Influential Article Review - Creating a Platform for Open Innovation and the Growth of Production Mechanisms

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This paper examines innovation and operations. We present insights from a highly influential paper. Here are the highlights from this paper: Innovation is the engine of development for enterprises, and there is an increasing trend to adopt an open innovation strategy. However, how to manage external resources in an open, collaborative and complementary manner, and in a shared environment that will yield the greatest networking effects, it is a challenging task. Because there is no such a satisfactory model for an open innovation strategy that combine operational mechanisms with the management of, external resources. Thhis article tries to fill the gap by adopting a resource-based perspective to construct an overall open innovation (OOI) business model. In this model, external resources are classified as industrial and non-industrial entities, to enable the identification of the interaction methods between manufacturing enterprises and external resources. The management of external resources involved in a Technology Open Innovation (TOI) cycle is given particular attention that includes: 1) the classification of the external resources of a TOI, 2) the general mechanisms extracted to promote qualified resources in and unqualified resources out, and 3) a business model to conceptualize the collaboration between enterprises and external resources. A case study of TOI is also provided to empirically verify its feasibility. This paper contributes to the literature by providing an original operational model and mechanism design for an open innovation strategy that can manage external resources effectively. For our overseas readers, we then present the insights from this paper in Spanish, French, Portuguese, and German.

Keywords: Manufacturing enterprise, Open innovation, Resource dependence, External resources, Mechanism

SUMMARY

- Resource Dependence Theory has become one of the most influential theories in organizational theory and strategic management. The need for external resources, mainly covering funding, human resources, materials and information, makes organizations potentially dependent on their external resources. RDT characterizes a corporation as an open system, dependent on contingencies in the external environment. RDT recognizes the influence of external factors on organizational behaviour, and although constrained by the context, executives can react to reduce any environmental uncertainty or dependency. In particular, the behaviour of the external resources will

be constrained, so that they correspond to organizational effectiveness and the organizational environment, which is like the control over vital resources. Given that organizations are not autonomous, as they are constrained by a network of interdependencies with other organizations, the external control of organizations shows them as being embedded in networks of interdependencies and social relationships.

- This paper constructs its model of an open innovation network based on RDT, in which, typically, the dependency relationship between industry and university can be explained as follows: since manufacturing enterprises form the core of the industry, they may obtain the necessary talent they require with relatively low costs from open innovation.
- Successful businesses are those that evolve rapidly and effectively, and they must attract resources of all types, drawing in capital, partners, suppliers, and customers to create cooperative networks. By studying the co-evolution of social and economic systems, especially in a changing competitive context, Moore presented the business ecosystem concept, which is regarded as a dynamic network of organizations featuring mutual support among its members, who co-evolve their capabilities and revolves around innovation and work cooperatively to create additional value and improve efficiency. Moving forward, combine the business ecosystem concept with innovation theory, and argue that the innovation ecosystem has become a new paradigm.
- In this paper, we specify that Overall Open Innovation should refer to a model whereby all the different parts of an enterprise involve themselves in innovation activities with external resources, to jointly meet customers' requirements. In this regard, we have enlarged the scope of open innovation to include the whole end-to-end chain of a manufacturing enterprise including marketing, R&D, testing, sourcing manufacturing, after-sales, etc., in which corresponding departments have various innovation requirements driven by the manufacturing enterprise's business strategy.
- Naturally, the above chain tends to integrate external resources in conjunction with their detailed requirements based on corporate external resource platforms. Based on the above-mentioned resource dependence theory and innovation ecosystem theory, an OOI business model is presented here to describe the logical relationship between manufacturing enterprises, end-users and external resources.

HIGHLY INFLUENTIAL ARTICLE

We used the following article as a basis of our evaluation:

Schot, J., & Steinmueller, W. E. (2018). Three frames for innovation policy: R&D, systems of innovation and transformative change. *Research Policy*, 47(9), 1554-1567.

