

Characteristics, Cases, and Implications of Open Innovation Intermediary Websites: Postprint

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Abstract

[Purpose / Significance] This study explores the characteristics and intermediary functions of open innovation intermediary websites, and examines their implications for scientific research in the new era. [Method / Process] It provides an overview of the characteristics of open innovation intermediary websites, and analyzes their intermediary functions and implementation using InnoCentive as a case study. [Result / Conclusion] Open innovation intermediary websites facilitate effective alignment between enterprises and academic departments, offering numerous implications for scientific research. Academic departments should adopt a more open philosophy in conducting research and innovation, and can leverage open innovation intermediary websites for research topic selection, industry-academia partnership building, transformation of scientific and technological achievements, stimulation of innovative thinking, etc.

Full Text

Intermediary Websites for Open Innovation: Attributes, Case Analysis, and Implications

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Abstract

[Purpose/Significance] This paper examines the characteristics and intermediary functions of open innovation intermediary websites, reflecting on the implications they hold for scientific research in the new era. **[Method/Process]** We summarize the key attributes of open innovation intermediary websites and analyze their intermediary functions and implementation mechanisms, using InnoCentive as a case study. **[Result/Conclusion]** Open innovation intermediary

websites facilitate effective connections between enterprises and academic institutions, offering valuable insights for research activities. Academic departments should embrace more open approaches to scientific innovation, leveraging these platforms for research topic selection, industry-academia partnership building, technology transfer, and creative thinking stimulation.

Keywords: open innovation, innovation intermediary, intermediary website, mediation mechanism, scientific research, InnoCentive

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1. Introduction

Open innovation, which evolved from technology innovation theory, emphasizes the importance of external knowledge resources for innovation. As the knowledge economy develops, enterprises can no longer rely solely on internal R&D departments to meet rapidly changing market demands and intensifying competition. H. Chesbrough formally introduced the concept of “open innovation” in *Open Innovation: The New Imperative for Creating and Profiting from Technology*, defining it as “a paradigm that assumes firms can and should use external ideas as well as internal ideas, and internal and external paths to market, as the firms look to advance their technology” [1]. Open innovation encourages enterprises to leverage diverse internal and external resources to solve problems, create new products and markets, and enhance innovation efficiency [2].

In an open innovation environment, entrepreneurship and startup development have become more active. Within the enterprise sector, universities and research institutions represent primary sources of knowledge resources, making it crucial for firms to utilize the expertise of academic departments and researchers for technological innovation. While open innovation is primarily defined from the enterprise perspective, it can also be viewed from the academic standpoint. Academic departments can similarly leverage internal and external resources to address research challenges, improve research efficiency, and promote the commercialization of research outcomes. Effective alignment between enterprises and academic departments is thus essential for both technological and scientific innovation.

Open innovation is a multi-stakeholder process that involves not only enterprises and academic departments but also the general public, investors, and government agencies. To facilitate open innovation, various platforms and environments have emerged to aggregate resources and promote connections for collaborative innovation. These platforms serve as innovation intermediaries within national, regional, or industrial innovation systems [3]. Specific orga-

nizational forms include industry associations, chambers of commerce, science parks, business incubators, research consortia, and technology transfer centers [4].

As technological and market uncertainties increase, knowledge resources become more networked, diversified, and fluid, while public participation in innovation grows increasingly important. This necessitates greater openness and flexibility in innovation systems, placing higher demands on innovation intermediaries. Amid the wave of mass innovation and entrepreneurship, numerous maker spaces have emerged, operating through various models such as “community + open office,” “online media + offline events,” “entrepreneurship education + joint incubation,” and “open technology platform + industrial resource support” [5]. These platforms bring together entrepreneurs, knowledge workers, investors, enterprises, academic departments, the public, and government agencies to support connections and interactions among stakeholders.

Concurrently, purely online or primarily web-based open innovation intermediary websites have emerged and continue to develop. These platforms leverage virtual space to overcome geographical and temporal constraints, aggregating innovation and knowledge resources worldwide to provide maximum support for open innovation. This paper first introduces the characteristics of open innovation intermediary websites, then presents a case analysis of InnoCentive, and finally explores the implications of these platforms for academic research activities.

2. Concept and Characteristics of Open Innovation Intermediary Websites

Open innovation intermediary websites are network platforms that provide intermediary services for open innovation via the internet. As a specific implementation form of open innovation platforms, they share the primary functions of other innovation intermediaries: (1) building bridges for technology transfer and diffusion to promote transformation of scientific achievements and industrialization; and (2) providing intermediary services that enhance technological innovation capacity, facilitate technology transfer, and develop industry-academia collaboration, thereby creating a supportive environment for open and collaborative innovation [6].

