreneurs** provide capital, market access, and commercialization pathways essential for scaling innovation.
- **Community Leaders and Nonprofits** ensure inclusivity, cultural integration, and alignment of district outcomes with societal needs.

1.4 How to Use this Blueprint

This Blueprint is intended as a practical reference for stakeholders involved in establishing, managing, or evolving Innovation Districts. It should be used to guide strategic planning, align initiatives with national priorities, and adapt the best global practices to local contexts. The document is not prescriptive; rather, it provides models, mechanisms, and considerations that can be tailored to the specific needs of each district, ensuring flexibility, scalability, and long-term sustainability. The suggested steps below demonstrate how the Blueprint can serve as a practical guide across stages and components of innovation district development.

- **Understand the Vision and Alignment:** Begin by reviewing the blueprint alignment with Vision 2030 and the National RDI Strategy to ensure your planning supports national transformation goals.
- **Identify Your Role:** Refer in context of how the blueprint applies to your role—whether you're an innovation leader, policymaker, academic, investor, or community leader.
- **Explore the Six Focus Areas:** Navigate through the six key focus areas—Governance, Infrastructure, Talent, Collaboration, Technology Transfer, and Evaluation—to understand the foundational elements of innovation district development.
- **Apply Purpose Statements as Strategic Anchors:** Use the purpose statements under each focus area to guide your strategic planning, ensuring your initiatives are aligned with the blueprint's intent.
- **Adapt Frameworks to Local Contexts:** Customize the practices, and recommendations to fit the specific needs, scale, and maturity of your innovation district or project.
- **Integrate with Existing Policies and Plans:** Align blueprint recommendations with existing urban development plans, regulatory frameworks, and sectoral strategies to ensure coherence and synergy.
- **Engage Stakeholders Collaboratively:** Use the blueprint as a resource to support discussion and coordination among stakeholders, encouraging shared involvement and cross-sector engagement.
- **Monitor Progress and Iterate:** Leverage the Monitoring and Evaluation section to define KPIs, track performance, and refine strategies based on data and feedback.

02

INTRODUCTION TO INNOVATION DISTRICTS

2.1 What are Innovation Districts?

At the outset, it is important to establish a common definition of what constitutes an Innovation District. The definition of Innovation Districts presented in this blueprint is a synthesized interpretation based on foundational work from globally recognized entities. It draws from the Brookings Institution[1], which emphasizes clustering of anchor institutions and startups in compact, transit-accessible environments; the World Bank[2], which highlights open innovation ecosystems fostering inclusive and sustainable growth; the MIT Innovation Initiative[3], which focuses on curated ecosystems integrating talent, technology, and capital; and the Global Institute on Innovation Districts[4], which underscores the role of proximity, digital connectivity, and intentional governance in enabling equitable innovation. These references collectively inform the comprehensive understanding adopted here.

Further, it draws upon local significance by referencing the definition of Technology Districts as outlined in the National Industrial Development and Logistics Program (NIDLP) National Technology Clusters Strategy which envisions forming an advanced and stimulating ecosystem that encourages innovation and entrepreneurship, supports technology localization, and enhances the Kingdom's global competitiveness in priority sectors. This alignment ensures that the Innovation Districts in Saudi Arabia not only reflect global best practices but are firmly grounded in national priorities and economic transformation goals.

> A **geographically defined, mixed-use urban area** that **brings together research institutions, startups, investors, and public entities** in an accessible, **digitally enabled environment.** It **fosters collaboration, accelerates commercialization, and drives inclusive economic** development through **shared infrastructure and integrated governance** to foster collaboration among researchers, entrepreneurs, investors, public and private sector entities.

Innovation Districts are defined by a common set of characteristics that distinguish them from traditional urban development or economic clusters. These characteristics reflect how districts integrate physical, digital, and institutional elements to create ecosystems that enable collaboration, commercialization, and long-term economic growth:

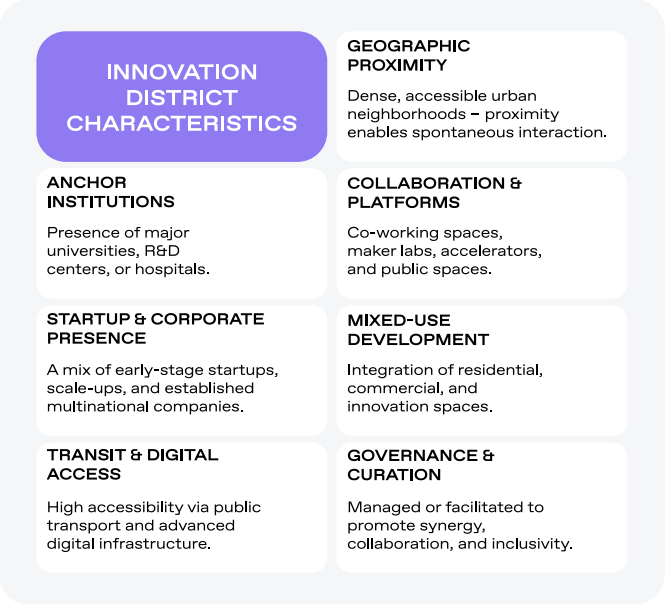


Figure: Innovation District characteristics

- **Geographic Proximity:** Innovation thrives in environments where institutions, businesses, and amenities are located within dense, accessible urban neighborhoods. This physical closeness enables spontaneous interactions, accelerates collaboration, and enhances access to talent, shared infrastructure, and resources—creating a vibrant ecosystem where ideas flow naturally.
- **Collaboration Platforms:** Shared environments such as co-working spaces, maker labs, accelerators, and public venues serve as the physical and cultural backbone of innovation districts. These platforms facilitate cross-sector engagement, support entrepreneurial experimentation, and foster a sense of community and openness essential for innovation.
- **Mixed-Use Development:** By integrating residential, commercial, and innovation spaces, districts promote a live-work-play dynamic that sustains continuous interaction among diverse stakeholders. This blend enhances urban vibrancy, improves accessibility, and supports the daily rhythms of innovators, making the district a destination rather than just a workplace.
- **Anchor Institutions:** Universities, along with R&D centers and teaching hospitals, serve as the core anchors of innovation districts in the Kingdom. Their academic and research excellence establishes the foundation for sustained innovation, talent development, and knowledge creation. In the Kingdom context, universities are not only centers of learning but are evolving into innovation leaders—driving applied research, fostering startups, and enabling technology transfer.

- **Startup & Corporate Presence:** A healthy mix of startups, scale-ups, and multinational corporations creates a dynamic ecosystem where innovation is accelerated through mentorship, investment, and market access. This diversity ensures that ideas can move from concept to commercialization within the district itself.
- **Transit & Digital Access:** Efficient public transportation and robust digital infrastructure are essential for enabling mobility, inclusivity, and seamless collaboration. These systems ensure that innovators can connect physically and virtually, supporting both local engagement and global reach.
- **Governance & Curation:** Effective governance ensures that the district evolves with strategic coherence and shared ownership. Inclusive decision-making and curated programming foster synergy across stakeholders, maintain transparency, and ensure that the district remains aligned with its innovation mission.

2.2 Why are Innovation Districts important?

Innovation districts play a pivotal role in shaping the future of cities, economies, and societies. They are not merely clusters of buildings or institutions, they are strategic ecosystems designed to accelerate innovation, foster inclusive growth, and position regions as competitive players in the global knowledge economy. Their importance lies in their ability to integrate economic, technological, social, and urban development into a unified framework that delivers long-term impact.

To understand their multifaceted value, it is essential to explore the core impact areas where Innovation Districts deliver strategic outcomes. The following dimensions highlight why they are central to national transformation and global competitiveness:

- **Catalyze Economic Diversification and Job Creation:** Drive transformation by nurturing emerging sectors like biotech, clean energy, and digital tech, while creating high-value jobs across the innovation value chain.

  Benchmark Insights, *the 22@ Barcelona – Spain initiative transformed a declining industrial area into a thriving innovation district. Today, it hosts over 93,000 workers and has generated more than 150,000 jobs, with a significant share in knowledge-intensive services such as ICT, media, and biotech. This shift has successfully diversified Barcelona's economy, reducing its reliance on tourism and traditional manufacturing, and proving how strategic urban innovation can catalyze economic transformation and job creation.*

- **Accelerate Innovation and Research Commercialization:** Connect academia, startups, and industry to speed up knowledge exchange, prototyping, and market-ready innovation through shared infrastructure and support systems.

  Benchmark Insights, Kendall Square - USA has evolved into one of the world's most innovative ecosystems, largely due to the synergistic partnerships between MIT, Harvard, and industry leaders. These collaborations span education, health sciences, and biomedical research, and are supported by shared labs, incubators, and venture networks. The result is a dense concentration of startups and R&D hubs, with rapid commercialization of academic research into market-ready solutions. This transformation demonstrates how strategic connectivity between academia and industry can accelerate innovation and deliver tangible economic and societal impact.

- **Attract Global Talent, Investment, and Partnerships:** Offer vibrant, collaborative environments that draw researchers, entrepreneurs, and investors, while linking local ecosystems to global innovation networks.

  Benchmark Insights, Masdar City – UAE has positioned itself as a global hub for sustainability and innovation. Through the Masdar City Free Zone, it offers attractive incentives and infrastructure for companies in tech, R&D, and clean energy, resulting in the creation of highly skilled roles and fostering local talent development. The city hosts international firms, research institutions, and startups, creating a collaborative ecosystem that connects local capabilities with global innovation networks. This demonstrates how strategic investment in innovation infrastructure can successfully attract global talent and partnerships, while boosting national competitiveness.

- **Foster Entrepreneurship and Emerging Industries:** Provide access to mentorship, funding, and technical expertise, enabling startups to grow and scale within a supportive, resource-rich ecosystem.

  Benchmark Insights, as part of the broader 22@ Barcelona – Spain innovation district, the 22@ Emprendedores initiative was launched to support entrepreneurs and startups through tailored programs offering mentorship, funding access, co-working spaces, and technical support. This initiative has helped build a thriving startup ecosystem, attracting both local and international founders and enabling many ventures to scale successfully. The results demonstrate how targeted support mechanisms can effectively foster entrepreneurship and stimulate the growth of emerging industries.

- **Enhance Urban Regeneration and Livability:** Revitalize underused urban areas into dynamic, mixed-use communities that integrate work, living, and leisure, improving sustainability and quality of life.

  Benchmark Insights, Masdar City – UAE exemplifies innovation-driven urban regeneration by transforming a desert zone into a sustainable, mixed-use community. It integrates smart technologies and green infrastructure, including autonomous mobility systems, energy-efficient buildings like

the Multi Comfort House by Saint-Gobain, and IoT-enabled monitoring for energy, water, and air quality. These features make Masdar City a living laboratory for future-ready urban solutions, demonstrating how strategic planning and innovation can enhance livability, sustainability, and urban resilience

Further, in the Kingdom, Innovation Districts have the potential to serve as strategic enablers of Vision 2030, contributing to the advancement of multiple national priorities and sectors. For example;

- **Technology Localization and Industrial Diversification:** Innovation Districts can directly advance Saudi Arabia's technology sector goals, by acting as catalytic platforms for research, commercialization, and talent development.
- **Digital Economy & AI Leadership:** Innovation Districts can potentially provide the ideal environment for AI startups, data science labs, and cybersecurity ventures to thrive—advancing digital transformation and positioning the Kingdom as a global tech hub.
- **Healthcare Innovation:** By hosting biotech incubators, digital health startups, and telemedicine platforms, Innovation Districts support the development and deployment of cutting-edge healthcare solutions that improve access and outcomes.
- **Clean Energy & Sustainability:** These districts can cluster clean energy innovators, R&D centers, and pilot projects in renewables, hydrogen, and carbon captured driving the energy transition and supporting climate goals.
- **Education & Talent Development:** Innovation Districts offer hands-on learning, research opportunities, and entrepreneurship training, strengthening STEM education and preparing a future-ready workforce.
- **Industrial Localization & Advanced Manufacturing:** By co-locating advanced manufacturing firms, Industry 4.0 technologies, and supply chain innovators, districts support localization and boost industrial competitiveness.
- **Environmental Resilience:** Innovation Districts can serve as testbeds for cleantech startups and environmental research, contributing to biodiversity protection, sustainable resource use, and ecological restoration.
- **Cross-Sector Integration & Global Competitiveness:** These districts foster collaboration across sectors—such as smart cities and digital health—while attracting global partners, investors, and talent.
- **Quality of Life & Social Impact:** Through integrated planning, Innovation Districts enhance urban vibrancy with cultural venues, community hubs, and public spaces—improving livability and global city rankings.

2.3 Key Building Blocks of an Innovation District Ecosystem

The success of an Innovation District depends on a well-coordinated ecosystem composed of interdependent building blocks. Each component—spanning governance, infrastructure, talent, research, and innovation—plays a vital role in shaping the district's performance and long-term impact. The following outlines these key ecosystem components and their potential contribution to Innovation District development.

- **Human Capital and Skills Development:** Focuses on building a skilled workforce capable of advancing RDI activities. It involves education, training, and continuous professional development in science, technology,

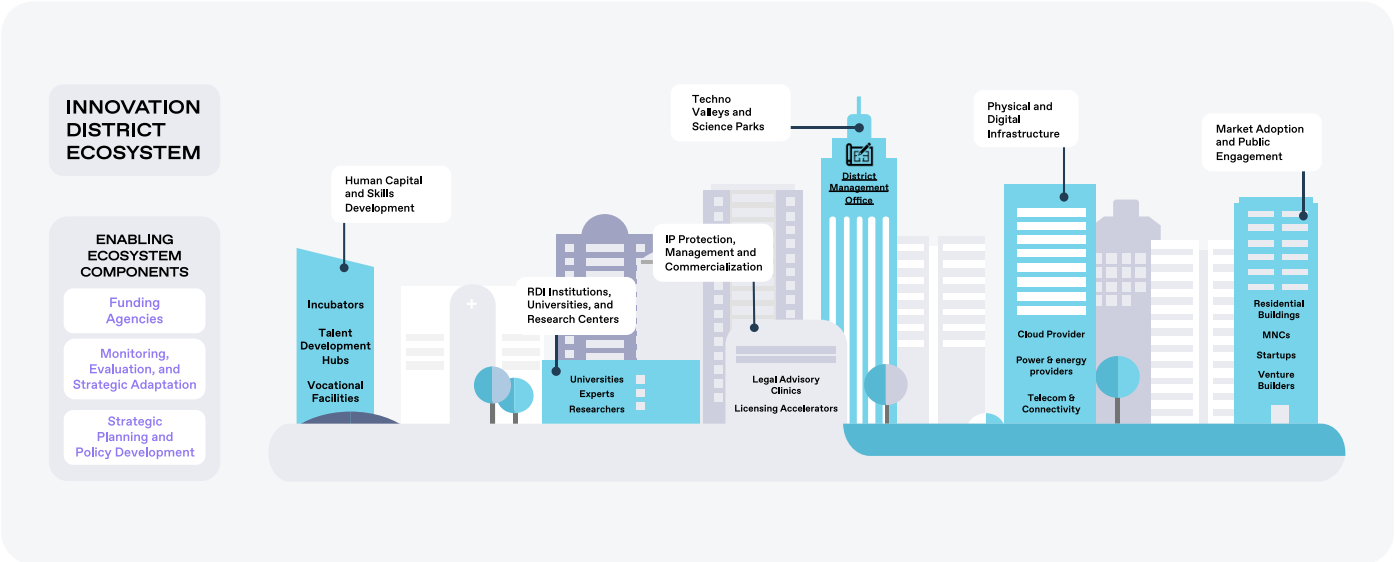


Figure: Innovation District Ecosystem

engineering, and innovation fields, to ensure a continuous pipeline of skilled talent for district ecosystems. By linking education, training, and professional development to district needs, districts become magnets for talent and engines of workforce competitiveness.

- **RDI Institutions, Universities, and Research Centers:** Serve as the backbone of the RDI ecosystem by generating new knowledge, conducting research, and providing the facilities, expertise, and resources needed to develop and refine technologies. They bring together academia, industry, and government to align priorities and drive innovation, to Act as anchor tenants and the technological backbone of districts, fueling knowledge creation, talent development, and collaborative projects. Their co-location and partnerships accelerate technology maturation, commercialization, and competitiveness of innovation districts.

- **IP Protection, Management and Commercialization:** Protecting intellectual property (IP), managing IP portfolios, and facilitating the commercialization of innovations are essential to ensuring that inventors and organizations can secure and benefit from their research outcomes, to Strengthens the commercialization pipeline within districts by ensuring innovators can secure and benefit from their IP. Encourages entrepreneurship, investment, and startup growth by protecting assets and making knowledge market ready.

- **Physical and Digital Infrastructure:** Provide the physical and digital backbone of innovation districts by ensuring access to state-of-the-art facilities, connectivity, and urban amenities. Infrastructure includes labs, incubators, co-working spaces, transportation systems, utilities, and digital networks that enable collaboration, experimentation, and scaling of innovations, to Enable seamless interaction among stakeholders by reducing logistical and operational barriers. Well-designed infrastructure attracts companies, investors, and talent by offering a conducive environment for research, development, and commercialization. It accelerates the formation of clusters, enhances livability, and ensures that innovation districts remain competitive, sustainable, and future-ready.

- **Market Adoption and Public Engagement:** Ensures that innovations reach the market and are adopted by consumers and industry. It involves marketing, public awareness campaigns, and engaging with stakeholders to promote new technologies. It facilitates the translation of innovation into real-world use by connecting technology developers with consumers, businesses, and policymakers. Venture builders within innovation districts play a critical role in this process by transforming validated innovations into scalable ventures, providing entrepreneurs and researchers with structured pathways to commercialization through mentorship, operational support, and access to funding and pilot opportunities. Districts act as living labs where solutions can be tested, demonstrated, and scaled, bridging the gap between R&D outcomes and widespread market adoption through trust-building, validation, and collaboration.

- **Techno Valleys and Science Parks:** Serve as hubs that bring together research institutions, universities, startups, and industries to foster innovation, technology transfer, and commercialization. They provide the physical and institutional infrastructure needed for collaboration, incubation, and scaling of new technologies. Techno Valleys and Science Parks act as catalysts for regional innovation by concentrating talent, research, and businesses in one location. With their advanced infrastructure, networking opportunities, and support services, they not only drive competitiveness and attract investment but also hold the potential to evolve into full-fledged Innovation Districts that accelerate economic diversification. Depending on the governance and strategic framework, they can operate as integral components of the Innovation District Office (IDO) or, in certain contexts, constitute the IDO themselves when they encompass the full innovation ecosystem and governance structure.

