

Stage-Based Alignment of Digital Technology Finance Platforms in University Science and Innovation Parks

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Abstract: Financing conditions faced by firms in university science and innovation parks change as the firms grow, and offering a uniform set of financial products can create a mismatch between supply and demand. Drawing on a corporate life-cycle perspective, this study compares Yingchuang Power in Chengdu with Tiankai Higher Education Innovation Park in Tianjin. The findings show that firms in the incubation stage primarily need technology information that outside investors can assess; firms in the acceleration stage require continuous operating data to improve financing assessment; and mature firms need platforms to connect them with industrial capital and collaborative networks. Stage-based alignment rests on data accumulated through actual service processes and on coordination among universities, government agencies, financial institutions, and park operators.

Keywords: University science and innovation parks; Digital technology finance platform; Stage-based alignment

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1. Introduction

University science and innovation parks support technology transfer and venture incubation. Whether financial services enter the process in time often affects how quickly a technology moves from the laboratory to the market. In recent years, park services have expanded to proof-of-concept work and pilot-scale testing. The 2024–2035 Master Plan on Building China into a Leading Country in Education also calls for stronger technology transfer service platforms based on national university science parks. This policy direction has brought digital technology finance platforms to the fore, as parks seek to use data to improve communication between firms and financial institutions.

Financing conditions vary substantially across technology ventures. Startups usually have little financial history, funding needs rise sharply during market expansion, and industrial collaboration becomes more important as firms mature. If a platform continues to offer the same services at every stage, a larger product

catalogue will not necessarily produce effective support. This study therefore examines how platform capabilities can change as firms grow and how multiple participants contribute to that adjustment.

2. Theoretical perspective and research method

Financial growth cycle theory holds that a firm's information transparency, asset base, and sources of capital change as it develops ^[1]. Research on digital platforms further suggests that a platform is both a technical system and an organizational arrangement: data interfaces can improve connectivity, but whether resources actually flow still depends on participant relationships and the institutional environment ^[2]. Read together, these two strands of research suggest that stage-based alignment is not a matter of assigning fixed labels to firms. It requires the platform to adjust how it identifies needs and organizes services as firms evolve.

In this study, a university science and innovation park refers to an innovation vehicle that draws on university research and technological outputs, with technology transfer and venture development as its principal functions. Following Yin's comparative case-study approach, the analysis considers Yingchuang Power in Chengdu High-Tech Industrial Development Zone and Tiankai Higher Education Innovation Park in Tianjin. The former began as a technology finance service platform and has developed a relatively mature range of capital instruments. The latter is embedded directly in university technology transfer and thus has closer access to early-stage projects. The contrast helps reveal how platform capabilities emerge.

3. Case comparison and the stage-based alignment mechanism

Yingchuang Power was established on a state-owned operating platform in Chengdu High-Tech Zone. The National Development and Reform Commission later included its one-stop investment and financing service among reform practices for wider replication. The platform integrates offline financial institutions with an online financing portal and adjusts its emphasis as firms grow. For nascent projects, it provides links to early-stage equity capital. Once firms have operating records, support shifts toward technology-oriented credit and investment–loan linkage; more mature firms can also obtain IPO preparation services. The strength of this model lies in the continuity of its financing instruments. Digitalization is used mainly to accumulate firm-level records and narrow the search for suitable products.

Tiankai Park is closer to the source of university research. It embeds proof-of-concept work, technology transfer services, and financing connections in the technology transfer process, a practice documented by Zhang *et al.* ^[3]. Validation records allow early projects to supplement limited financial information and help financial institutions understand technological progress at an earlier point. As a firm enters the acceleration stage, fund investment and bank credit are introduced in sequence. Compared with Yingchuang Power, Tiankai is better positioned to identify projects before meaningful operating data exist, although continuous credit records still need to be built through follow-on services.

The cases represent two distinct pathways: one extends financial services into a park ecosystem, while the other adds financing capacity to a technology transfer system. Yingchuang Power is stronger in capital organization, whereas Tiankai Park has an advantage in early-stage technology assessment. Both connect online systems with offline professional services. The firm needs to drive changes in platform capabilities, while information accumulated by the platform feeds back into firm growth. **Figure 1** summarizes this two-way alignment.