The key distinction from other innovation intermediary models lies in their web-based functionality, enabling broad connections among enterprises, research institutions, the public, investors, and government agencies. Through network technologies, these platforms establish relationships, facilitate exchanges, and manage cooperation processes among innovation participants. Leveraging technological advantages, open innovation intermediary websites maintain close contact and interaction with various stakeholders, characterized by dynamic openness, convenient and flexible services, cross-regional reach, extensive network coverage, rich knowledge resources, and high activity levels.

For enterprises facing unsolvable problems, these platforms enable them to seek external assistance, preventing project delays and capital waste while accelerating innovation and improving quality through integration with external resources. Although enterprises could establish their own web platforms or use public social networks to seek external resources, corporate portals have limited reach, primarily attracting existing visitors and missing numerous potential high-quality participants. On social media platforms like Facebook or Weibo, task-related information can easily become submerged in information overload, failing to connect with quality participants. Professional open innovation intermediary websites, however, aggregate large numbers of researchers and technical experts across various fields, enabling effective resource pooling and matching, thereby improving success rates and reducing costs. Additionally, these platforms provide a space for knowledge exchange where users share ideas and generate intellectual collisions.

Several foreign platforms with open innovation intermediary functions have been established, including InnoCentive, Marblar, Innoget, Presans, Inpama, and GenIE. These platforms differ in their targeted industries, service objects, mechanisms, and scope. For instance, InnoCentive (U.S.) focuses on chemistry and biology; Marblar (U.K.) aims to “make scientific discoveries applicable,” allowing scientists to post achievements and seek practical applications; Innoget (Spain) connects those seeking inventions with inventors; Presans (France) provides a search engine to find matching collaborators among millions of experts; Inpama (Germany) helps scientists and inventors commercialize patents; and GenIE (India) offers a platform for sharing ideas and seeking partnerships.

China also has websites for posting tasks or seeking participants, such as Zhubajie, Task China, and Weichaishi. However, these platforms primarily feature low-innovation, low-technical tasks with minimal technical thresholds—often routine technical tasks or everyday problems—fundamentally distinct from the technological innovations and inventions on open innovation intermediary websites.

3. Functions and Implementation: The InnoCentive Case

InnoCentive, founded in 2001 by the pharmaceutical giant Eli Lilly, derives its name from “innovation” and “incentive.” As one of the early crowdsourcing communities using reward-based incentives, it has become an influential platform focusing on chemistry and biology. Positioned as a connector between leading enterprises’ problems and top scientists, the platform serves two main user categories: “seekers” and “solvers.” Seekers include governments, non-profits, partners, and corporations that pay membership fees to access and use the platform. Solvers comprise the general public, though primarily scientists, engineers, and research personnel, who can register for free. According to platform data, InnoCentive has aggregated over 200,000 problem solvers from nearly 200 countries, including numerous scientific talents, with corporate seekers such as NASA, Boeing, Procter & Gamble, and Eli Lilly.

3.1. Helping Seekers Access External Innovation Resources

Accessing substantial external resources is crucial in open innovation. InnoCentive provides seekers with high-quality external resources—top scientists worldwide. Under traditional models, enterprise-researcher collaborations build upon conventional interpersonal networks, representing high-cost relationship building converted from strong ties. In contrast, InnoCentive’s model builds relationships through dynamic online networks at much lower cost. Moreover, network-based connections enable enterprises to access larger quantities, broader scopes, and more diverse types of external innovation resources, creating favorable conditions for efficiently meeting innovation demands.

By October 2015, 64 seekers had posted over 800 challenges on InnoCentive, with 348 solved by 16,500 solvers [8]. Between January and October 2015 alone, more than 50 challenges were issued, with participant numbers per challenge ranging from 200-300, reaching up to over 650. Geographical analysis of participants shows global distribution, demonstrating InnoCentive’s capacity to connect seekers with worldwide external innovation resources and attract substantial participation.

3.2. Gatekeeping and Processing Demand Information

Expressing innovation needs is the critical first step in open innovation. InnoCentive assists seekers in effective demand articulation. Before challenges are publicly posted, seekers submit them to InnoCentive, which processes the innovation demands before publication, including brief descriptions, requirements, deadlines, and reward methods.

According to CEO D. J. Carroll, InnoCentive’s staff primarily comprises domain experts whose main tasks involve helping seekers analyze their problems and accurately describe challenges to attract scientist attention [10]. Leveraging accumulated knowledge and experience, InnoCentive can precisely define seekers’ problems, categorizing challenges into four types: ideation, theoretical, practical, and electronic practice [11]. Ideation challenges involve brainstorming new ideas, such as innovative solutions for new products or technical problems. Theoretical challenges require solvers to demonstrate whether solutions can become final products or solve problems, featuring longer durations and higher rewards than ideation challenges. Practical challenges demand detailed solutions that can be applied in practice, with more time for proposal development and higher compensation. Electronic practice challenges typically involve enterprises seeking experienced partners for already-developed new technologies.