- **Funding:** Provide the necessary financial resources to support research and innovation. They allocate grants, loans, and investments to institutions, startups, and projects that align with national RDI priorities. To provide critical capital to fuel district activity, from early-stage research to scale-ups. Funding directed through districts ensures financial sustainability of startups, accelerates proof-of-concept development, and supports high-risk/high-reward innovation.

- **Monitoring, Evaluation, and Strategic Adaptation:** Tracking the performance and impact of deployed innovations through continuous monitoring, outcome evaluation, and strategic adjustments to ensure successful implementation and scaling, to equip districts with performance measurement frameworks and feedback loops. Enables district leaders to monitor outcomes in real time, benchmark globally, and adapt strategies dynamically to maximize economic and innovation impact.

- **Strategic Planning and Policy Development:** The strategic direction for national RDI activities by creating policies, frameworks, and guidelines that govern and guide the ecosystem. It ensures alignment with Vision 2030 and defines priority areas for investment and research focus, providing districts with national strategic direction and alignment to Vision 2030 priorities. Helps districts identify focus sectors, prioritize investments, and create tailored innovation agendas that avoid duplication and reinforce national goals.

By aligning these components with the Kingdom's ongoing initiatives, the foundation is set for Innovation Districts that leverage national priorities and resources while advancing resilience and global competitiveness. This alignment provides the coherence and momentum necessary to ensure districts deliver on their intended purpose—catalyzing innovation-led growth. Realizing the full potential of this ecosystem also requires enabling policy support including regulatory flexibility, targeted incentives, and coordinated national frameworks, to create the conducive environment necessary for sustainable innovation district growth.

At the same time, it is critical to safeguard against the risk of districts drifting into generic business parks. Innovation intensity must remain a defining feature. Studied benchmarks show that **successful districts sustain at least 30–40% of activities in knowledge- and innovation-intensive sectors** such as R&D institutions, startups, scale-ups, and anchor corporates. To achieve this, districts should adopt clear targets for the share of innovation-focused organizations among tenants and embed supportive zoning and incentive policies that prioritize innovation-led uses, underpinned by enabling national and local policy frameworks that create the regulatory and institutional conditions for these ecosystems to thrive.

2.4 Innovation District Growth Stages

Building on insights from the National Technology Clusters Strategy (NTCS), innovation districts can be viewed along a continuum of growth, reflecting their ecosystem strength, institutional depth, and economic impact. This framework recognizes that districts evolve at different speeds, requiring tailored support and interventions aligned with their stage of development.

Mature districts represent globally recognized innovation environments with fully developed and integrated ecosystems. They exhibit a strong concentration of high-value tenants, including leading corporations, top research institutions, and a dense network of startups and investors. Core activation enablers such as talent, regulatory readiness, digital and physical infrastructure, and overall livability operate at an advanced level, often supported by specialized incentives. Their outputs reflect strong commercialization activity, robust job creation, and consistent knowledge generation.

Emerging districts demonstrate meaningful progress toward maturity but have not yet achieved the ecosystem depth of mature districts. They typically host a growing base of companies and startups, with increasing engagement from global accelerators and investors, although R&D intensity remains moderate. Enablers are improving, supported by sector-specific regulations, skills development programs, and emerging specialized infrastructure yet social and community infrastructure may still be evolving. Outputs show positive momentum, though they have not reached world-class levels.

Nascent districts remain at an early stage of development, often with limited ecosystem density and modest economic impact. Tenancy is typically small in scale, with few startups, minimal investor presence, and low levels of R&D activity. Foundational enablers such as digital infrastructure, talent access, and ecosystem support mechanisms are often underdeveloped. Incentives tend to focus on basic attraction rather than innovation-led growth, and outputs remain limited.

This framework provides a practical lens for guiding strategic interventions, enabling policymakers and ecosystem actors to direct resources, capacity-building efforts, and incentives according to each district's stage of evolution, ensuring a cohesive and scalable national innovation landscape. The framework also aligns with the Kingdom's broader aspiration to cultivate a world-class innovation landscape, targeting the advancement of at least five districts to a mature, globally competitive level by 2030. This shared ambition underscores a national commitment to nurturing innovation-driven growth and positioning the Kingdom as a leading hub for technology, research, and knowledge-based industries.

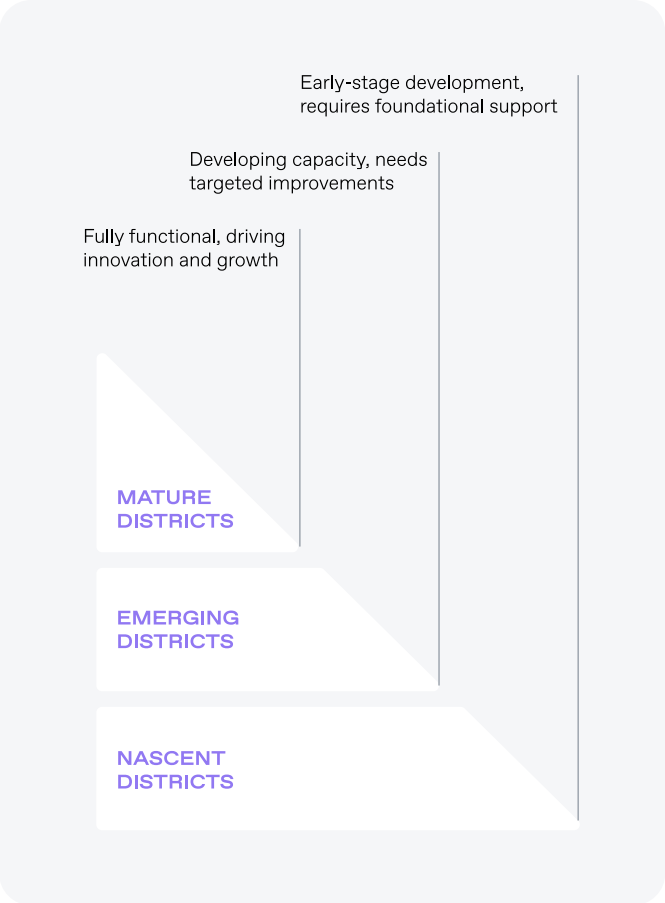


Figure: Districts Maturity Levels

03
INNOVATION DISTRICT STRATEGIC DIRECTION

The strategic purpose of an Innovation District is **to act as a national platform that drives socio-economic transformation through innovation, collaboration, and knowledge exchange.** It goes beyond real estate or commercial development, functioning as a mission-oriented ecosystem that creates sustained public value.

To achieve this purpose, Innovation Districts must be grounded in foundational principles that combine global best practices with the Kingdom's local context and long-term aspirations.

Figure: Principles for Innovation Districts

- **Collaborative Leadership and Adaptive Governance:** Establish inclusive governance models that unite public agencies, private enterprises, academia, and civic organizations under a shared innovation agenda. Ensure clarity in roles, responsibilities, funding mechanisms, and regulatory frameworks to enable agile decision-making and strategic alignment.
- **Smart, Sustainable, and Inclusive Infrastructure:** Design physical and digital infrastructure guided by ESG principles, ensuring environmental responsibility, social inclusivity, and governance transparency. Leverage smart technologies (e.g. IoT, AI, data platforms) to enable efficient service delivery and seamless connectivity.
- **Vibrant Ecosystem for Global Talent:** Create an environment that attracts and retains top talent through inclusive programming, career development opportunities, and spaces that foster creativity and collaboration. Support affordability and accessibility to ensure diverse participation across all demographics.
- **Branding, Marketing, and Global Engagement:** Strengthen the district's global identity through coordinated branding, investor-facing communication, and international outreach. Position the district as a globally competitive innovation hub to attract partners, companies, talent, and sustained global collaboration.
- **Integrated Knowledge Ecosystem:** Promote deep collaboration between universities, research institutions, and industry to drive open innovation, knowledge exchange, and co-creation. Enable mission-driven research that addresses national and global challenges.
- **Commercialization and Entrepreneurial Activation:** Support the full innovation lifecycle from research to market through incubators, accelerators, mentorship networks, and technology transfer mechanisms. Foster a culture of entrepreneurship and experimentation.
- **Impact-Driven Performance Management:** Implement robust metrics and dashboards to monitor economic, social, and environmental outcomes. Use data-driven insights to guide continuous improvement, ensure accountability, and demonstrate the district's value to stakeholders.

04

GOVERNANCE AND MANAGEMENT OF INNOVATION DISTRICT

4.1 Governance for Innovation Districts

The governance of an Innovation District requires a multi-layered structure that ensures strategic oversight, effective operations, and inclusive stakeholder participation. A strong governance model ensures that the district remains aligned with national priorities, while also responding to the needs of local stakeholders. The composition of governance can be typically structured across four levels, each serving a distinct purpose. Each governance level requires a tailored composition of stakeholders and experts to fulfill its mandate effectively.

Note: *When designing governance, it is essential to* ***consider existing governance within the districts.*** *The proposed framework should be used as a* ***reference*** *point to enhance the current situation, build established relationships, and avoid duplication.*

- **Lead Governance body:** Provides strategic leadership for the district. It sets the overall mandate and ensures that district activities remain aligned with broader national research, development, and innovation goals while maintaining strong alignment with market needs and economic opportunities. Without this level, districts risk fragmentation and loss of direction. The key functions include:

- Define the district's strategic mandate and approve its long-term roadmap.
- Oversee district compliance with regulatory, sustainability, and innovation frameworks.
- Ensure balanced allocation of resources across infrastructure, talent, and innovation programs.
- Monitor performance and report outcomes to higher-level authorities.
- Resolve major conflicts of interest between stakeholders.

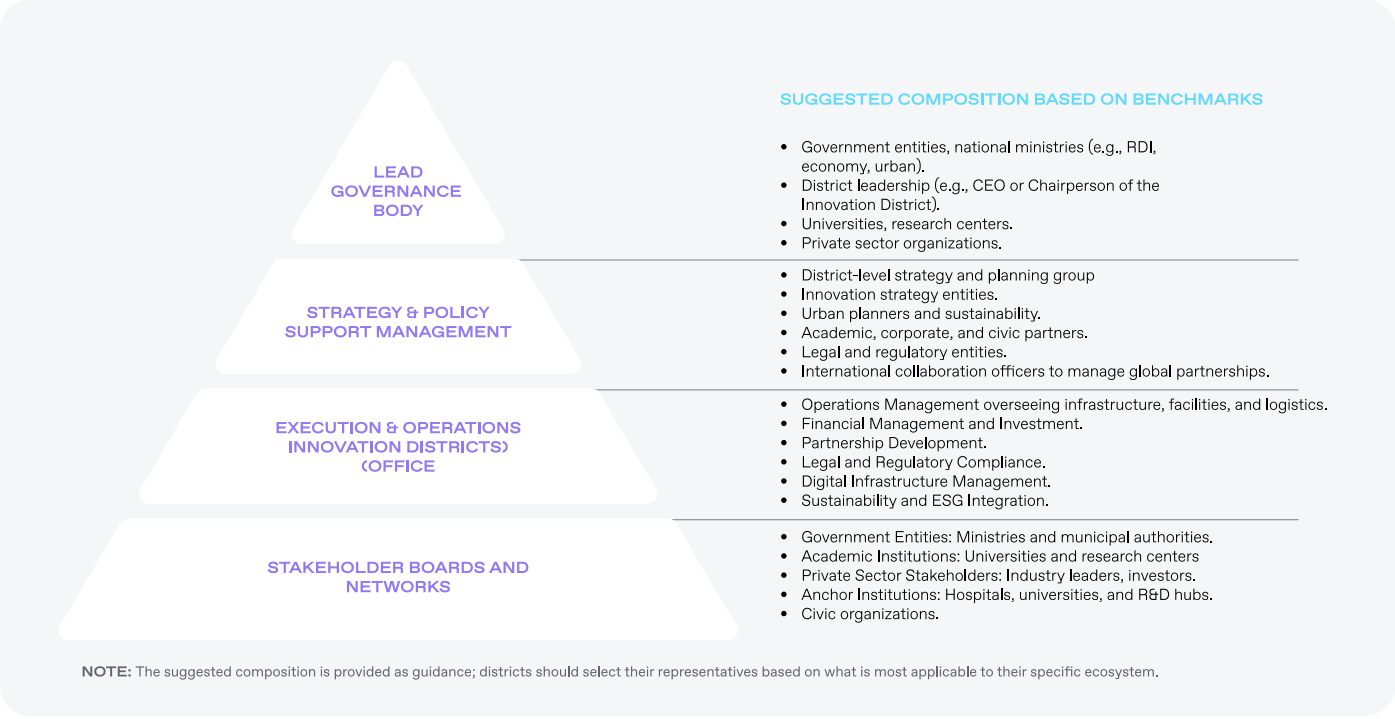


Figure: Suggested composition of Innovation District governance

- **Strategy & Policy Management:** Translates national priorities into frameworks that guide the growth and operations of innovation districts. It ensures coherence across districts and supports integration with wider urban and economic strategies. Key roles include:
  - Develop sectoral strategies and clustering priorities based on district strengths.
  - Design incentive schemes to attract startups, corporates, and investors.
  - Set policies for sustainability, digital integration, and community inclusivity.
  - Ensure integration of the district with wider city planning and economic strategies.
  - Establish partnerships for research collaboration and international engagement.

- **Execution & Operations Innovation Districts Office:** The operational arm responsible for implementing strategic plans and managing day-to-day activities. Key roles include:
  - Operate as a one-stop shop for permitting, licensing, and investor support.
  - Manage real estate, facilities, and shared services within the district.
  - Coordinate startup incubation, acceleration, and cluster development programs.
  - Oversee digital platforms, smart infrastructure, and ensuring alignment within applicable export control and ITAR compliance frameworks.
  - Track and report performance indicators to the Lead Governance Body.

- **Stakeholder Boards and Networks:** These boards bring together ecosystem stakeholders to ensure inclusivity, co-creation, and collaborative growth. They provide a structured mechanism for continuous feedback and ecosystem alignment. However, the nature of stakeholder relationships within these boards can vary—ranging from formal agreements and licensing arrangements to more organic, trust-based collaborations. Recognizing and adapting to these different governance models is essential for effective coordination. Key roles include:
  - Support the development of industry clusters and sector-specific working groups.
  - Foster community engagement and integration of cultural and social initiatives.
  - Promote international linkages through partnerships and exchanges.
  - Advice on emerging trends, talent requirements, and innovation opportunities.

4.2 District Management Team Roles & Responsibilities

Innovation District Offices* commonly adopt a functional organizational structure, which organizes operations around well-defined skill domains. Employees are grouped based on their core capabilities such as strategic planning, program design, stakeholder engagement, and operational support. This helps districts manage activities in a well-organized manner, ensuring visibility, accountability, and responsiveness to evolving needs. There are several important elements to consider for a successful Innovation District Office, including:

- **Leadership:** Strong leadership is essential to guide strategy, build partnerships, and align district goals with national innovation agendas. Leaders should possess skills in systems thinking, policy alignment, and ecosystem orchestration. Their ability to empower teams and adapt to change is critical for long-term success.

- **Team Size:** District team size depends on factors such as the number of active programs, stakeholder diversity, and strategic focus areas. A skill-based sizing approach ensures the right mix of capabilities rather than just headcount.

- **Roles and Responsibilities:** A dedicated team with clearly defined skill sets promotes efficiency and agility. Key capabilities include strategic foresight, program execution, stakeholder management, Governance and Regulatory, and operational excellence. Employees must understand their roles to navigate complex innovation ecosystems and deliver measurable outcomes.

Innovation District Offices typically adopt a functional structure organized around two core domains: Leadership & Strategy and Operations & Partnerships. These domains reflect the key responsibilities required to guide, implement, and sustain district activities:

The **Leadership & Strategy** roles focus on setting the strategic direction of the district, building partnerships, and ensuring alignment with national and regional priorities.

- **District Head:** Provides overall leadership and strategic oversight. Responsible for aligning the district's vision with national innovation goals, managing stakeholder relationships, and ensuring performance against key metrics.

- **Strategy & Policy:** Develops long-term strategic plans, monitors policy trends, and ensures the district's initiatives are aligned with national RDI strategies and economic development frameworks and also manage coordination with regulatory bodies.

* While the term "Innovation District Office" (IDO) is used for consistency, the focus is on the function rather than the name. Existing entities such as techno-valleys, science parks, or research hubs in the Kingdom can evolve to perform the IDO role as they scale, expanding their scope from infrastructure and research management to comprehensive innovation district operations.