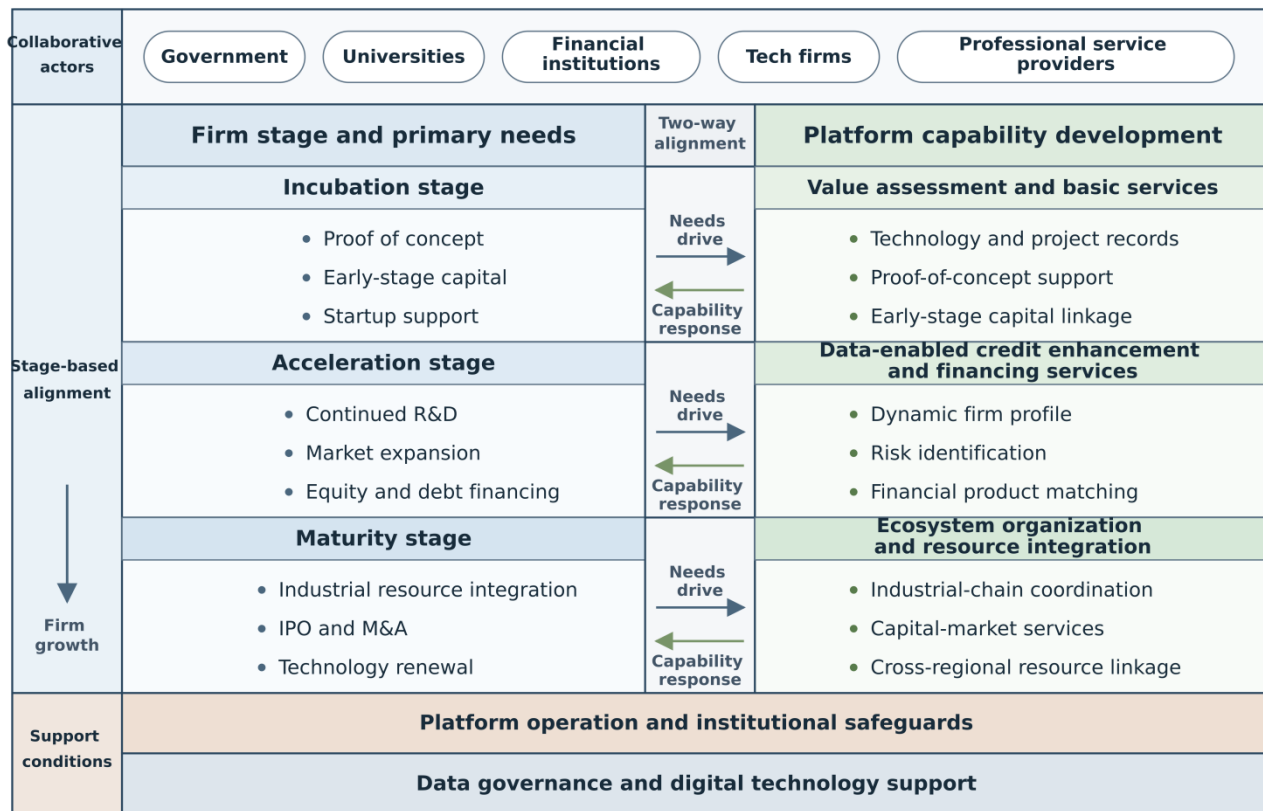


Figure 1. Stage-based alignment mechanism of digital technology finance platforms

3.1. Incubation stage: Producing assessable technology information

Firms in the incubation stage may have little beyond a technical proposal and an R&D team, giving outside investors limited grounds for assessing commercial prospects. A park can build project records around ownership of technological outputs, proof-of-concept work, and pilot-scale testing, while preserving expert assessment trails. The purpose of these records is to make technology information traceable, not to replace professional judgment with a model. At this stage, proof-of-concept funding and early-stage equity capital are more appropriate. Government agencies and universities provide foundational services, while investment institutions continue to make decisions on market terms.

3.2. Acceleration stage: Improving financing assessment with continuous data

As firms enter the acceleration stage, orders and operating cash flows begin to emerge, but R&D and market expansion create substantial funding pressure. With a firm's authorization, the platform can cross-check operating records against information held by financial institutions and build a dynamic firm profile. Existing research shows that alternative data can supplement conventional credit records^[4], although platform assessments should remain an input to, rather than a substitute for, due diligence. Financing instruments should be matched to the intended use of funds, and firms should be reassessed when operations change so that outdated classifications do not persist.

3.3. Maturity stage: From financing linkage to resource coordination

Mature firms generally have better access to ordinary credit, and their new needs often arise from technological renewal and industrial collaboration. The platform can use information accumulated through long-term service relationships to connect firms with industrial funds, upstream and downstream partners, technology transaction services, and IPO advisers. Technology services can strengthen the resilience of innovation ecosystems^[5], but the platform should confine itself to identifying needs and organizing connections; firms and professional institutions remain responsible for specific transactions. If a firm begins a new round of technological exploration, its stage assessment should also be revised.

The three stages are not separate service lists. Records created for early projects support later credit assessment, while dynamic firm profiles make resource connections at the maturity stage more effective. The roles of government agencies, universities, and financial institutions likewise change over time, whereas park operators remain responsible for identifying needs and coordinating processes. Digital technology becomes a stable platform capability only when it is integrated into assessment, credit approval, and follow-up services.

4. Implications for Shandong

Shandong already operates technology finance platforms such as Kerongxin. Measures issued by the Shandong Provincial Department of Science and Technology in 2025 call for linking innovation points with credit-enhancement assessments and strengthening support through technology-oriented credit and venture investment. University science and innovation parks therefore do not need to construct separate closed systems. A more practical arrangement is for the provincial platform to establish common data standards and aggregate financial products, while individual parks identify university technologies and firm needs. Project records can begin at the proof-of-concept stage and gradually develop into dynamic firm profiles as actual service records accumulate.

Parks differ in their industrial base, so service modules need not be installed all at once. Parks with concentrated university resources can begin with early-stage technology assessment, whereas manufacturing clusters should strengthen financing for pilot-scale testing and industrial-chain services. Platform operation must also define the boundaries of data authorization and retain a channel for human review. Performance assessment should look beyond total financing to whether projects continue to attract capital and whether firms form new technological partnerships through the platform.

5. Conclusion

The value of a digital technology finance platform in a university science and innovation park depends on whether its services keep pace with firm growth. The incubation stage centers on making technological value intelligible; the acceleration stage requires credible operating information; and the maturity stage shifts toward organizing industrial resources. Platform capabilities accumulate through actual service delivery, and one-off data collection cannot substitute for sustained engagement. Because this study relies on a comparison of public case materials, its conclusions require further testing across a broader range of parks, particularly through longitudinal observation of how firm stages and platform services change together.

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Disclosure statement

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