3.3. Evaluating Solutions

Beyond helping seekers articulate needs, InnoCentive evaluates returned solutions for quality and validity. According to challenge descriptions, solvers’ proposals undergo review by InnoCentive staff. If standards are met, solutions are submitted, with optimal ones selected from numerous proposals. Only valid or

best solutions receive rewards [8]. InnoCentive's knowledge-based evaluation ensures objective, impartial third-party assessment while improving seekers' selection efficiency and overall open innovation effectiveness.

3.4. Facilitating Effective Communication Between Seekers and Solvers

While seekers' needs can be publicly posted to some extent on InnoCentive, solvers' solutions require confidentiality measures. To ensure effective communication and information protection, InnoCentive creates private "black boxes" for individual seeker-solver interactions, inaccessible to other participants. However, InnoCentive retains the right to monitor any interaction to identify problems and provide solutions promptly. With its long service history and prominent client cases, InnoCentive has established trust among both parties. Its technical team also addresses any questions solvers encounter during problem-solving.

3.5. Establishing Effective Trust Mechanisms

Addressing trust issues between seekers and solvers represents a major challenge. The first concern involves reward payments. Seekers offer rewards ranging from \$500 to \$1 million based on task type and difficulty. InnoCentive must ensure seekers have sufficient funds and that rewards reach valid solution providers. Unlike traditional one-to-one collaboration where multiple solvers may address one problem simultaneously, all valid solutions receive rewards. InnoCentive must accurately evaluate proposals and ensure every valid provider receives agreed-upon rewards, preventing non-payment or unreasonable rejection.

The second concern involves intellectual property. After posting problems, seekers provide summaries for solver browsing. Before joining, solvers can view problem summaries and participant numbers. Upon application, InnoCentive requires solvers to sign legal documents online, clarifying rights, obligations, and intellectual property [12]. Only after signing can solvers access detailed challenge information. Throughout the process, InnoCentive must prevent both seekers' technology leakage and solvers' rights infringement.

4. Implications for Scientific Research

Open innovation intermediary websites represent a new type of innovation intermediary, providing robust support for open innovation activities and building dynamic networks that effectively connect enterprises with researchers. These platforms not only support enterprise innovation but also create opportunities for academic research, facilitating access to complementary innovation resources.

4.1. Using Intermediary Websites for Research Direction Selection

Researchers can use these platforms to understand enterprise technology needs and innovation demands, assessing the market prospects of their research projects and adjusting research directions accordingly. By analyzing platform information, researchers can evaluate whether their projects remain at the forefront compared to peers, clarifying or adjusting research directions accordingly.

4.2. Building Industry-Academia Partnerships Through Intermediary Websites

Close industry-academia collaboration has become a crucial trend in technological innovation. Open innovation intermediary websites offer new pathways for building such partnerships. Under this model, enterprise-researcher relationships become dynamic and open. Enterprises can access numerous potential researchers, while researchers can connect with multiple enterprises seeking solutions. Researchers can proactively establish connections with enterprises based on their research foundations or achievements, potentially forming multiple partnerships and even new stable collaborations.

4.3. Achieving Technology Transfer Through Intermediary Websites

When research projects or achievements match enterprise innovation needs, opportunities for technology transfer emerge. Beyond platforms like InnoCentive that primarily post enterprise needs, other platforms such as Marblar and Inpama focus on researchers posting their inventions. Researchers can use these platforms to publish scientific achievements, explore practical applications, and identify enterprises for commercialization, thereby achieving effective technology transfer.

4.4. Stimulating Creative Thinking Through Intermediary Websites

Open innovation intermediary websites connect enterprises, academic departments, social groups, investors, and government organizations, transcending temporal and geographical constraints to form multi-stakeholder knowledge networks. Researchers can participate in tasks of interest or provide input—even without winning rewards, they can gain insights into industry needs, track field developments, update knowledge, broaden perspectives, and showcase expertise. These platforms provide environments for researchers to break free from fixed thinking patterns, interact with enterprises, other researchers, and the public, thereby stimulating creative thinking.

4.5. Embracing Openness in Scientific Research

Academic departments should adopt more open philosophies for scientific innovation, opening organizational boundaries and promoting multi-stakeholder

participation. While leveraging these platforms for collaborative innovation, academic departments should enhance intellectual property protection awareness while promoting reasonable knowledge outflow and absorption, and encourage interdisciplinary exchange and cooperation. They should actively search for, identify, acquire, and utilize external innovation forces, integrating internal and external innovation capabilities to improve efficiency and enhance innovation capacity.

Currently, China lacks mature open innovation intermediary websites, representing a significant gap for both enterprise open innovation and academic open research activities. Against the backdrop of mass innovation and entrepreneurship, such platforms are expected to emerge and develop rapidly in China.

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Note: Figure translations are in progress. See original paper for figures.

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