- **Innovation Program:** Oversees the design and implementation of innovation programs, including incubators, accelerators, and research initiatives. Supports technology transfer, commercialization of research, and investment attraction—ensuring alignment with priority sectors and enabling scalable innovation.
- **Stakeholder Engagement:** Cultivates a high-impact stakeholder ecosystem by aligning academic institutions, industry leaders, investors, and community organizations around shared innovation and inclusion goals. Builds enduring partnerships that foster trust, accelerate knowledge exchange, and unlock collaborative value. Champions inclusive engagement models that ensure diverse voices shape decision-making, drive co-creation, and strengthen long-term ecosystem resilience

The **Operations and Monitoring** roles focus on the execution of programs, infrastructure management, financial sustainability, and ecosystem coordination. Possessing the right human capabilities is essential for Innovation Districts and can serve as a key differentiator. These roles require a diverse set of capabilities, including but not limited to:

- **Operations Management:** Responsible for running daily district operations, including facilities, logistics, and service delivery. This requires strong skills in vendor coordination, regulatory compliance, and operational risk management to ensure efficiency and reliability.
- **Tenant Management:** Overseeing tenant relations and ensuring the smooth operation of a property from a tenants perspective, encompassing tasks like finding and screening tenants, managing lease agreements, handling rent collection, addressing maintenance requests, and facilitating move-in/move-out processes to foster tenant satisfaction and retention.
- **Financial Management and Investment:** Manages district budgeting, financial planning, and investment attraction. Requires proficiency in structuring PPPs, leveraging grants, and designing sustainable revenue models, along with analytical skills to track and report on financial performance.
- **Partnership Development:** Executing partnership strategies and driving joint initiatives across local and international ecosystems. Leverages relationship-building and negotiation skills to activate innovation networks, foster collaboration, and deliver measurable impact.
- **Legal and Regulatory Compliance:** Ensures that district activities meet national laws, zoning rules, IP frameworks, and data policies. Requires strong legal knowledge, contract management skills, and the ability to identify and mitigate risks.
- **Sustainability and ESG Integration:** Embeds environmental and social goals into planning and operations. Demands expertise in ESG reporting, green infrastructure, and climate resilience, as well as skills to monitor sustainability performance and engage partners in long-term goals.
- **Digital Infrastructure Management:** Oversees deployment and maintenance of smart systems, data platforms, and digital services. Requires technical proficiency in IoT, 5G, and digital twins, along with cybersecurity expertise and the ability to ensure interoperability.
- **Placemaking and Real Estate Development:** Leads development of real estate projects and public spaces to create a vibrant, mixed-use district. Requires skills in urban design, project management, and coordination with planners and developers to align with innovation-friendly design principles.
- **Marketing and Communications:** Promotes the district to attract companies, talent, and investment. Requires expertise in branding, PR, and storytelling, combined with stakeholder communication skills to position the district globally.
- **Community Engagement and Inclusion:** Connects residents and local communities with district opportunities. Requires outreach skills, program design for workforce and education, and the ability to build trust and ensure inclusive growth.
- **Data and Impact Analysis:** Tracks and reports district performance across economic, social, and sustainability outcomes. Requires analytical skills, KPI design expertise, and the ability to turn data into insights that guide strategy and secure funding.
- **Monitoring and Evaluation:** Ensures that innovation district initiatives are progressing effectively by tracking key performance indicators (KPIs) aligned with strategic goals. They collect and analyze data to assess program impact, identify areas for improvement, and optimize resource allocation. Through regular reporting and stakeholder engagement, M&E supports informed decision-making and continuous enhancement of innovation outcomes.

4.3 Regulatory Considerations for Sustainable Innovation Ecosystems

Considering global practices, there are several key regulatory considerations that shape the successful establishment and operation of Innovation Districts. The following also highlights some of the principal related entities in the Kingdom that play a direct role in planning, governance, and compliance.

Districts should, however, conduct their own due diligence on detailed processes and any sector-specific compliance requirements. In addition, there is a need to establish a framework that guides these regulatory considerations, aligned with the maturity stage across districts. Compliance protocols should be structured as tiered mechanisms that evolve as entities mature, allowing early-stage innovators the flexibility to experiment while progressively aligning with higher regulatory standards. Over-regulation in early-stages, without corresponding facilitation or support mechanisms, can create barriers to innovation and slow ecosystem growth.

1. **Urban Planning, Zoning & Land Use:** Innovation Districts rely on compact, mixed-use environments that integrate research spaces, housing, business facilities, and public amenities. Proper planning ensures that growth is sustainable, density is managed, and districts remain livable and attractive to talent. Key related entities (non-exhaustive):

    - **MOMAH (Ministry of Municipalities and Housing):** Districts can secure licenses and permits for construction and land use. MOMAH sets urban planning codes, approves zoning changes, and enforces density and sustainability guidelines.
    - **Local Municipalities / City Councils:** Districts must obtain building permits and approvals for adaptive re-use of industrial or heritage buildings. Municipalities oversee compliance with local development regulations and allocation of public spaces.
    - **Development Authorities / Economic Zone Commissions:** Districts require masterplan approval when located within their jurisdictions. These entities regulate land allocation, oversee re-development projects, and ensure alignment with regional development priorities.
    - **MODON (Saudi Authority for Industrial Cities and Technology Zones):** Districts can obtain operational and land use licenses to activate infrastructure and tenant activities. Modon regulates industrial zoning, issues permits for construction and facility setup and ensures compliance with national development standards and service access requirements.

Selected Global Insights for Regulatory Approaches (non-exhaustive):

- Flexible zoning policies enable innovation districts to evolve organically by accommodating mixed-use development that blends research facilities, housing, commercial spaces, and public amenities. This adaptability fosters dynamic environments where startups, academia, and corporates can co-locate and collaborate. By reducing rigid land-use constraints, districts can respond more effectively to emerging needs and attract diverse stakeholders.

  Benchmark Insights "Masdar City (UAE) integrated live-work-play model is the outcome of flexible zoning policies. Through the integration of housing, office space, retail, and public amenities.

- Create regulatory sandboxes within designated areas, allowing for experimentation with new planning models, technologies, and business formats. These zones empower districts to pilot unconventional approaches without disrupting broader urban frameworks. They encourage agility, attract forward-thinking investors, and position the district as a testbed for scalable innovation.

  Global example In Illinois, USA, the Commerce Commission implemented a sandbox for utilities to experiment with renewables, EVs, and digital tools.

- Land contribution schemes incentivize developers and stakeholders to allocate portions of land for public amenities such as parks, cultural spaces, and mobility infrastructure. These contributions enhance livability, promote social inclusion, and strengthen the district's appeal to talent and residents. Strategically planned public spaces also support community engagement and long-term sustainability.

  Benchmark Insights "Kendall Square (USA) Land contribution schemes incentivize developers and stakeholders to allocate portions of land for public amenities such as parks, cultural spaces, and mobility infrastructure.

- Accelerated approval for strategic innovation and sustainability projects reduce bureaucratic delays and signal government commitment to innovation-led growth. Fast-track mechanisms enable quicker deployment of critical infrastructure, attract high-impact investments, and support time-sensitive initiatives. This responsiveness enhances competitiveness and reinforces the district's reputation as a catalyst for transformation.

  Global example The U.S. Food and Drug Administration (FDA) uses a Fast-Track Designation to expedite the review of drugs that address serious conditions and unmet needs. This model is often cited as a benchmark for how fast-track systems can support innovation.

2. **Intellectual Property & Technology Transfer:** Districts thrive when research outputs can be protected and commercialized. Strong IP and tech transfer frameworks provide credibility to international partners, encourage R&D investment, and enable startups to scale globally. Key related entities (non-exhaustive):

- **SAIP (Saudi Authority for Intellectual Property):** Districts must register patents, trademarks, copyrights, and industrial designs with SAIP. The authority enforces IP protection and provides legal frameworks for commercialization.
- **Technology Transfer Offices:** Districts can establish and maintain Technology Transfer Offices (TTOs) that operate in compliance with national IP regulations and commercialization standards, ensuring effective legal protection, licensing, and spinout creation.
- **RDI (Research Development and Innovation Authority):** Provides the regulatory framework, funding mechanisms, and enabling policies that govern technology transfer and commercialization. RDI also supports the establishment and operation of TTOs, ensuring alignment with national innovation priorities and legal standards.

Selected Global Insights for Regulatory Approaches (non-exhaustive): Drawing from global innovation districts, successful IP and technology transfer Commercialization ecosystems are supported by:

- Innovation districts establish dedicated Technology Transfer Offices (TTO) or commercialization arms to manage intellectual property, support spinouts, and attract venture capital. These entities streamline the path from research to market, helping innovators navigate IP protection, licensing, and startup formation while building investor confidence.
- Districts can implement fast-track approval pathways for IP registration and licensing, enabling startups and research institutions to protect and commercialize innovations more efficiently. These mechanisms reduce administrative delays and signal strong government support for innovation-led growth.
- Governments can establish innovation overlay zones that act as regulatory sandboxes, allowing districts to experiment with new business models, technologies, and planning approaches. These zones foster agility, attract forward-thinking investors, and position districts as testbeds for scalable innovation.
- Offering targeted incentives such as grants, tax credits, or subsidized legal support for startups in strategic sectors like biotech, clean tech, and AI encourages commercialization and reduces barriers to entry. These measures help build vibrant ecosystems and attract high-impact ventures.

3. **Data Governance & Cybersecurity:** With digital platforms, smart systems, and data-driven collaboration at the core of Innovation Districts, compliance with data and cybersecurity regulations ensures trust, protects intellectual assets, and enables global partnerships. There is also the need for a tiered approach to data residency and compliance, allowing flexibility for early-stage startups while progressively strengthening requirements as they scale, thereby avoiding premature barriers to innovation. Key related entities (non-exhaustive):
   - **SDAIA (Saudi Data & AI Authority):** Districts must comply with the Personal Data Protection Law (PDPL) and ethical AI guidelines. SDAIA oversees data privacy, cross-border data transfers, and AI use.
   - **DGA (Digital Government Authority):** DGA establishes national frameworks and standards for data governance, cybersecurity, and digital interoperability. Compliance with DGA guidelines enables districts to build trust, enhance operational resilience, and promote responsible data sharing across research, industry, and government ecosystems.
   - **NCA (National Cybersecurity Authority):** Districts need to implement cybersecurity controls as per NCA's Essential Cybersecurity Controls (ECC) and sector-specific regulations.
   - **CST (Communications, Space & Technology Commission):** Districts must coordinate with CST to secure approvals for broadband, 5G deployment, and cloud infrastructure.

Selected Global Insights for Regulatory Approaches (non-exhaustive):

- Districts can implement secure data-sharing frameworks that balance openness with protection, enabling collaboration while safeguarding sensitive information. These frameworks help build trust among stakeholders and support compliance with international data standards.
- Establishing centralized cybersecurity protocols across district entities ensures consistent threat monitoring, rapid response capabilities, and resilience against cyberattacks. This unified approach strengthens digital infrastructure and protects innovation assets.
- Regulatory models that promote ethical AI use and data transparency—such as GDPR-aligned policies—enhance public confidence and attract global partners. Clear governance around data ownership, consent, and usage rights is essential for sustainable innovation ecosystems.

4. **Environmental & ESG Compliance:** Sustainability is now a prerequisite for attracting investment and talent. Districts that comply with environmental and ESG regulations can demonstrate alignment with Vision 2030 and the Saudi Green Initiative, strengthening their global competitiveness. Listed companies within the District, are primarily responsible for ESG compliance and reporting in line with CMA, Tadawul, and national frameworks. Districts, however, play an enabling role by consolidating

ecosystem level sustainability data, demonstrating collective progress while promoting transparency and contributing to the national sustainability agenda. Key related entities (non-exhaustive):

- **MEP (Ministry of Economy and Planning):** Plays a key role in advancing national sustainability and ESG integration in line with Saudi Vision 2030. Its work involves developing frameworks, coordinating strategies, and fostering private sector engagement.
- **MEWA (Ministry of Environment, Water and Agriculture):** Sets national environmental strategy and oversees biodiversity, water, and agricultural sustainability.
- **NCEC (National Center for Environmental Compliance):** Districts are required to obtain environmental impact assessments and permits for new developments. NCEC enforces air, water, and soil protection standards.
- **SASO (Saudi Standards, Metrology & Quality Organization):** Districts must comply with green building codes, energy efficiency regulations, and material standards set by SASO.
- **CMA (Capital Market Authority), Tadawul, and SAMA:** Districts hosting listed companies or financial entities must integrate ESG reporting in line with national disclosure standards.
- **Development Authorities, like Royal Commission for Riyadh City (RCRC):** These bodies oversee urban planning and development, often integrating sustainability and environmental standards into district-level projects.

Selected Global Insights for Regulatory Approaches (non-exhaustive):

- Districts can offer tax credits or grants for developments that meet high sustainability standards, encouraging the adoption of energy-efficient designs, eco-friendly materials, and green construction practices. These incentives help attract responsible investors and position the district as a leader in sustainable urban development.
- Establishing low-emission zones within innovation districts restricts access for conventional vehicles and promotes electric or shared mobility solutions. This approach reduces air pollution, improves public health, and aligns with broader climate goals, making the district more attractive to environmentally conscious residents and businesses.
- Encouraging the use of technologies like pneumatic waste collection, greywater reuse, and water conservation systems enhance resource efficiency and environmental performance. These smart systems support circular economy principles and improve the district's resilience to environmental challenges.
- Providing access to green bonds and sustainability-linked loans enables districts to finance infrastructure projects that meet environmental, social, and governance (ESG) criteria. These tools attract impact-driven capital and reinforce the district's alignment with global sustainability standards.

5. **Business Licensing & Investment Incentives:** Streamlined licensing and competitive incentives lower entry barriers for startups, SMEs, and international investors. Districts that effectively use these tools attract more companies and diversify economic activity. Beyond simplifying business setup processes, districts should establish progressive and performance-based incentive frameworks that encourage responsible, innovative, and high-impact business behavior such as strong ESG performance, local hiring and content development, innovation, high-tech exports, IP creation, and attraction of external investment. Key related entities (non-exhaustive):

   - **CEDA (Council of Economic and Development Affairs):** Provides strategic oversight and alignment for economic initiatives, including investment incentives and regulatory reforms. Districts benefit from CEDA-backed programs that support private sector growth, economic diversification.
   - **MISA (Ministry of Investment):** Districts must register startups, SMEs, and foreign companies through MISA to operate legally. MISA also grants access to incentives such as 100% foreign ownership and tax exemptions.
   - **ZATCA (Zakat, Tax and Customs Authority):** Districts need to comply with tax registration and can apply for customs exemptions or tax holidays where eligible.
   - **HRSD (Ministry of Human Resources & Social Development):** Districts must comply with Saudization and local content requirements by ensuring workforce nationalization targets are met.
   - **ECZA (Economic Zones and Special Zones Authority)::** Districts located in SEZs must register with the authority to benefit from customs exemptions, tax holidays, and regulatory advantages.

Selected Global Insights for Regulatory Approaches (non-exhaustive):

- Districts can enhance international participation by offering fast-track residency and licensing for foreign entrepreneurs and skilled talent. These streamlined pathways reduce administrative barriers, accelerate onboarding, and position the district as a globally accessible hub for innovation and investment.
- Providing multi-year tax exemptions for R&D-intensive startups and scale-ups helps reduce early-stage financial burdens and encourages long-term innovation. These incentives support high-risk ventures, attract deep-tech founders, and reinforce the district's role as a launchpad for transformative technologies.
- Waiving import duties for specialized equipment, research tools, and technology infrastructure lowers setup costs and accelerates operational readiness. This approach enables startups and research entities to access critical resources without delay, boosting productivity and competitiveness.
- Offering targeted incentives and regulatory support for priority industries—such as biotechnology, artificial intelligence, clean energy, and advanced manufacturing—aligns district development with national competitiveness goals. These measures attract strategic investments and foster sector-specific innovation clusters.

6. **Infrastructure & Utilities:** Reliable and resilient utilities are essential to support high-tech industries, research facilities, and residents in Innovation Districts. Coordination with infrastructure providers ensures uninterrupted services and integration of smart systems. Key related entities (non-exhaustive):
   - **MOT (Ministry of Transport and Logistics Services):** Districts need approvals for transport integration, including road networks, public transport, and logistics facilities.
   - **SEC (Saudi Electricity Company) & Ministry of Energy:** Districts must secure energy supply agreements and ensure compliance with renewable energy integration policies.
   - **NWC (National Water Company):** Districts must coordinate for potable water supply, wastewater management, and reuse systems.
   - **CST (Communications, Space & Technology Commission):** Districts must obtain approvals for telecom infrastructure, broadband services, and digital connectivity.

Selected Global Insights for Regulatory Approaches (non-exhaustive):

- Districts can adopt integrated utility planning that combines energy, water, and waste systems into a unified smart infrastructure model. This approach enhances operational efficiency, reduces environmental impact, and supports sustainability goals.
- Implementing district-wide renewable energy solutions—such as solar microgrids or geothermal systems—can reduce dependency on traditional power sources and attract green tech innovators. These systems also position the district as a leader in climate-resilient development.
- Establishing mobility innovation zones allows districts to experiment with autonomous vehicles, micromobility, and low-emission transport under flexible regulatory frameworks. These zones promote sustainable mobility, reduce congestion, and position the district as a leader in future-ready transportation.
- Encouraging the integration of clean energy and resource-efficient systems through regulatory incentives supports sustainable development. These measures reduce environmental impact, improve operational performance, and align district infrastructure with national climate and energy goals.

7. **Public Safety, Accessibility & Social Inclusion:** To be successful, districts must be inclusive and safe, offering opportunities for all residents and workers. Regulations safeguard accessibility, protect public health, and ensure that districts integrate affordable housing and workforce programs. Key related entities (non-exhaustive):
   - **MOMAH and Municipalities:** Districts must comply with Saudi Building Codes covering safety, universal accessibility, and fire prevention standards.
   - **MHRSD (Ministry of Human Resources and Social Development):** Districts must embed accessibility for persons with disabilities and integrate workforce development and inclusion initiatives.
   - **SBCNC (Saudi Building Code National Committee):** Districts must adhere to SBC requirements for structural safety, universal access, and resilience.
   - **MODON (Saudi Authority for Industrial Cities and Technology Zones):** Industrial and tech-focused districts under MODON must meet safety, environmental, and workforce inclusion standards.

Selected Global Insights for Regulatory Approaches (non-exhaustive):

- Districts should require all public and private buildings to meet accessibility standards for people with disabilities. This ensures universal access to facilities, promotes inclusive design, and aligns with global principles of equity and human rights.
- Districts can promote social equity by incentivizing hiring from underserved communities and supporting workforce development programs. These initiatives expand economic opportunity, build local capacity, and foster inclusive growth across the innovation ecosystem.
- Regular assessments of fire safety, emergency access, and structural resilience are essential to protect public health and ensure safe environments. These evaluations help districts maintain compliance, reduce risk, and build trust among residents and stakeholders.

8. **Governance & Management Structures:** Legal recognition of a district management entity ensures that it has the authority to coordinate stakeholders, manage land, and deliver services. This enables long-term governance and operational sustainability. Key related entities (non-exhaustive):
    - **RDI (Research Development and Innovation Authority):** Districts must align with the Research Development and Innovation Authority's national RDI strategy by coordinating human capital development, infrastructure planning, and commercialization pathways. RDI sets strategic direction, proposes regulations, monitors performance, and ensures collaboration across academia, industry, and government in line with Vision 2030.
    - **NIDLP (National Industrial Development and Logistics Program):** NIDLP oversees the development of technology districts through the Technology Districts and Clusters Committee. Districts should align with NIDLP's objectives to strengthen industrial diversification, promote high-value technology localization, and integrate with national cluster development plans. NIDLP provides funding, investment frameworks, and performance oversight to ensure districts contribute effectively to Saudi Arabia's innovation-driven economic transformation.
    - **MC (Ministry of Commerce):** Districts that operate as commercial entities need to establish a legal entity registered under MC to manage land, contracts, and operations, while non-profit or academic institutions may follow alternative arrangements as applicable.
    - **Municipalities / City Councils:** Districts must obtain operating licenses that authorize them to coordinate across stakeholders and deliver services.
    - **PIF (Public Investment Fund) and NDF (National Development Fund):** Districts can partner with these entities to structure financing, governance-linked investment, and long-term sustainability funds.

Selected Global Insights for Regulatory Approaches (non-exhaustive):

- Establishing governance boards that include representatives from government, academia, industry, and community groups ensure balanced decision-making and inclusive oversight. These boards foster collaboration, align district priorities with national goals, and promote transparency in strategic planning.
- Implementing performance-based management frameworks allows districts to track innovation outcomes, stakeholder engagement, and resource utilization. These systems support continuous improvement and help align district activities with national innovation goals.
- Districts should be legally recognized as independent entities with authority over land, infrastructure, and service delivery. This formal status enables long-term governance, operational autonomy, and the ability to coordinate stakeholders effectively across public and private sectors.

05

INFRASTRUCTURE AND SUPPORT FOR INNOVATION DISTRICT

5.1 Physical Infrastructure for Innovation Districts

Innovation districts require a purposefully designed physical environment that supports collaboration, productivity, and quality of life. The infrastructure must be flexible, future-proof, and inclusive, enabling the district to adapt to technological advancements, environmental challenges, and evolving stakeholder needs.

- **Infrastructure**

  A robust infrastructure framework is fundamental to transforming an Innovation District into a high-performing, sustainable, and resilient environment. Globally, successful districts leverage both existing assets and future-ready systems to support high-tech activities, attract talent, and ensure long-term competitiveness. In the Kingdom, infrastructure development must align with strategic transformation goals, including innovation, sustainability, and inclusivity. To achieve this, infrastructure planning should address several interconnected dimensions:

  - **Mobility infrastructure** is central to accessibility and urban integration. Expanding metro, tram, and bus networks improves regional connectivity, while the creation of bike lanes, pedestrian pathways, and car-free zones encourages active transport and reduces congestion. To support smart mobility, districts should also integrate autonomous shuttles and electric vehicle (EV) charging stations, ensuring seamless and sustainable movement across the area.

    Consideration: Design mobility systems that prioritize accessibility, sustainability, and integration with regional networks.

    Benchmark Insights: "Masdar City (UAE) features a car-free core supported by electric podcars (PRT), autonomous shuttles, cycling lanes, and shaded walkways—enhancing safety, accessibility, and low-carbon mobility."

  - Equally important are the **utility systems** that power and sustain the district. Modernizing electrical substations, water supply, and sewer networks is essential for reliability and efficiency. The implementation of smart grids and renewable energy sources, along with advanced stormwater management systems such as bioswales and permeable pavements, contributes to environmental resilience and resource optimization.

Consideration: Implement resilient, smart, and sustainable utility networks that support high-tech operations and environmental goals.

Benchmark Insights: Masdar City (UAE) operates a 10 MW solar farm, rooftop PVs, a smart grid, and passive cooling systems, all aligned with ambitious renewable energy targets.

- In today's digital economy, **digital infrastructure** is a critical enabler of innovation. High-speed fiber-optic networks, public Wi-Fi zones, and smart city sensors provide the connectivity and data intelligence needed to support advanced services. The development of AI-ready data centers and cloud connectivity hubs ensures that the district can host and scale emerging technologies.

  Consideration: Build a digitally connected environment that supports innovation, data intelligence, and emerging technologies.

  Benchmark Insights: South Korea's national cluster strategy integrates publicly funded digital infrastructure (AI, 5G, robotics, and smart manufacturing facilities) with regional industry hubs.

- To meet global standards, infrastructure must also embed sustainability features across all layers. This includes constructing LEED-certified buildings, installing solar-ready rooftops, and adopting waste-to-energy systems and greywater recycling. Energy-efficient lighting and HVAC systems further reduce environmental impact and operational costs.

  Consideration: Embed sustainability across all infrastructure layers to meet global standards and reduce environmental impact.

  Benchmark Insights" in Kendall Square (USA) The district features the first underground electrical substation in the U.S., the largest wastewater recycling system in the Northeast, and LEED Platinum-certified buildings.

All new infrastructure projects must adhere to a set of strategic criteria. They should align with the district's transformation goals—focusing on innovation, sustainability, and inclusivity—while integrating seamlessly with existing systems to avoid redundancy. They must enable high-tech and knowledge-based activities, meet advanced environmental performance standards, and promote circular resource use. Additionally, should enhance accessibility for all users and demonstrate resilience to climate risks and future technological advancements.

- **Promoting Mixed-Use, Compact & Diverse Environment**

A mixed-use, compact, and diverse urban form is a defining feature of successful Innovation Districts. It fosters collaboration, creativity, and vibrancy by integrating various functions and populations within walkable, well-connected spaces. This approach not only enhances the quality of life but also supports economic dynamism and social inclusion. In the context of Saudi Arabia, districts should leverage existing assets while guiding new development through strategic planning and inclusive design principles.

- **Mixed-use development** lies at the heart of this model. By intentionally combining residential, commercial, office, cultural, and recreational spaces within a single district or even within individual buildings, districts can create vibrant environments that support both daytime and nighttime economies. This diversity of land use; housing, retail, hospitality, and public amenities; encourages continuous activity and fosters urban vitality. Accessibility and connectivity are essential, with pedestrian-friendly design and seamless access to public transit enabling mobility and reducing reliance on private vehicles. Community integration is also key, achieved through a range of housing types, inclusive services, and accessible public spaces that promote social cohesion. Sustainability is embedded throughout, with efficient land use and green building practices contributing to environmental goals. Innovation and R&D spaces further enhance this model by attracting talent, supporting entrepreneurship, and fostering collaboration. Their inclusion within mixed-use districts stimulates knowledge-based economic growth and aligns with broader goals of diversification and smart urban development.

  Consideration: Promote mixed-use environments that prioritize walkability, accessibility, and integration of residential, commercial, and innovation spaces.

  Benchmark Insights: In Kendall Square (USA) 25% of units in new projects are below market rate; required mix of unit sizes including family-friendly 3-bedroom units.

- **Compact urban design** further strengthens the district's functionality. High-density development allows for vertical and horizontal integration of land uses, optimizing space and supporting a critical mass of activity. Accessible neighborhoods ensure short distances between residential, commercial, institutional, and recreational areas, encouraging active mobility and reducing the need for car travel.

  Consideration: Encourage high-density, compact urban design that supports vertical and horizontal integration of land uses and promotes active mobility.

  Benchmark Insights: In 22@Barcelona (Spain) Redevelopment mandates include subsidized housing, public amenities, and green spaces to ensure income diversity and quality of life.

Benchmark Insights: In Masdar City (UAE) Walkable layout with shaded alleys, courtyards, and plazas.

- A **diverse tenancy and population** mix is vital for maintaining inclusivity and retaining talent. Affordable housing options tailored to students, researchers, entrepreneurs, and essential workers help ensure accessibility and long-term engagement. The integration of creative industries, service providers, and community organizations enriches the district's cultural and economic landscape, creating a dynamic and inclusive ecosystem. To support this diversity, targeted policies and rent structures can be introduced—such as subsidized or capped rents for startups, students, and early-stage ventures, while applying market rates to corporates, incubators, and venture capital firms. These measures help balance financial sustainability with social equity, ensuring that innovation and opportunity remain accessible to all.

  Consideration: Implement inclusive housing and tenancy policies that support affordability, diversity, and long-term engagement across all user groups.

  Benchmark Insights: In Masdar City (UAE) Integrated Live-Work-Play Model: Homes, offices, research centers, schools, and retail are co-located to support daily life and innovation.

- Activating the **public realm** is essential for building community and enhancing livability. Quality open spaces such as parks, plazas, and green corridors offer opportunities for relaxation, recreation, and social interaction. These spaces should be animated through dynamic programming, including cultural events, pop-up markets, and community engagement activities that strengthen local identity and foster a sense of belonging.

  Consideration: Design and program public spaces to support cultural vibrancy, social inclusion, and long-term community engagement.

  Benchmark Insights: In 22@Barcelona (Spain) The district hosts cultural events and community programs that preserve neighborhood identity and promote social inclusion, aligning with its goal of equitable urban regeneration.

- **Zoning Regulations**

- Zoning regulations establish the legal and planning framework that enables the transformation of industrial or underutilized areas into dynamic, mixed-use innovation districts. These regulations are designed to support flexibility, inclusivity, and sustainable growth while ensuring alignment with broader urban and national objectives.

  Consideration: Establish zoning regulations that enable transformation of underutilized areas into dynamic, mixed-use innovation districts aligned with national and urban goals.

  Benchmark Insights: In 22@Barcelona (Spain) Regulations encourage concentration of ICT, media, energy, design, and biomedical sectors to drive collaboration and innovation synergies.

- A key aspect of zoning reform involves **rezoning for innovation**, which allows for the transition from single-use zones—such as industrial areas—to high-density, mixed-use environments. This shift enables a variety of functions to coexist, supporting the evolving needs of innovation ecosystems and emerging industries. Flexibility in land use is essential to accommodate rapid changes in technology and business models.

  Consideration: Enable rezoning from single-use to high-density, mixed-use environments to support evolving innovation ecosystems.

  Benchmark Insights: In Kendall Square (USA) Rezoning for Mixed-Use & Density: Transitioned from industrial to high-density mixed-use zoning to accommodate labs, offices, housing, retail, and green space.

- To encourage strategic development, **incentive mechanisms** should be embedded within the zoning framework. These may include density bonuses for projects that incorporate affordable housing or green building practices, fast-track permitting for catalytic developments, and tax incentives for sustainability-focused or R&D-driven initiatives. Such tools help attract investment and accelerate transformation.

  Consideration: Integrate incentive tools such as density bonuses, fast-track permitting, and tax benefits to accelerate strategic development.

  Benchmark Insights. Masdar City (UAE) offering 100% foreign ownership, tax exemptions, profit repatriation, and easy setup within a global clean-energy ecosystem.

- Effective zoning also requires robust **master planning and governance**. Comprehensive land use plans should integrate infrastructure, mobility, and public spaces, while clear guidelines on building heights, setbacks, and land use mix ensure cohesive and context-sensitive development. These plans must be adaptable yet enforceable, providing clarity for developers and public agencies alike.

  Consideration: Develop comprehensive land use plans with clear guidelines to ensure cohesive, adaptable, and context-sensitive development.

Benchmark Insights: In Masdar City (UAE) 6.4 km² city with designated zones for clean-tech businesses, research, residential, and public services.

- **Flexibility and adaptability** are critical to fostering innovation. Zoning should allow for the adaptive reuse of existing buildings, enabling sustainable redevelopment and preserving cultural assets. It should also support temporary installations, pilot projects, and experimental spaces that encourage creativity and rapid prototyping.

  Consideration: Support adaptive reuse, temporary installations, and experimental spaces to foster innovation and creativity.

  Benchmark Insights: in 22@Barcelona (Spain) Poblenou were rezoned to allow for mixed-use development, including residential, commercial, and innovation spaces. By 2010, the innovation district already had 114,000 m2 of new green space and companies, businesses and shops.

Finally, sustainability standards and climate resilience goals should be integrated into the regulatory framework, ensuring that Innovation Districts contribute to long-term environmental and economic resilience.

5.2 Digital Enablers for Innovation Districts

Digital enablers represent the critical infrastructure and intelligent systems that allow Innovation Districts to operate as smart, sustainable, and future-ready ecosystems. They support daily operations while also driving long-term transformation through real-time intelligence, collaborative innovation, and resilient urban services. The following are some design considerations, derived from global practices—non-exhaustive in nature but intended to provide direction—emphasizing the need for a holistic digital strategy. While these points are based on international references, it is equally important to align with and build upon the frameworks established by the Digital Government Authority and other national entities driving the Kingdom's digital agenda. Such alignment ensures that advanced connectivity, smart technologies, and governance frameworks are integrated seamlessly into the urban fabric, keeping districts competitive and attractive to global talent, investors, and innovators.

1. **Digital Connectivity**: The foundational layer of any innovation district. It enables seamless interaction between people, devices, and systems—powering the flow of data, ideas, and services across the ecosystem. Without robust digital infrastructure, innovation districts cannot support the advanced technologies, real-time collaboration, and data-driven services that define modern urban innovation.

   - **High-Speed Broadband and Fiber Network**- Supports high-throughput applications such as AI training, telemedicine, and immersive learning.

     Design Consideration:

     - Implement redundant fiber loops for network resilience.
     - Enable multi-operator access to foster competition and service quality.
     - Provide dark fiber leasing options to ensure scalability for future needs.

   - **5G and Future Wireless Technologies**- Enables ultra-low latency high device density and network slicing for customized services

     Design Considerations:

     - Deploy 5G infrastructure to support autonomous vehicles, remote surgeries, AR/VR, and smart grid management.
     - Plan for seamless integration with future wireless standards (e.g., 6G).
     - Ensure robust coverage and capacity in high-density environments.

   - **Wi-Fi Networks** - Offers ubiquitous, high-performance wireless connectivity for residents, businesses, and visitors.

Design Considerations:

- Utilize modern Wi-Fi standards (e.g., Wi-Fi 6/7) for higher throughput and lower latency.
- Deploy AI-optimized mesh networks to dynamically allocate bandwidth and minimize congestion.
- Ensure secure, easy-to-access public Wi-Fi zones throughout the district.

- **Cloud Platforms and Edge Data Centers**- Provide elastic computing resources, AI model hosting, and real-time analytics to support digital services and innovation.

Design Considerations:

- Hybrid cloud and edge computing models to balance performance, cost, and data sovereignty.
- Ensure proximity of edge data centers to reduce latency for critical applications.
- Support interoperability and scalability for diverse user needs.

- **Cybersecurity Infrastructure**- Safeguards digital assets, data, and services against evolving cyber threats, ensuring trust and compliance.

Design Considerations:

- Deploy AI-driven threat detection and response systems.
- Adopt zero-trust architecture and quantum-resistant encryption.
- Align with national cybersecurity frameworks (e.g., NCA, SDAIA) to ensure regulatory compliance and resilience.

2. **Smart Technologies**: Empower the district to function as a self-aware, adaptive system enhancing operational efficiency, sustainability, and quality of life. By integrating advanced digital solutions, the district can optimize resource use, improve service delivery, and foster a culture of continuous innovation.

- **Open Data Platforms and APIs**- Facilitate civic tech innovation, academic research, and third-party service development through transparent data sharing.

Design Considerations:

- Establish robust data licensing, API rate limits, and developer engagement programs.
- Ensure data privacy, security, and compliance with relevant regulations.
- Promote open standards to maximize interoperability and ecosystem growth.

- **Internet of Things (IoT)**- Enables real-time monitoring, automation, and optimization of urban systems such as mobility, environment, and utilities.

Design Considerations:

- Deploy scalable, low-power IoT architectures (e.g., LoRaWAN, NB-IoT, IPv6) for broad coverage and efficient data transmission.
- Implement applications such as smart parking, environmental monitoring, energy metering, and asset tracking.
- Ensure interoperability and data security across devices and platforms.

- **Digital Twin Platforms** - Provide virtual replicas of physical assets and systems to simulate, predict, and optimize urban operations and planning.

Design Considerations:

- Integrate Building Information Modeling (BIM) and Geographic Information Systems (GIS) for spatial intelligence.
- Use digital twins for infrastructure simulation, predictive maintenance, and scenario planning.
- Enable real-time data integration for continuous system improvement.

- **Artificial Intelligence and Machine Learning** - Drive data-driven decision-making, predictive analytics, and automation across district operations.

Design Considerations:

- Apply AI/ML for predictive maintenance, anomaly detection, citizen sentiment analysis, and demand forecasting.
- Establish AI ethics boards and bias mitigation protocols to ensure responsible and transparent use.
- Foster partnerships with research institutions for continuous AI innovation.

- **Smart Building and Energy Systems** - Optimize building performance, energy efficiency, and occupant comfort through intelligent automation.

Design Considerations:

- Implement adaptive HVAC, daylight harvesting, occupancy-based controls, and microgrid integration.
- Target high-performance certifications (e.g., LEED Platinum) through digital optimization.
- Enable real-time monitoring and control for energy and resource management.

06

TALENT ATTRACTION AND RETENTION IN INNOVATION DISTRICTS

Innovation districts thrive when they clearly define and actively support the human capital that drives their ecosystems. Talent sustains research, entrepreneurship, and collaboration across academia, industry, and government. To build a globally competitive district, it's essential to understand the types of talent involved and the distinct strategies required to attract versus retain them.

To build a resilient and competitive innovation district, it is essential to distinguish between the strategies used to attract new talent and those needed to retain existing talent, as each requires a tailored approach to meet different needs and motivations.

1. **Talent Attraction Considerations:** Attracting talent involves positioning the innovation district as a destination of choice for local and global professionals, researchers, and entrepreneurs. This goes beyond recruitment—it is about cultivating a compelling identity and ecosystem that draws in high caliber individuals seeking opportunities for collaboration, creativity, and impact. Successful global districts from benchmarks demonstrate that talent attraction is driven by the interplay of strong academic-industry linkages, quality of life, and access to networks and funding. The ability of a district to attract top talent depends on how effectively it combines place-making, opportunity creation, and ecosystem collaboration into a coherent and inspiring destination for innovation. Below are some of key strategies that can support talent attraction within the district:

    - **Strategic Branding and Positioning:** A distinctive brand identity helps position the district as a destination for innovators, researchers, and entrepreneurs. Strategic marketing efforts should highlight the district's sectoral strengths, quality of life, and global connectivity. Example strategies include:

        - Launch an international "Work, Live, Innovate" campaign showcasing district success stories, lifestyle benefits, and startup opportunities through global media and digital channels.

        - Participate in major global forums and exhibitions (e.g., Smart City Expo, Web Summit, LEAP) to showcase the district's innovation ecosystem and attract high-caliber professionals and organizations.

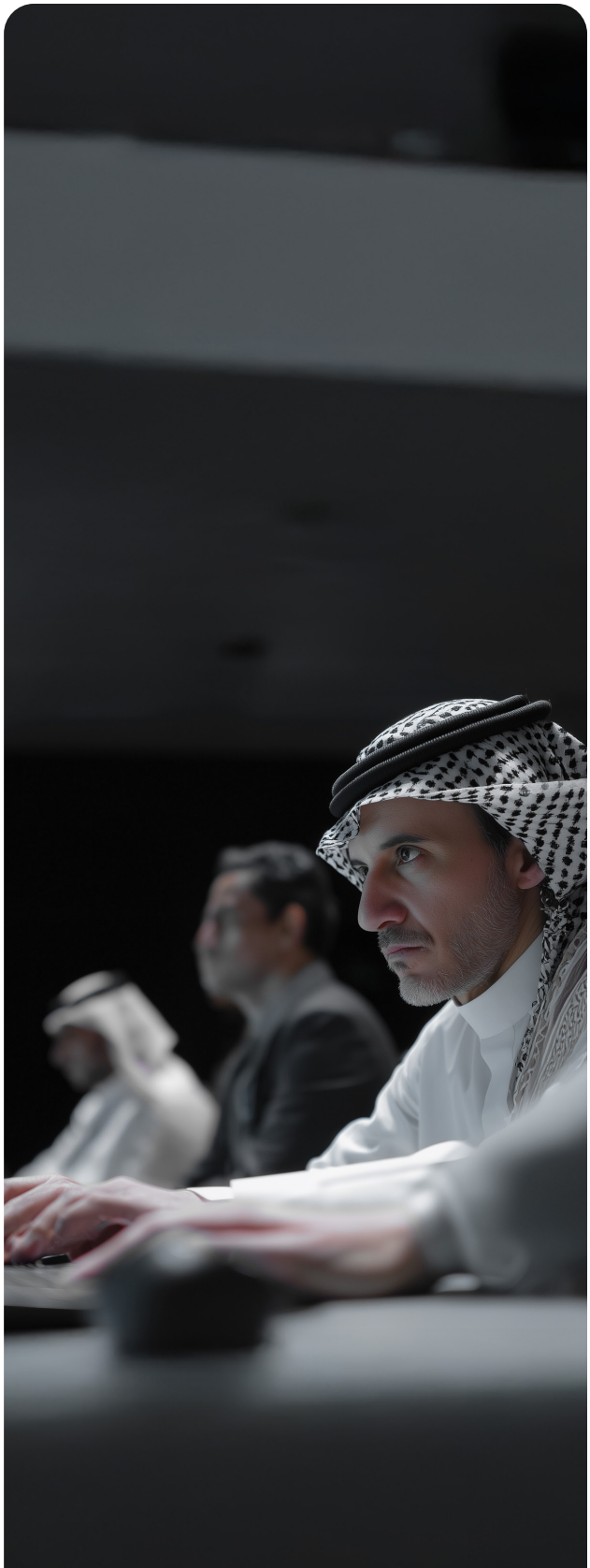
- **Education and Talent Pipeline Integration:** A strong linkage between education, research, and industry is vital to attract and sustain a skilled talent pool within the district. Establishing a joint governance council with academic leaders, supporting industry–university R&D labs, and offering structured internships will align curricula with real-world needs. Co-developing academic programs and facilitating faculty exchanges with global partners will enhance competitiveness, attract students to district-based universities, and deepen engagement within the innovation ecosystem. Example strategies include:
  - Launching structured internship and fellowship programs to connect students with real-world innovation environments.
  - Facilitating faculty exchange and co-teaching initiatives to bring global expertise into the district.
- **Startup Accelerators:** Programs that provide early-stage startups with seed funding, mentorship, and collaborative workspace. These accelerators help entrepreneurs rapidly develop their business models, connect with investors, and scale their ventures making the district a dynamic hub for innovation and talent attraction. Example strategies include:
  - Embedding mentorship programs with experienced entrepreneurs and investors.
  - Providing access to prototyping labs, legal advisory, and investors.
- **Develop Strategic International Partnerships:** Partnering with global academic institutions, research networks, and innovation hubs allows for talent exchange programs, joint research initiatives, and dual-degree offerings. These partnerships expand the district's reach and reputation, making it a destination of choice for international talent seeking global exposure and collaboration. Example strategies include:
  - Establish joint research centers and dual-degree programs with top international universities to facilitate talent exchange and global collaboration.
- **Co-locate World-Class Research Institutions:** Bringing globally recognized universities and research centers into the district enhances its credibility and visibility. These institutions act as magnets for top-tier faculty, postdocs, and graduate students, while also attracting corporate R&D partnerships. Their presence signals a high-caliber innovation environment. Example strategies include:
  - Invite globally ranked universities and research institutes to establish satellite campuses or research centers within the district to boost credibility and attract top-tier talent.

2. **Talent Retention Considerations:** Retaining talent requires creating an environment where professionals feel engaged, supported, and committed to long-term growth. This involves more than employment—it depends on quality of life, career advancement, and community integration. The district should offer clear professional development pathways, continuous learning opportunities, and access to collaborative networks that enable innovation and leadership growth. Equally important are livability factors such as affordable housing, cultural vibrancy, family-friendly amenities, and a sense of belonging fostered through community engagement programs. Together, these elements help transform the district into a place where talent chooses not only to work—but to build a life. Below are some of the key strategies that can support talent retention within the district:

   - **Continuous Learning and Career Growth:** Enhances talent retention by offering professionals a clear and continuous path for career advancement. By aligning personal development goals with business objectives, it ensures that talent is nurtured in a way that supports both individual aspirations and strategic workforce needs ultimately driving long-term retention and sustainable performance. Example strategy include:
     - Establishing district-based learning centers offering modular certifications helps professionals see a clear path for growth.
   - **Established Industry and Corporate Anchors:** Enhances its appeal to top talent by signaling credibility, opportunity, and growth. It creates a dynamic ecosystem where professionals can engage with leading companies, access cutting-edge resources, and benefit from rich networking and collaboration opportunities. This environment not only fosters innovation but also attracts ambitious individuals seeking meaningful careers, global exposure, and the chance to contribute to impactful projects alongside respected industry leaders. Example strategy include:
     - Establish corporate innovation labs and rotational programs between startups and large firms to provide professionals with diverse career experiences and long-term growth opportunities, which are supported by innovation-ready corporate partners that maintain open sandbox environments for experimentation.
     - Encourage core companies within the district to host demonstration zones or living labs within the district, showcasing breakthrough technologies and providing engagement opportunities for researchers and entrepreneurs.

- **Supportive Policy and Incentives:** Plays a crucial role in attracting top talent to innovation districts by creating an environment that enables growth, experimentation, and long-term success. When governments and institutions provide incentives such as tax breaks, funding programs, streamlined regulations, and visa facilitation, they not only lower barriers but also demonstrate a strong commitment to fostering innovation. In addition, offering targeted incentives to top global universities to establish satellite campuses or research centers within these districts can further strengthen the talent pipeline, drive knowledge transfer, and anchor cutting-edge research activity. These combined measures encourage skilled professionals, entrepreneurs, and researchers to relocate, invest their efforts, and build impactful ventures in a district where their contributions are valued and supported. Example strategies include:
  - Introducing tax incentives, fast-track licensing, and relocation support packages to attract and retain entrepreneurs, researchers, and skilled professionals.
  - Providing financial incentives and land grants for top universities and research institutions to establish satellite campuses or research centers within the district.
  - Implement policy flexibilities or streamlined iqama processing to enhance talent mobility and support workforce development in innovation districts.
- **Quality of Life and Livability:** Integrated lifestyle and work environment enhances retention by ensuring that professionals and their families can enjoy affordable housing, efficient mobility, and vibrant cultural amenities. This balance between career opportunities and quality of life strengthens the district's competitiveness. Example strategies include:
  - Partnering with developers to provide subsidized housing options for talent in critical sectors.
  - Creating cultural hubs, wellness spaces, and recreational programs that enhance community well-being.
  - Integrate sustainability measures such as renewable energy systems, climate-resilient infrastructure to promote environmental well-being and long-term urban appeal.
- **Inclusive and Diverse Community:** It's fostering a welcoming environment where individuals from different backgrounds feel valued and empowered to contribute. Diversity brings a richness of perspectives, ideas, and problem-solving approaches, which enhances creativity and innovation. Inclusive practices also promote equity and collaboration, making the district more appealing to global talent seeking not just opportunity, but a sense of belonging and purpose in their professional journey. Example strategy include:
  - Encourage organizations within the district to adopt equitable hiring, pay transparency, and inclusive leadership programs that ensure representation across genders, nationalities, and abilities by offering the organizations recognition awards for inclusive practices and providing guidance frameworks or advisory support to help implement these initiatives.
  - Create district-level forums or advisory bodies that develop inclusion frameworks, monitor progress, and celebrate diversity through awareness campaigns and annual reports.
  - Organize festivals, networking programs, and cultural exchanges that connect local and international residents, foster mutual understanding and social cohesion.

07
INTEGRATING R&D AND ACADEMIC COLLABORATION



Integrating research and development (R&D) initiatives within an innovation district through active collaboration with universities and research institutions is a cornerstone of building a high-impact, knowledge-driven ecosystem. This approach ensures that academic research is not siloed but directly contributes to solving real-world challenges, advancing technology, and supporting industry growth. By embedding R&D infrastructure such as shared labs, interdisciplinary research centers, and co-funded programs within the district, stakeholders can foster continuous innovation and accelerate commercialization.

7.1 Strategies and Enablers for Effective Collaboration

1. Strategic Collaboration Themes

- **Joint Research Programs:** Strengthen strategic collaboration by fostering shared innovation, knowledge exchange, and capacity building across institutions. They align research efforts with national priorities, enabling evidence-based solutions to complex challenges. These programs also support talent development and technology transfer, enhancing long-term sustainability. Ultimately, they create high-impact partnerships that accelerate progress toward strategic goals. Example initiatives include:
  - Establishing co-funded R&D programs targeting national priority sectors such as energy, biotechnology, or advanced manufacturing.
  - Creating research chairs or joint innovation labs that link university expertise with industry needs.
  - Launching collaborative grant schemes that incentivize multi-institutional and cross-sector research partnerships.

    Benchmark Insight: Kendall Square in Cambridge, USA leverages its proximity to MIT to drive collaborative research in biotech and life sciences with institutions such as Harvard, resulting in rapid commercialization and global recognition.

- **Collaborative Spaces:** Collaborative spaces are shared environments that unite researchers, entrepreneurs, and industry professionals to co-create, test, and scale innovative solutions. By connecting academia, industry, and government, they serve as catalysts for shared innovation, enabling interdisciplinary collaboration and accelerating the development of practical solutions to complex challenges. Example initiatives include:

- Living labs transform campuses and urban areas into real-world testbeds for smart technologies, enabling user-centered design and regulatory flexibility.
- Innovation studios serve as interdisciplinary spaces where students, faculty, and industry partners co-develop solutions to complex challenges, bridging academic research with practical application.
- Hackathons and innovation festivals foster vibrant ecosystems by connecting academic talent with industry needs, sparking new ventures and surfacing emerging trends.
- Design and technology hubs further strengthen this collaboration by integrating creative industries, academia, and tech development through shared infrastructure and programming.

Benchmark Insights: Barcelona's Design Hub and Venture Café in Kendall Square exemplify how innovation collaboration drives ecosystem vitality and accelerates the adoption of emerging technologies.

- **Venture Creation:** Venture creation within the innovation district is a critical pathway for translating academic research into market-ready solutions and building a pipeline of high-growth startups. This will help reinforce the innovation district's role as a launchpad for innovation, economic diversification, and talent development. Example initiatives include
  - University-linked incubators located in the district provide early-stage ventures with mentoring, prototyping facilities, and funding, supporting the commercialization of research outputs.
  - Sector-specific startup accelerators offer structured programs that scale university-affiliated ventures and connect them with investors and industry partners.
  - Entrepreneurship programs embedded in academic curricula cultivate innovation skills and entrepreneurial mindsets among students and researchers.
  - Spin-off facilitation ensures that promising research is transitioned into viable businesses through licensing and venture building.

  Benchmark Insights: LabCentral in Kendall Square and The Catalyst Accelerator in Masdar City demonstrate how academic institutions can fuel venture creation and commercialization.

- **Investment:** Investment collaboration will ensure the financial sustainability and long-term growth of innovation ecosystems. It enables the scaling of research outcomes into market-ready solutions through shared funding and strategic alignment. Example initiatives include:
  - Public-private R&D funding enables co-investment in strategic research initiatives and infrastructure, aligning government, academia, and industry interests.
  - University venture funds provide capital support for startups emerging from academic research, bridging the gap between innovation and commercialization.
  - Joint infrastructure development, such as shared labs and innovation hubs, enhances the district's capacity for collaborative research and accelerates technology deployment.
  - Corporate-university partnerships foster long-term investment in talent development, sponsored research, and joint ventures, ensuring alignment with industry trends and future workforce needs.

  Benchmark Insights: Kendall Square (USA) benefits from deep corporate-academic partnerships, such as the MIT-IBM Watson AI Lab, which drives AI research and commercialization through joint investment and shared infrastructure.

2. Enablers to Enhance Collaboration

To enhance collaboration between the ecosystem entities, there is key enablers that must be strategically developed and aligned. These enablers created for sustained partnerships, shared innovation, and impactful outcomes. The following are the core enablers that drive and enhance effective collaboration.

- **Policy and Regulatory Support:** Clear, innovation-friendly policies are essential to accelerate collaboration between universities and innovation districts. Streamlined IP frameworks make it easier to transfer technologies from research labs to startups, while accelerated IP registration and sandbox frameworks create a test-and-learn environment that minimizes regulatory bottlenecks and expedites innovation deployment. Flexible funding models encourage joint R&D investment, especially in high-risk, high-reward areas.

  Benchmark Insights: Masdar City (UAE) supports innovation through clear regulatory frameworks and free zone policies that enable 100% foreign ownership, streamlined IP protection, and joint R&D funding between government, academia, and private investors in clean technologies.

- **Governance and Coordination Mechanisms:** Joint governance structures such as innovation boards or part of the lead governance body ensure that universities and district authorities are aligned on priorities, resources, and outcomes. This fosters accountability and long-term collaboration.

Benchmark Insights: 22@ Barcelona (Spain) employs a joint governance model led by the City Council and the 22@ Coordination Commission, aligning public, academic, and private actors to ensure coordinated planning and long-term collaboration.

- **Stakeholder Engagement Mechanisms:** Inclusive engagement mechanisms—like advisory councils, co-design workshops, and innovation forums—bring together academia, industry, government, and community stakeholders. These platforms build trust, align goals, and ensure that innovation responds to real-world needs.

  Benchmark Insights: Kendall Square (USA) engages academia, industry, and government through the Kendall Square Association's forums, workshops, and other programs, fostering collaboration and shared innovation goals.

- **Regional IP Commercialization Hub:** A centralized IP commercialization hub can significantly enhance the efficiency of research-to-market pathways. By offering services such as IP strategy development, licensing support, commercialization advisory, and access to industry mentorship networks, the hub empowers academic researchers and startups to navigate the complexities of tech transfer and strengthen their market understanding. This structure reduces duplication, streamlines processes, and increases the success rate of ventures emerging from university research.

  Benchmark Insights: Kendall Square (USA) hosts MIT's Technology Licensing Office and The Engine, which centralize IP management and commercialization, streamlining tech transfer and accelerating research-to-market outcomes.

- **Global/Regional Innovation Talent Exchange:** Global/Regional talent exchange programs allow students, researchers, and entrepreneurs to rotate across innovation hubs, fostering cross-pollination of ideas and expertise. This enhances innovation capacity and builds a collaborative regional ecosystem.

  Benchmark Insights: 22@ Barcelona (Spain) promotes talent exchange through programs like 22@ Staying in Company, connecting students and researchers with local firms to enhance skills development and industry exposure across the district.

7.2 Incentives for Businesses to Engage in Research and Innovation Activities

To strengthen the district's innovation ecosystem, targeted incentives encourage businesses to invest in research and collaborate with academic institutions. These measures reduce financial barriers, accelerate technology development, and foster long-term partnerships.

- **Financial Incentives and Tax Benefit:** Providing financial incentives such as R&D tax credits, innovation grants, and matching funds directly reduces the cost of research and development for businesses. These mechanisms encourage companies to invest in high-risk, high-impact innovation and engage in collaborative projects with universities and research centers. Tax deductions for R&D expenses and favorable treatment of innovation-related assets further enhance the financial viability of long-term research partnerships, accelerating the development of new technologies within the district.

- **Access to Public Research Infrastructure:** Offering preferential or subsidized access to publicly funded laboratories, testing centers, and prototyping facilities enables businesses—especially startups and SMEs—to participate in advanced research without significant capital investment. This shared infrastructure model promotes collaboration with academic institutions, facilitates joint experimentation, and reduces duplication of resources. It also strengthens the district's innovation ecosystem by making high-quality research tools broadly accessible.

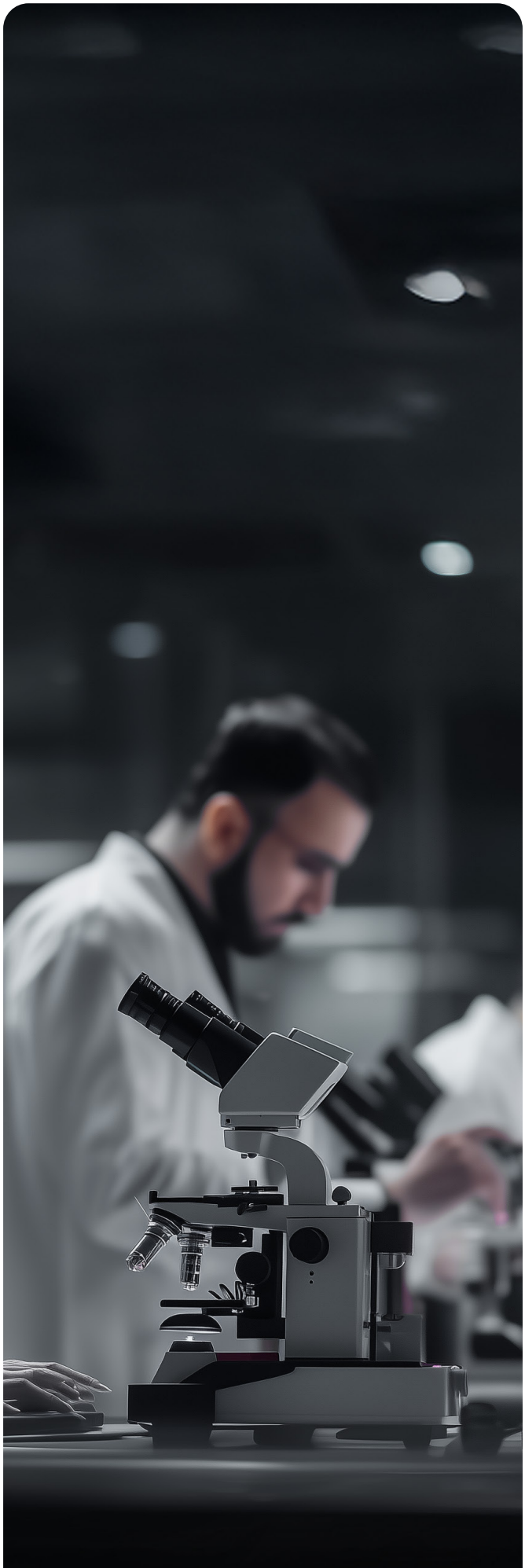
- **Co-Funding and Collaborative Grant Programs:** Structured co-funding programs that require partnerships between businesses and academic institutions incentivize private-sector engagement in research. These programs reduce financial risk for companies while ensuring access to specialized expertise and talent. By prioritizing projects with commercial potential and societal relevance, such grant schemes foster meaningful collaboration and accelerate the translation of research into market-ready solutions.

- **Fast-Track Regulatory and IP Support:** Streamlining regulatory processes and intellectual property (IP) services for innovations developed through academic collaboration enhances the attractiveness of investing in R&D. Fast-track patent reviews, reduced filing fees, and access to legal advisory support help businesses bring products to market more efficiently. These mechanisms shorten development cycles and increase the competitiveness of innovation emerging from the district.

- **Recognition and Certification Programs:** Recognition through innovation awards, certification schemes, and industry rankings motivates companies to invest in research and collaborative innovation. Certifications for excellence in R&D or innovation leadership can also be linked to eligibility for future funding opportunities or procurement advantages, reinforcing a culture of innovation within the district.

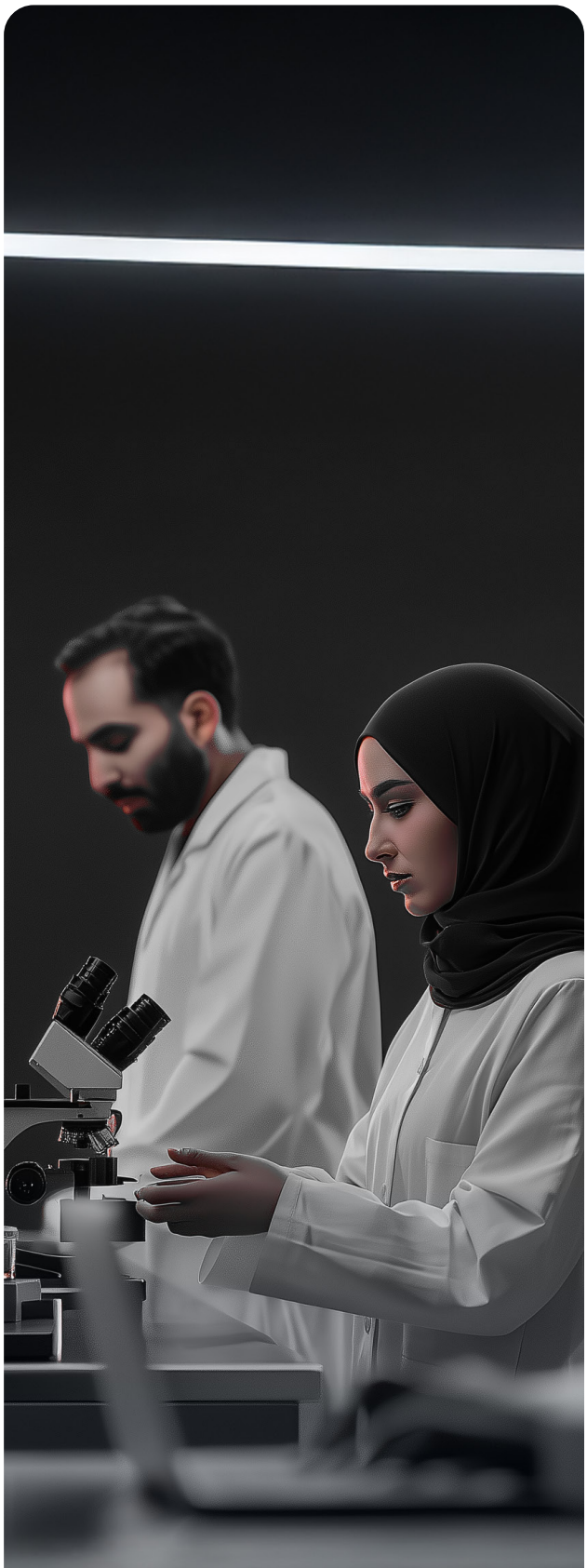
Selected Benchmark Insights (non-exhaustive):

- *China's National Innovation Zones provide direct government financial incentives to reduce business risk and accelerate commercialization.*
- *Under Singapore's Smart Nation and Punggol Digital District, the government introduced tax concessions for multinational R&D investors and a Regulatory Sandbox (Cyberpolygon) to test high-risk innovations safely.*
- *Masdar City (UAE) has earned LEED Platinum and WiredScore/SmartScore certifications, recognizing its excellence in sustainability, digital infrastructure, and smart city innovation.*
- *Kendall Square (USA) offers financial incentives through Massachusetts Life Sciences Center tax programs, reducing R&D costs and encouraging private-sector investment in high-risk innovation.*
- *22@ Barcelona (Spain) provides businesses and startups access to public research facilities and testing labs within the district, promoting shared use of advanced R&D infrastructure and reducing entry barriers for innovation.*
- *22@ Barcelona (Spain) recognizes innovation excellence through awards and public rankings coordinated by the City Council and 22@Network, incentivizing companies to engage in collaborative R&D and showcase their impact.*



08

ENABLE TECHNOLOGY TRANSFER AND COMMERCIALIZATION



8.1 Technology Transfer as a Strategic Mandate

Technology transfer and commercialization form a core strategic mandate of Innovation Districts. They transform research excellence into tangible economic and societal value, ensuring that discoveries do not remain confined to laboratories but evolve into market-ready innovations that drive growth and improve quality of life. Within an Innovation District, technology transfer is the mechanism through which ideas, knowledge, and intellectual property flow between universities, startups, and industry—enabling the creation of new products, services, and enterprises that advance national priorities. Strategic importance within Innovation Districts:

- **Catalyst for Economic Diversification:** By accelerating commercialization, districts can contribute to new industry creation, high-value job opportunities, and private investment attraction, reinforcing the Kingdom's knowledge-based economy.
- **Bridge between Research and Market:** Districts can provide the infrastructure and support ecosystem—labs, incubators, accelerators, and venture networks—that convert scientific breakthroughs into commercially viable solutions.
- **Enabler of Collaboration and Knowledge Exchange:** Through structured partnerships among academia, government, and industry, districts can facilitate shared innovation, licensing opportunities, and cross-sector co-creation.
- **Driver of Societal Impact:** Commercialization of new technologies leads to solutions that address health, sustainability, and digital transformation challenges, supporting Vision 2030 objectives for human prosperity and well-being.

Achieving successful technology transfer and commercialization within Innovation Districts requires strong alignment among all key stakeholders, each playing a distinct but interconnected role within the innovation ecosystem. The coordinated efforts of government, academia, industry, and investors are essential to transform research outputs into real-world applications that generate long-term value for the economy and society.

- **Government and Regulators:** Supports technology transfer by creating a favorable regulatory environment, maintaining and promoting the protection and use of intellectual property, and encouraging the commercialization of early-stage technologies. This includes introducing tax or

other financial incentives to promote new technology adoption and private sector participation in innovation.

- **Universities and Research Institutions:** Play a central role by encouraging and incentivizing the adoption of research innovations and resources—such as funding cutting-edge research, supporting TTO operations, and providing inventor incentives. They also help foster a culture of innovation and entrepreneurship by offering opportunities for students and researchers to launch startups and engage in applied research.
- **Industry and Private Sector:** Contribute to technology transfer by sponsoring collaborative research opportunities for students and researchers, co-developing technologies, and investing in innovation initiatives such as hackathons, accelerators, and pilot programs. Their market insights and commercialization capabilities help ensure that research outcomes are translated into viable, scalable products.
- **Venture Capital, Private Equity, and Investors:** Provide essential financial backing for commercialization by funding the companies that develop and scale new technologies. This includes early-stage investment to validate and prototype innovations, as well as follow-on funding to support the growth and expansion of spinouts and startups.

8.2 Enablers to Support Technology Transfer and Commercialization

For Innovation Districts to successfully bridge the gap between research and market, they must establish dedicated strategies and mechanisms that institutionalize technology transfer, enable commercialization, and align with the national RDI priorities. These mechanisms ensure that innovation activities move systematically from discovery to deployment while generating measurable economic and social impact.

- **Establishment of District-Level Technology Transfer Offices (TTOs):** TTOs serve as pivotal enablers of knowledge commercialization and ecosystem connectivity. Their mandate is to identify promising research outputs, protect intellectual property, and facilitate their transition into market-ready innovations through licensing, partnerships, and startup creation. TTOs act as intermediaries between academia, industry, and government, fostering collaboration and aligning research with real-world needs. They also support entrepreneurial activity by guiding researchers through the commercialization process, offering legal and business expertise, and connecting them with incubators, accelerators, and investors. Operating within a broader innovation ecosystem, TTOs contribute to regional economic development, societal impact, and the sustainability of innovation by embedding best practices in governance, stakeholder engagement, and performance evaluation.

The structure and governance of a TTO significantly influence its effectiveness. Best practices suggest adopting flexible operational models that balance academic integrity with commercial agility. For example, some TTOs operate as semi-autonomous entities or spin-offs, allowing them to respond quickly to market demands while maintaining alignment with institutional goals. A well-defined operational model ensures clarity in roles, accountability, and resource allocation, which helps streamline decision-making and enhances the TTO's ability to support diverse commercialization pathways. In addition, co-investment models between public entities, universities, and private investors should be encouraged to share risk, attract capital, and accelerate commercialization across priority sectors.

The Research, Development and Innovation Authority (RDI) has released the Technology Transfer Office (TTO) Blueprint[27], which provides comprehensive guidance on establishing and managing effective technology transfer functions across universities, research centers, and innovation entities. This blueprint outlines best practices for governance, IP management, commercialization processes, and performance evaluation.

By leveraging RDI's TTO Blueprint, Innovation Districts can adopt standardized frameworks and operating models that align with national priorities, accelerate research-to-market translation, and enhance ecosystem connectivity. The TTO Blueprint serves as both a reference and an implementation guide—helping districts strengthen their internal commercialization capacity, attract investment, and integrate seamlessly into the broader national RDI ecosystem.

Benchmark Insights: 22@ Barcelona (Spain) established multiple Technology Transfer Centers within its innovation ecosystem, linking universities and industry to streamline patent licensing, support spin-offs, and accelerate commercialization through dedicated innovation offices.

- **Robust IP Protection Frameworks:** A strong IP framework is foundational to technology transfer within Innovation Districts. It ensures that innovations emerging from research institutions, startups, and collaborative ventures are adequately protected and attractive to investors. Clear and transparent IP ownership policies, especially for publicly funded research build trust among researchers, innovators, and industry partners. Districts should streamline invention disclosure processes, provide access to legal expertise, and promote early-stage IP assessment and patent filing. A well-functioning IP environment safeguards innovation, minimizes disputes, and accelerates the path from discovery to commercialization.

Benchmark Insights: 22@ Barcelona (Spain) maintains strong IP protection frameworks through university-led patent

offices and public advisory programs, ensuring research outcomes are safeguarded and attractive to investors.

- **Licensing and Commercial Pathways:** Licensing and partnership agreements are core mechanisms for bringing technologies to market. Innovation Districts should offer flexible licensing models; exclusive, non-exclusive, or open-access, based on the type of technology and target sector. Establishing transparent benefit-sharing frameworks and royalty policies can incentivize inventors while ensuring equitable returns for all stakeholders. District governance bodies should also facilitate clear negotiation protocols and standardized contract templates to reduce delays. By offering multiple commercialization pathways through licensing, joint ventures, or spinouts; districts can maximize the economic and social returns of their innovation outputs.

  Benchmark Insights: Masdar City (UAE) enables commercialization through flexible licensing and partnership agreements between universities, startups, and global firms, accelerating clean-tech deployment and cross-sector innovation.

- **Market-Driven Approach:** A market-oriented approach ensures that research outputs are aligned with real-world challenges and industry needs. Innovation Districts should actively engage with industry partners, end-users, and investors early in the development cycle to validate market demand and ensure commercial viability. Regular market assessments, foresight studies, and feedback loops can help direct R&D efforts toward high-impact applications. Embedding this demand-driven approach ensures that innovations emerging from the district are not only technically sound but also economically scalable and socially relevant—leading to stronger uptake and investment.

  Benchmark Insights: Kendall Square (USA) applies a market-driven model through MIT's corporate partnerships and Venture Café programs, ensuring R&D outputs are aligned with real-world industry needs and commercially viable applications.

- **Competencies and Institutional Readiness:** For technology transfer and commercialization to thrive, Innovation Districts must build strong institutional and human capabilities. This includes expertise in IP management, business development, investment facilitation, and industry collaboration. Equally vital is leadership commitment and cross-functional coordination among universities, research centers, private sector entities, and government enablers. Districts should invest in capacity building through continuous training, mentorship programs, and exposure to global best practices. A skilled and well-coordinated ecosystem ensures agility, informed decision-making, and sustained innovation performance.

  Benchmark Insights: 22@ Barcelona (Spain) builds institutional capacity through its 22@Network and Technical Office, offering mentorship, training, and collaboration platforms that strengthen local research and innovation capabilities.

- **Financial Support and Resource Mobilization:** Access to early-stage funding is a critical enabler for advancing innovation from concept to commercialization. Innovation Districts should establish funding mechanisms such as proof-of-concept grants, seed funding, and venture capital partnerships to support prototyping, product validation, and market entry. Venture builders can also play a pivotal role by providing both capital and hands-on operational expertise to help early-stage startups accelerate growth and reach market readiness. Collaborative funding models that combine public investment, private sponsorship, and industry co-financing can reduce risk and foster shared ownership. By mobilizing diverse funding sources—government programs, research grants, corporate partnerships, venture builders, and impact investors—districts can create a sustainable financial ecosystem that accelerates technology deployment and strengthens long-term innovation capacity.

  Benchmark Insights: Punggol Digital District under Singapore's Smart Nation initiative functions as a national testbed for technology transfer and prototyping. Demonstrates how shared infrastructure and regulation can form a district's for piloting and scaling new technologies.

09
STAKEHOLDER AND COMMUNITY ENGAGEMENT

Stakeholder and community engagement is a cornerstone of successful innovation district development, ensuring that growth is inclusive, responsive, and sustainable. In complex urban ecosystems, where academia, industry, government, and local communities intersect, active engagement fosters trust, transparency, and shared ownership of the district's vision. It enables planners and developers to align infrastructure, public services, and innovation initiatives with the real needs and aspirations of diverse stakeholders. Moreover, it enhances the district's resilience by integrating local knowledge, encouraging collaboration across sectors, and building civic capacity. Without structured and meaningful engagement, innovation districts risk becoming exclusive enclaves, disconnected from their urban context and vulnerable to social and environmental challenges. Therefore, embedding stakeholder engagement into governance and planning processes is not just beneficial, it is essential for long-term success.

Engaging local communities, academia, and other stakeholders is vital to the success of innovation districts, as it ensures development is inclusive, collaborative, and aligned with shared goals. By actively involving diverse groups in planning and decision-making, districts can foster trust, unlock new ideas, and build resilient ecosystems that reflect the needs of all participants.

Key Examples of Engagement Strategies

- **Multi-Stakeholder Governance Platforms:** Establishing multi-stakeholder governance platforms is essential for fostering inclusive and coordinated decision-making in innovation districts. Platforms such as district councils or advisory boards, bring together representatives from academia, industry, government, and local communities to collaboratively shape the district's strategic direction. By facilitating shared decision-making, they ensure that development priorities reflect a balanced mix of economic, social, and academic interests. Such structures also promote transparency and accountability, helping to build trust among stakeholders. When designed with rotating leadership and open participation, these platforms can adapt to evolving needs and maintain long-term strategic alignment across sectors.

  Benchmark Insights: Masdar City (UAE) engages multiple stakeholders through its advisory councils and partnerships with government entities, universities, and private firms, ensuring coordinated decision-making and alignment on sustainability and innovation goals.

- **Intermediary Organizations:** Intermediary organizations play a critical role in bridging gaps between diverse stakeholders within innovation districts. Acting as neutral conveners, these entities facilitate dialogue, coordinate collaborative initiatives, and serve as communication hubs for district-wide updates and opportunities. Their presence helps reduce fragmentation and ensures that efforts across academia, industry, and community groups are aligned and mutually reinforcing.

  Benchmark Insights: In Kendall Square, Organizations like the Kendall Square Association exemplify this model by hosting forums, promoting shared values, and enabling cross-sector partnerships that drive innovation and inclusivity.

- **Participatory Urban Planning and Design:** Participatory urban planning is a powerful strategy for embedding community values into the physical and functional design of innovation districts. Through co-design workshops, town halls, and digital engagement platforms, residents, students, and workers can actively contribute to shaping public spaces, mobility systems, and infrastructure. This inclusive approach not only enhances the relevance and usability of urban development but also builds civic trust and ownership.

  Benchmark Insights: In 22@Barcelona, Design Hub is the flagship public facility of the 22@ innovation district, serving as a vibrant engine for interdisciplinary collaboration in design, research, and innovation. By bridging creative industries, academia, and technology, it plays a central role in shaping Barcelona's identity as a global design capital.

- **Inclusive Workforce and Talent Development:** Innovation districts must prioritize inclusive workforce development to ensure that economic opportunities are accessible to all segments of the population. By partnering with educational institutions, vocational training centers, and local schools, districts can create pathways into innovation careers for underrepresented and underserved communities. Programs offering mentorship, internships, and entrepreneurship support help cultivate a diverse talent pipeline and foster upward mobility. This strategy transforms innovation districts from elite enclaves into engines of equitable growth and social advancement.

  Benchmark Insights: In 22@Barcelona, 22@ Synergy is a thematic co-creation program where companies and academic institutions jointly solve real-world challenges through open innovation workshops and applied research collaboration.

- **Open Innovation and Knowledge Sharing:** Open innovation is a cornerstone of dynamic and collaborative innovation ecosystems. Encouraging academic and industry to engage in joint research, public lectures, hackathons, and open-access initiatives fosters a culture of transparency and shared learning. These activities break down silos, accelerate the commercialization of research, and strengthen the intellectual fabric of the district. By promoting knowledge exchange across disciplines and sectors, innovation districts can remain agile, competitive, and responsive to emerging challenges and opportunities.

  Benchmark Insights: In 22@Barcelona, Networking Event held regularly bringing together professionals, researchers, and startups to exchange insights, present projects, and foster informal partnerships across sectors (e.g., 22@ Breakfast)

- **Community Benefit Agreements (CBAs):** It's a formal mechanism that ensure innovation district development delivers tangible benefits to local communities. These agreements, negotiated between developers and community groups, can guarantee affordable housing, public amenities, job creation, and environmental sustainability benchmarks. CBAs provide a structured way to align private investment with public interest, offering enforceable commitments and accountability measures. When implemented effectively, they help mitigate displacement, promote equity, and build long-term community support for district initiatives.

  Benchmark Insights: In Kendall Square, Venture Café is a community-driven hub that fosters collaboration among entrepreneurs, researchers, investors, and community leaders. Weekly networking events, mentoring, and learning opportunities to help ideas grow.

- **Digital Engagement and Smart Tools:** Leveraging digital tools is an increasingly vital strategy for broadening stakeholder engagement in innovation districts. Mobile applications, interactive dashboards, and virtual town halls enable real-time feedback, transparent performance tracking, and inclusive participation across geographic and demographic boundaries. These technologies enhance accessibility, allowing stakeholders to engage with district planning and operations regardless of time or location. Smart engagement platforms also support data-driven decision-making, helping planners respond quickly to community input and evolving needs.

  Benchmark Insights: 22@ Barcelona (Spain) utilizes digital tools such as Decidim Barcelona, an online civic platform that enables residents, businesses, and institutions to provide feedback, track projects, and participate in planning through transparent, data-driven engagement.

10
FUNDING STRATEGY AND FINANCIAL SUSTAINABILITY

A robust funding strategy is essential for the long-term success and resilience of innovation districts. These districts require sustained investment in infrastructure, research facilities, public spaces, and community programs often over a multi-decade horizon. Globally, successful innovation districts leverage a mix of public funding, private investment, and philanthropic or grant-based support to balance risk, ensure inclusivity, and maintain financial sustainability. Strategic funding models not only enable physical development but also support programming, talent development, and ecosystem coordination. By aligning financial mechanisms with the district's mission and stakeholder interests, innovation districts can remain adaptive, inclusive, and competitive.

Innovation districts globally rely on diverse and strategic funding structures to support their development, operations, and long-term sustainability by blending public investment, private capital, and grant-based support to create resilient and inclusive ecosystems.

- **Public Sector Investment:** Public funding typically serves as the catalyst for innovation district development. Governments invest in foundational infrastructure roads, utilities, transit, and public spaces as well as anchor institutions like universities and research centers. This early investment de-risks the district, making it attractive for private capital. In practice, public funds are often tied to urban regeneration goals, inclusive housing, and workforce development. Long-term sustainability is achieved by embedding innovation districts into broader city planning and budgeting cycles, ensuring continued support through municipal or national development programs.

  Benchmark Insights: In 22@Barcelona, Barcelona City the city council invested in a Special Infrastructure Plan to improve urban services and utilities. This helped create a modern, well-equipped environment that attracts innovative companies and supports collaboration.

  Benchmark Insights: Kendall Square, The City of Cambridge and Massachusetts state agencies provide grants, tax incentives, and infrastructure funding. Programs like MassCEC (Massachusetts Clean Energy Center) offer technical support and capital for clean energy projects.

- **Private Capital Investment:** Private sector investment plays a pivotal role in scaling innovation districts and driving commercial activity. Real estate developers and private companies often fund the construction of office buildings, research labs, mixed-use developments, and urban infrastructure. These investments are typically market-driven, but districts can strategically attract them by offering zoning incentives, innovation-linked leases, and density bonuses. The presence of multinational corporations such as global tech firms serves as a powerful magnet for private capital, signaling market confidence and stimulating further real estate and venture capital inflows. This dynamic creates a self-reinforcing cycle where infrastructure development attracts talent and startups, which in turn sustains demand and investment. Long-term financial sustainability is achieved by aligning private returns with ecosystem success, ensuring that investors benefit from tenant retention, innovation growth, and regional competitiveness.

  Benchmark Insights: In 22@Barcelona, Fund construction and urban development facilities through real estate developers and companies. The attraction of multinationals (e.g., Amazon, Microsoft, Cisco) further drew real estate and venture capital inflows.

- **Grant-Based Funding:** Philanthropic foundations and research grants provide flexible capital for programming, inclusion, and experimentation. These funds often support initiatives that are high-impact but low-return, such as education, community engagement, and translational research. Districts sustain this funding by building long-term relationships with donors, aligning projects with foundation missions, and demonstrating measurable social and economic outcomes. Competitive grant writing and consortium-based applications also help secure recurring support from national and international research bodies.

  Benchmark Insights: In Kendall Square , Organizations like the Broad Institute receive philanthropic funding alongside industry partnerships to support large-scale biomedical research.

- **Public-Private Partnerships (PPPs):** PPPs help build large scale infrastructure like innovation campuses and mixed-use developments. When managed well with clear roles, transparent finances, and shared goals they create long-term value. These partnerships ensure public services are improved while private investors see returns, making the district more sustainable and attractive for future growth.

  In innovation districts, PPPs require tailored risk-sharing arrangements that reflect the long investment horizons and uncertain early returns characteristic of innovation-led development. Global experience shows that effective PPP structures allocate early-stage demand and infrastructure risk to the public sector—particularly for shared R&D facilities, enabling infrastructure, and public realm assets—while private partners focus on development

execution, operations, and long-term value creation. As districts mature and ecosystem demand stabilizes, risk and return profiles are progressively rebalanced toward private sector participation. Embedding explicit risk-allocation principles within PPP frameworks enhances investor confidence, accelerates project delivery, and supports the sustained growth of innovation ecosystems.

Benchmark Insights: In Masdar City, Third-party developers finance and construct projects while Masdar provides land, infrastructure, and sustainability oversight.

- **Blended Finance and Anchor Investment:** blended finance and anchor investment approaches play a critical role in enabling large-scale innovation district development, particularly in capital-intensive and early-stage environments. International benchmarks demonstrate that the participation of public or sovereign anchor investors can significantly reduce perceived risk, signal long-term commitment, and crowd in private and institutional capital. Blended finance structures typically combine public or sovereign capital absorbing early-stage risk with private investment scaling assets and ventures over time. When deployed strategically, these mechanisms align national development priorities with market-based investment discipline, supporting both financial sustainability and innovation impact without displacing private sector participation.

  Benchmark Insights: In early stages of Masdar City, the district was anchored by long-term public capital through Mubadala, which absorbed early-stage development risk by funding core infrastructure, research institutions, and clean-technology assets that were not expected to generate immediate commercial returns. As Masdar City matured, financing diversified toward private real estate investment, corporate R&D expenditure, and commercial activity within the free zone, illustrating how sovereign anchor investment can de-risk early innovation district development while enabling a gradual transition to market-led financial sustainability.

Internal Revenue Generation Strategies within Innovation Districts:

Innovation districts globally are evolving beyond traditional funding models to adopt self-sustaining revenue strategies that support long-term operations, programming, and ecosystem growth. These strategies blend direct income sources with innovative financial mechanisms that reinvest value back into the district.

These are foundational income sources that districts use to fund daily operations and services:

- **Property Rental:** A core revenue source for many districts is leasing models, grow-in-place spaces such as labs, co-working offices, and retail units. These rentals not only generate steady income but also support the physical clustering of startups, researchers, and service providers, reinforcing the district's collaborative environment and scalability.
- **Licensing Fees:** Innovation districts often partner with universities and research centers to commercialize intellectual property (IP) through licensing agreements. These fees are generated when patented technologies, software, or research outputs are licensed to startups or corporations. Standardized spinout terms and licensing templates streamline the process, allowing districts to earn recurring revenue while promoting innovation transfer.
- **Investment Income:** Districts increasingly take equity stakes in startups or collaborate with venture capital firms to create district-managed funds. Returns from these investments, whether through exits, dividends, or fund performance provide a sustainable income stream that can be reinvested into infrastructure, programming, or new ventures, aligning financial growth with ecosystem development. In addition, some districts may establish their own venture builders as investment vehicles, enabling them to generate equity-based returns while directly shaping innovation pipelines that enhance the long-term value of the local entrepreneurial ecosystem.
- **Programmatic Fees:** Innovation districts charge fees for participation in structured programs like accelerators, incubators, and soft-landing services for international teams. These fees help fund mentorship, training, and networking activities, while also ensuring that programs remain high-quality and responsive to market needs.
- **Event Hosting and Sponsorships:** Districts monetize their brand and physical space by hosting innovation summits, hackathons, pitch competitions, and corporate showcases. Revenue is generated through ticket sales, sponsorships, and partnerships, while these events also enhance visibility, attract talent, and foster cross-sector collaboration.

Innovation district financial strategies should be designed around tiered models that evolve with district maturity and innovation intensity. International benchmarks demonstrate that both financial models and incentive mechanisms must be differentiated according to the district's development stage (nascent, emerging, mature) and the level of R&D and innovation contribution by tenants. In early stages, public funding and incentive structures play a catalytic role by de-risking infrastructure, attracting anchor institutions, and incentivizing research-intensive activities. As districts mature, financial sustainability increasingly relies on diversified revenue streams, performance-linked incentives, and private capital participation, with incentives progressively shifting from attraction-based to outcome-based mechanisms. Aligning financial models and incentives through a tiered approach ensures long-term sustainability, preserves innovation intensity, and prevents innovation districts from converging into conventional commercial developments.

11

INNOVATION DISTRICT ACTIVATION

Activating an innovation district requires more than physical development; it calls for a strategic, phased approach that aligns vision, governance, infrastructure, and ecosystem dynamics. This framework outlines the essential steps to guide districts from concept to full operation, ensuring they are positioned to deliver measurable impact, attract global talent, and foster sustainable, inclusive growth. While these steps provide a common direction and best-practice guidance, each innovation district should tailor its approach to reflect the unique characteristics of its local ecosystem, sectoral focus, and regional priorities.

Figure: Suggested Innovation District Activation plan

- **Phase 1: Foundation and Strategic Direction:** This phase lays the groundwork for activating an innovation district by aligning stakeholders, setting up governance, and securing regulatory and strategic enablers. It ensures clarity of purpose, leadership structure, and ecosystem readiness before physical development begins. Key activities include:
  - **Define Vision and Priority Sectors:** Establish a clear vision for the district that aligns with national and regional innovation strategies. Identify priority sectors that reflect the district's strengths and national innovation goals.
  - **Define Governance Framework:** Develop a robust governance model outlining the roles, responsibilities, and decision-making processes of all key actors. Including the government partners, private-sector entities, and academic institutions. This ensures transparency, strategic alignment, and long-term accountability across all district activities.
  - **Establish Innovation District Office:** Create a dedicated operational body responsible for managing district activities. Adopting a functional organizational structure, organized around defined domains such as governance, partnerships, and infrastructure—helps ensure coordination, accountability, and flexibility as the district evolves.
  - **Map Ecosystem Assets and Stakeholders:** Identify existing universities, research centers, startups, corporates, and innovation hubs that can form the early foundation of the district. This mapping supports targeted partnerships and collaborative program design.
  - **Secure Regulatory Enablement:** Work with relevant authorities to obtain required regulatory support, including zoning reforms, flexible building codes, and incentives that encourage R&D and business participation.
  - **Engage Anchor Institutions:** Confirm participation of key universities, corporates, investors, and R&D agencies that can act as anchor partners. Their presence provides credibility, attracts other stakeholders, and drives long-term sustainability of the district.
- **Phase 2: Infrastructure & Enablers:** This phase focuses on building the physical and digital foundations that enable the innovation district to operate effectively and attract talent, startups, and corporate partners. It ensures the district is functional, connected, and ready to support innovation activities. Key activities include:
  - **Develop Mixed-Use Urban Form:** Design and construct a balanced mix of residential, office, lab, and public spaces to support a live–work–learn–play environment. This approach promotes density, walkability, and vibrant community life.
  - **Implement Smart Infrastructure:** Deploy essential infrastructure including transit systems, utilities, IoT networks, and high-speed fiber. These systems support digital operations, mobility, and sustainability across the district.

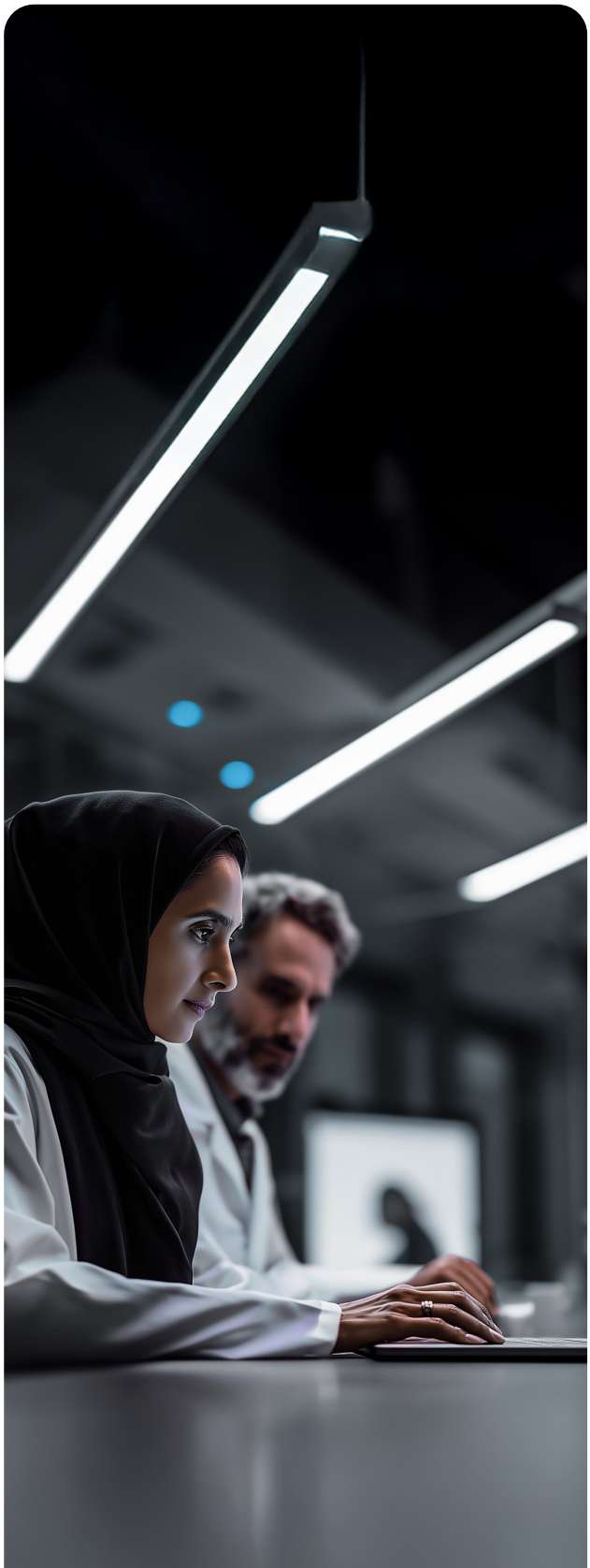
- **Activate Core Support Services:** Establish foundational services such as incubators, funding access, legal and IP advisory, and facilities management. These services are critical to supporting startups, researchers, and innovation firms.
- **Pilot Living-Lab Initiatives:** Launch real-world pilots in areas like mobility, energy efficiency, and digital twins. These initiatives allow the district to test and refine innovative solutions in collaboration with startups and universities.
- **Launch District Branding and Community Engagement:** Introduce a clear district identity through branding, communications, and public events. This builds visibility, attracts talent, and fosters a sense of belonging among stakeholders.

- **Phase 3*: Ecosystem Growth & Collaboration:** This phase focuses on expanding the innovation district's capacity by deepening partnerships, developing talent pipelines, and integrating industry. It builds on the foundational infrastructure to create a dynamic, collaborative ecosystem that drives innovation outcomes. Key activities include:
  - **Develop Thematic Clusters:** Organize innovation activities around priority sectors such as AI, biotech, clean energy, and creative industries. These clusters help concentrate expertise, attract investment, and foster specialization.
  - **Launch Joint R&D Programs:** Facilitate co-funded research initiatives between academia and industry. These programs accelerate technology development and strengthen commercialization pathways.
  - **Enhance Talent Development:** Introduce structured programs including internships, fellowships, and global talent visas to attract and retain skilled innovators and researchers.
  - **Create Collaboration Incentives:** Provide targeted grants, tax credits, and challenge-based funding to encourage partnerships between corporates, startups, and research institutions.
  - **Integrate into the National Innovation Alliance:** Connect with national platforms to access shared services, benchmarking tools, and cross-district collaboration opportunities.
- **Phase 4: Continuous Improvement:** This phase focuses on ensuring the long-term sustainability, adaptability, and global relevance of the innovation district. It transitions the district from a managed initiative to a self-sustaining ecosystem with strong governance, diversified funding, and international connectivity. Key activities include:
  - **Institutionalize Governance:** Transform the Innovation District Office into an autonomous management entity with fiscal independence and board oversight to ensure long-term operational continuity.
  - **Strengthen Global Partnerships:** Establish strategic collaborations with leading innovation districts worldwide to facilitate talent exchange, joint research, and global visibility.
  - **Embed Performance Monitoring:** Implement a data-driven KPI framework to continuously track innovation, sustainability, and inclusion metrics, enabling evidence-based decision-making.
  - **Enhance International Visibility:** Strengthen global presence by joining and actively engaging with leading international associations to advance knowledge exchange, and global recognition.
  - **Diversify Revenue Streams:** Expand funding sources through real estate investment, licensing income, service fees, and co-investment platforms to reduce reliance on public funding.
  - **Scale and Replicate:** Apply lessons learned to support the activation of new districts across the Kingdom through the RDI Alliance framework, promoting national innovation network growth.

* This stage can build upon the foundation of existing innovation assets, such as technology valleys, science parks, and university-based research centers. Many of these entities may already operate at a similar stage of maturity and can leverage this framework to scale their impact further, provided the right strategic direction and enabling infrastructure are in place.

12

CORE SUPPORT SERVICES WITHIN INNOVATION DISTRICTS



Innovation Districts thrive when they offer not only infrastructure and governance, but also a comprehensive portfolio of support services that enable startups, researchers, corporates, and the community to innovate, grow, and commercialize ideas. These services act as the backbone of the ecosystem, providing critical resources and reducing barriers to entry for innovators. The following categories outline the key support services that districts should consider offering:

- **Business Incubation & Acceleration:** Business incubation and acceleration programs are structured initiatives that support startups at different stages of development by providing mentorship, resources, and access to networks. Incubation focuses on early-stage ventures, often in the idea or prototype phase, offering workspace, technical support, and business development services over a longer period to help founders refine their business model and prepare for market entry. Acceleration, on the other hand, targets more mature startups with validated products and aims to drive rapid growth through short, intensive, cohort-based programs emphasizing mentorship, investor readiness, and scaling. Together, these programs reduce barriers to entry, foster innovation, attract investment, and contribute to job creation and long-term economic growth.

  To achieve this, innovation districts should offer a diverse portfolio of incubation and acceleration services, including:

  - **Incubators:** Offer co-working spaces, shared labs, and access to business services that reduce overhead costs and enable startups to focus on product and market development.
  - **Accelerators:** Provide intensive, time-bound programs with mentorship, investor access, and structured curricula to help startups refine business models and scale rapidly.
  - **Proof-of-Concept & Urban Testbeds:** Real-life platforms to pilot and validate technologies in areas such as mobility, IoT, or cleantech, accelerating their adoption and commercialization.
  - **Corporate-Startup Matchmaking:** Facilitates collaboration between entrepreneurs and established companies for co-creation, partnerships, and pilot projects.
  - **Venture Builders:** Co-create startups from scratch by providing funding, expertise, and shared resources to transform ideas into scalable businesses.

- **Mentorship, Training & Talent Development:** Mentorship and training ensure that innovators and entrepreneurs have the knowledge, skills, and networks required to succeed. These services connect emerging talent with experienced professionals and provide structured learning opportunities. By building human capital, the district strengthens its role as a talent hub, aligning workforce capabilities with future industry demands and positioning itself as a global center for innovation excellence.
  - **Structured Mentorship:** Connects startups and researchers with seasoned entrepreneurs, corporate leaders, and investors who provide strategic advice and guidance.
  - **Entrepreneurship Training:** Delivers workshops and programs on business planning, product development, fundraising, and go-to-market strategies.
  - **Skills Development Programs:** Focus on advanced technologies (e.g. AI, biotech, clean energy, robotics), leadership, and innovation management to build future-ready skills.
  - **Student & Researcher Engagement:** Creates pipelines through internships, fellowships, and placement programs linking talent directly with startups and corporate labs.
- **Access to Funding & Investment Readiness:** Access to capital is one of the most critical enablers for startup growth and innovation. By providing diverse funding options and preparing entrepreneurs for investment, the district strengthens its ability to attract high-quality ventures and retain them long-term. A structured funding ecosystem also signals to global investors that the district is investment-ready, increasing both financial inflows and confidence in the ecosystem.
  - **Seed & Early-Stage Funding:** Grants, micro-loans, and angel networks help entrepreneurs bridge the initial financing gap.
  - **Equity Financing:** Access to venture capital funds, corporate investments, and private equity opportunities to fuel scale-up stages.
  - **Public Incentives & Grants:** Guidance on national and regional innovation grants, R&D credits, and subsidy schemes that reduce financial risks for startups.
  - **Investment Readiness Programs:** Support in pitch development, financial modeling, and due diligence to prepare startups for successful fundraising.
  - **Innovation Funds:** District-managed or co-investment funds strategically deployed into high-potential startups aligned with national priorities.
- **Legal, IP & Financial Advisory Services:** Legal, intellectual property, and financial advisory services are essential to reducing risk, protecting innovation, and ensuring long-term viability. Startups and research spin-offs often lack in-house expertise in these areas; by embedding advisory support in the district, innovators are empowered to commercialize securely and compliantly. This strengthens confidence among global investors, supports alignment with national IP frameworks, and builds the district's reputation as a safe and structured environment for innovation.
  - **Legal Advisory:** Guidance on incorporation, contracts, licensing, compliance, and dispute resolution.
  - **Intellectual Property (IP) Support:** Specialized assistance for patent filings, trademarks, copyrights, and alignment with the national Technology Transfer Office (TTO) blueprint.
  - **Regulatory Guidance:** Navigation of sector-specific regulations, data protection standards, and international compliance requirements.
  - **Financial Advisory:** Services for taxation, accounting, financial modeling, and valuation to ensure fiscal health of startups.
  - **Specialized Advisory:** Targeted support for regulated industries such as biotech, healthcare, and cleantech.
- **Networking, Collaboration & Market Access:** Networking and collaboration are the lifeblood of innovation districts, transforming them from clusters of companies into dynamic ecosystems. By fostering connections between startups, corporates, investors, academia, and government, districts accelerate knowledge exchange and create pathways for global expansion. Regular engagement programs, global linkages, and market access platforms position the district as both a local hub and an international gateway.
  - **Networking Platforms:** Regular events such as demo days, forums, summits, and themed workshops to encourage collaboration and knowledge sharing.
  - **Innovation Alliances:** Participation in national and international innovation networks for benchmarking, knowledge exchange, and joint initiatives.
  - **Cluster Development:** Support for sector-based communities (ICT, biotech, clean energy, creative industries) that encourage co-location and shared innovation.
  - **Market Entry Support:** Assistance with global soft-landing programs, trade missions, and international exhibitions to expand market access.
  - **Community Engagement:** Inclusive cultural, educational, and outreach programs that integrate the district into the social fabric and build a strong identity.

Equally important is the establishment of district-wide maintenance and support services that enhance livability, productivity, and resilience—ensuring the district remains attractive to startups, researchers, investors, and residents alike.

- **Facilities Management** is crucial because it ensures that all physical assets such as buildings, public spaces, and infrastructure—are maintained to the highest standards. This operational backbone keeps the district safe, efficient, and attractive for businesses, researchers, and residents. Effective facilities management supports uninterrupted operations, enhances user satisfaction, and upholds environmental sustainability. By integrating smart technologies and sustainable practices, it also helps the district remain resilient, competitive, and aligned with international standards, ultimately reinforcing its reputation as a world-class destination for innovation and investment.
  - **Infrastructure Maintenance:** This involves the upkeep of essential district infrastructure such as roads, utilities, lighting, landscaping, and public amenities. Smart technologies like IoT sensors are integrated to enable predictive maintenance, real-time fault detection, and automated reporting ensuring reliability, safety, and operational efficiency across the district.
  - **Building Operations:** Core services include HVAC systems, elevators, water supply, waste management, and energy optimization. These are managed through advanced Building Management Systems (BMS), which automate controls to improve energy efficiency, reduce operational costs, and enhance occupant comfort and safety.
  - **Sustainability and Green Operations:** Sustainable practices are embedded throughout the district, including recycling programs, green cleaning methods, water conservation, carbon tracking, and renewable energy integration. These efforts aim to align with global sustainability standards such as LEED and Estidama, reinforcing the district's commitment to environmental stewardship.
  - **Safety and Security:** Comprehensive safety systems cover surveillance, access control, emergency response, and fire protection. These are supported by cutting-edge technologies like AI-powered video analytics, integrated command centers, and digital emergency alert systems to ensure a secure and responsive environment for all users.
- **Community Engagement:** It transforms the innovation district from a simple workplace into a vibrant, inclusive, and culturally rich environment. By building trust and encouraging participation, it strengthens the social fabric and identity of the district, making it more resilient and sustainable in the long term.
  - **Events and Programming:** A diverse range of activities such as hackathons, cultural festivals, speaker series, wellness programs, and networking events are organized to promote cross-disciplinary collaboration, spark creativity, and foster a sense of community belonging among all district stakeholders.
  - **Digital Platforms for Engagement:** The use of mobile apps, community portals, feedback systems, and virtual town halls enables continuous and accessible communication. These platforms often leverage AI-driven personalization to boost participation and tailor content to the unique interests and needs of users, ensuring everyone feels connected and heard. In addition, a unified digital innovation management platform connecting researchers, startups, mentors, and investors in real time can strengthen transparency, coordination, and data-driven collaboration across the ecosystem.
  - **Civic Participation and Co-Creation:** Residents and stakeholders are actively involved in the planning, design, and policy-making processes of the district. Methods such as surveys, workshops, participatory budgeting, and citizen advisory boards empower the community to co-create solutions and shape the district's future.
- **Inclusion and Accessibility:** Efforts are made to ensure that all services and spaces are accessible to everyone, including people with disabilities, youth, and underserved groups. Initiatives like digital literacy programs, inclusive design audits, targeted outreach, and universal access to public spaces help create an environment where everyone can participate and thrive.

13

FRAMEWORKS FOR MONITORING AND EVALUATION

Monitoring and evaluation are essential tools for steering strategic growth, enhancing operational efficiency, and ensuring the long-term sustainability of innovation districts. Key performance indicators (KPIs) serve as metrics to measure the performance of innovation districts and track their progress by:

- **Setting the innovation district's direction:** Defining specific KPIs helps innovation districts concentrate their efforts and avoid wasting time and resources on activities that do not align with their strategic goals.
- **Defining the innovation district's purpose:** The KPIs selected by innovation districts reflect their core priorities and mission, ensuring that all initiatives are purpose-driven.
- **Measuring the impact created by the innovation district:** By tracking strategic and operational KPIs over time, district leaders can assess progress, identify areas for improvement, and make informed adjustments to their strategies.
- **Communicating the value of the innovation district to stakeholders:** Consistent tracking and reporting of strategic and operational KPIs allow district leaders to demonstrate progress, showcase achievements, and highlight the district's contribution to broader innovation goals.

Without clear and well-defined KPIs, it becomes difficult for an innovation district to evaluate whether it is achieving its intended objectives. These KPIs can be categorized into two main types:

- **Strategic KPIs:** These define the long-term direction and purpose of the innovation district and measure its overall performance.
- **Operational KPIs:** These track the district's day-to-day activities and performance, helping optimize resources, monitor progress, and ensure accountability.

The KPIs presented in this blueprint, however, primarily focuses on operational and implementation performance. They are designed to guide early district setup, governance efficiency, and ecosystem activation.

To ensure alignment and avoid premature definition of high-level strategic KPIs, such as those related to district maturity, health, sustainability, and socio-economic impact, it is recommended to first establish operational baselines. Once these are in place, a comprehensive Operational Excellence (OE) Framework should be implemented to assess and evolve toward a strategic KPI

framework that measures broader outcomes such as district maturity, innovation intensity, and long-term sustainability.

As part of the OE Framework, districts should develop strategic KPIs after operational stabilization to monitor:

- **District Maturity and Health:** Long-term performance, governance resilience, and institutional growth.
- **Sustainability and Impact:** Economic diversification, environmental performance, and societal value creation.
- **Innovation Ecosystem Strength:** Collaboration density, talent retention, and commercialization success.

13.1 KPIs Aligned with the District's Goals

These KPIs collectively represent the full performance framework applicable to mature innovation districts, reflecting a comprehensive and advanced stage of ecosystem development. However, to guide districts at different points in their growth journey, the KPIs have been grouped to highlight which indicators are most relevant for nascent and emerging districts, and which are primarily suited to mature districts. The KPIs include the following:

Nascent KPIs

- **Number of Startups and Scale-ups Supported:** Measured by counting the total number of startups and high-growth companies operating within the district's incubators, accelerators, or co-working spaces. Data is obtained from innovation district registries or business licensing databases.
- **Number of Innovation Events Hosted (hackathons, forums, workshops):** Measured by counting the number of ecosystem-building events organized within the district. This KPI is based on event calendars, program reports, and community engagement records.
- **Number of Co-Working and Lab Space Operational:** Measured by counting the shared workspaces and specialized labs currently active and available for use. This KPI is based on facility management records, leasing data, and infrastructure inventories.
- **Talent Attraction and Retention Rate:** Measures the number of skilled professionals, researchers, and entrepreneurs attracted to and retained within the district. Data is collected from HR records of incubators, accelerators, and partner institutions.
- **Number of Invention Disclosures and Patent Applications Filed:** Measured by counting all invention disclosures submitted by researchers within the district and the number of new patent applications filed. This reflects the strength of the early-stage research pipeline and the district's capacity to generate protectable intellectual property. Data is collected from TTOs, research centers, and district-level IP records.

Emerging KPIs

- **Occupancy Rate of Innovation and Office Spaces:** Calculated as the percentage of available innovation-related spaces (labs, research centers, co-working offices) currently occupied by startups, SMEs, or anchor institutions. Data is tracked through facility management or district administration systems.
- **Technology Transfer and Commercialization Activity:** Tracks the volume of technology licenses, collaborative research agreements, and industry partnerships initiated within the district. Information is gathered from universities, R&D centers, and innovation offices.
- **Total Venture Capital Raised by District Startups:** Measures the aggregate funding secured by startups and scale-ups operating within the district. Data is compiled from investment reports, venture databases, and startup registries.
- **Number of Pilot Projects or Urban Innovation Trials Conducted:** Tracks the total number of active pilot projects and proof-of-concept initiatives implemented within the district's innovation testbeds. Information is maintained by innovation district offices or municipal agencies.
- **Number of Innovation Events Hosted (hackathons, forums, workshops):** Measured by counting the number of ecosystem-building events organized within the district. This KPI is based on event calendars, program reports, and community engagement records.
- **Sustainability and Green Mobility Adoption Rate:** Assessed by the percentage of district users adopting sustainable commuting modes (walking, cycling, electric vehicles, or public transport) and the proportion of buildings certified under green standards such as LEED. Data is collected from environmental audits and transport usage surveys.

Mature KPIs

- **Average Time for Business Onboarding within the District:** Measured by the average number of days required for new companies or startups to complete all district-managed onboarding steps, including registration in the district's internal systems, workspace allocation, access to utilities and digital infrastructure, and completion of partnership or incubation agreements.

- **Contribution to Decent Work and Economic Growth:** Measured by the number of high-quality jobs created within the innovation district, the percentage of employees hired from local communities, and the rate of fair-wage compliance among district enterprises. Data is derived from labor market statistics and HR disclosures.
- **Number of New University Spin-out Companies:** Counts the total number of companies spun out from academic or research institutions within the district, indicating knowledge commercialization effectiveness.
- **Number of High-Growth and Unicorn-Status Companies:** Counts the total number of district-based companies that have achieved unicorn valuation or comparable high-growth milestones. Data is collected from investment reports, valuation databases, and company disclosures.
- **Efficiency of Intellectual Property (IP) Licensing:** Measured by the average time taken from disclosure to deal closure for IP licensing agreements. Data is sourced from tech-transfer offices and legal records.
- **Number of Co-Working and Lab Space Operational:** Measured by counting the shared workspaces and specialized labs currently active and available for use. This KPI is based on facility management records, leasing data, and infrastructure inventories.
- **Number of Formal Partnerships with Global Innovation Districts:** Measured by counting the total number of signed collaboration agreements, MoUs, joint programs, or co-innovation initiatives established with globally recognized matured innovation districts. Data is sourced from district administration records and partnership reports.
- **Contribution to GDP:** Measured by estimating the district's direct and indirect economic contribution to local and national GDP. This includes value added through district enterprises, research commercialization, high-value activities, and productivity gains. Data is derived from economic impact assessments, district financial reporting, and national accounts.
- **Total Job Creation within the District:** Measured by the cumulative number of jobs created by companies, startups, research institutions, and service providers operating within the district. Includes both direct jobs (within companies) and indirect jobs (through suppliers and service ecosystems). Data sourced from HR reports, labor market data, and district registries.
- **Average Revenue Generated per Hosted Company:** Calculated by dividing the total combined revenue of companies operating within the district by the number of active companies. This reflects the economic performance and growth trajectory of district-based enterprises. Data obtained through enterprise surveys, annual reports, and district administration records.

13.2 Data Collection Methods and Incentives

Data Collection Methods

- **Stakeholder Reporting:** Transparent communication builds trust and ensures accountability across public and private sectors.
  - **Annual impact reports:** Summarize district performance across strategic KPIs and are share with government, industry, and community stakeholders.
  - **Annual innovation and foresight reports:** Highlight emerging global trends, technology shifts, and strategic opportunities, positioning the district as a regional thought leader and informing policy and investment decisions.
  - **Public-facing portals:** Provide open access to selected metrics, enabling citizen engagement and feedback.
- **Performance Reviews and Benchmarking:** Regular reviews help assess progress and maintain competitiveness.
  - **Quarterly or annual KPI reviews:** Evaluate performance against predefined targets and identify areas for improvement.
  - **Global benchmarking:** Compare district performance with international peers to assess competitiveness and identify best practices.
- **Adaptive Feedback Loops:** Data insights are used to refine strategies and improve operational effectiveness.
  - **Continuous improvement workshops:** Engage stakeholders in reviewing data and proposing enhancements.
  - **Policy and program adjustments:** Use performance trends to inform updates to zoning, mobility, sustainability, and innovation programs.
- **Integrated Data Platforms:** Innovation districts benefit from centralized systems that aggregate real-time data across multiple domains.

- **Centralized dashboards:** Aggregate data from infrastructure, mobility, energy, and economic systems into a unified interface for decision-makers.
- **IoT sensors and smart meters:** Capture environmental data such as energy usage, air quality, and traffic flow.
- **GIS mapping tools:** Visualize spatial data related to land use, development density, and accessibility.

Data Collaboration Strategies

- **Incentive Mechanisms:** Targeted incentives foster active data sharing and sustained participation across the innovation ecosystem.
  - **Data-sharing incentives:** Introduce recognition programs for ecosystem members who consistently contribute high volume and quality of data.
  - **Incentive-based participation:** Encourage ecosystem partners to share data through benefits such as co-branding in reports, or priority inclusion in pilot programs.
- **Collaborative Data Frameworks:** Standardized processes ensure secure, transparent, and consistent data exchange among ecosystem partners.
  - **Data exchange frameworks:** Establish standardized templates and digital tools for partners to submit relevant performance data easily and securely.
  - **Data-sharing agreements:** Incorporate data-sharing clauses within partnership contracts and MOUs, clearly defining responsibilities, confidentiality, and frequency of reporting.

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