This is the link to the publisher's website:
https://www.sciencedirect.com/science/article/pii/S0048733318301987

INTRODUCTION

With the advent of the internet age, manufacturing enterprises face new challenges and opportunities in the competitive globalized local and global market. Driven by the rapid development of market globalization, manufacturing enterprises must make greater efforts to fulfil individual demands from the market by utilizing global resources and through open innovation. Since (Chesbrough 2003) first presented the concept of open innovation, the study of open innovation has become increasingly popular amongst academics and practitioners alike. Open innovation is defined as the process of strengthening the interaction and collaboration of multiple partners involved in a business ecosystem, to jointly deliver an innovative product or solution. This means that successful open innovation partnerships will be useful for exploring meaningful and innovative solutions to satisfy customers' requirements. Moreover, the sourcing,

integration and development of products and business model innovations through "win-win" external partnerships are of great interest to manufacturing enterprises, to capture the maximum commercial value of their investments (Muhdi 2011; Nakagaki et al. 2012).

At present, a large number of manufacturing enterprises from different industries, such as consumer goods, electronics, and equipment have benefited greatly from the adoption of open innovation strategies to enrich their internal innovation processes (Serrono and Fischer 2007). Many of these companies compete to win through the implementation of an open innovation strategy, cooperating with various partners in a value chain—including universities and institutes, and even other enterprises—by flexibly opening up to external partnerships and placing increasingly reliance on their collaborations with external resources (Etzkowita 2008; Leydesdorff 2003). A good case in point is Procter & Gamble's innovation practice (Huston and Sakkab 2006), whose success is attributed largely to innovative collaborations with external partners, whereby roughly 50% of Procter & Gamble's new products now originate from outside the parent company. Classifying innovative resources and integrating them into an open innovation strategy has generally been considered too complicated a problem for manufacturing enterprises, and hence, this issue has not been adequately studied.

Therefore, the objective of this paper is to develop a new model for open innovation. The research questions of this paper consist of (1) what types of external resources could be identified to facilitate the development of open innovation? (2) what sort of business model is needed to develop the collaboration between manufacturing enterprises and external resources during an open innovation process? (3) how can a manufacturing enterprise adopt a certain mechanism to manage those external resources effectively?

This research makes several contributions to improve the modelling of an open innovation strategy that can enhance the innovative capabilities of manufacturing enterprises based on the existing research. First, a novel overall open innovation model is constructed. Second, the technology open innovation cycle is discussed, including the array of external resources and mechanisms to manage the external resources, and a business model in conjunction with a case study is presented.

This paper is structured as follows: Critical literature review and motivation for the study section discusses the research background and the motivation for the present study; Theoretical foundation of an open innovation strategy section provides a theoretical foundation for the proposed open innovation strategy. In Open innovation business model section, a business model for the overall open innovation is presented; while in Management of external resources in an open innovation system section, external resources are firstly classified and the mechanisms used to manage these external resources are then detailed. A business collaboration model of open innovation technology is discussed in A business collaboration model of the TOI section. A case study section presents a case study, focusing on the open innovation practice of a typical Chinese manufacturing enterprise. The conclusions of the study are presented in Conclusion section.

CONCLUSION

Open innovation plays an increasingly vital role in supporting a manufacturing enterprise's continued development. In order to integrate external resources more efficiently, it is essential to classify the resources categories and build a relevant mechanism, under which the optimization of the external resources can be executed in a self-rotating innovation cycle.

Moreover, an overall open innovation business model is presented, to identify the logical relationship between the manufacturing enterprise, and its end-users and external resources. Additionally, a TOI is specifically discussed in this paper, in which the classification of the external resources, and an external resources screening mechanism are analyzed, and shown to help in selecting qualified resources and excluding unqualified resources from the business model. The outcome could be a reference for manufacturing enterprises to coordinate the phasing-in and phasing-out of external resources during the TOI process. In addition, our paper indicates the feasibility of the model proposed in this paper with the Haier Group TOI case study. Therefore, this paper has provided a new model for open innovation, enabling the management of external resources, which is missing in the current literature. The proposed open

innovation strategy model can be useful in other enterprises for efficient management of external resources and enhanced performance.

There are some limitations to be further studied including: (1) the authors focus on the development of a generic mechanism framework; and it would be worthwhile to consider a particular mechanism suitable for the management of a specific external resource; (2) there is a need to explore more case studies from a variety of industrial backgrounds. In this regard, the proposed open innovation strategy combined with the generic mechanism framework could be further verified and may be of reference for other enterprises.

APPENDIX

FIGURE 1
BUSINESS MODEL OF OOI

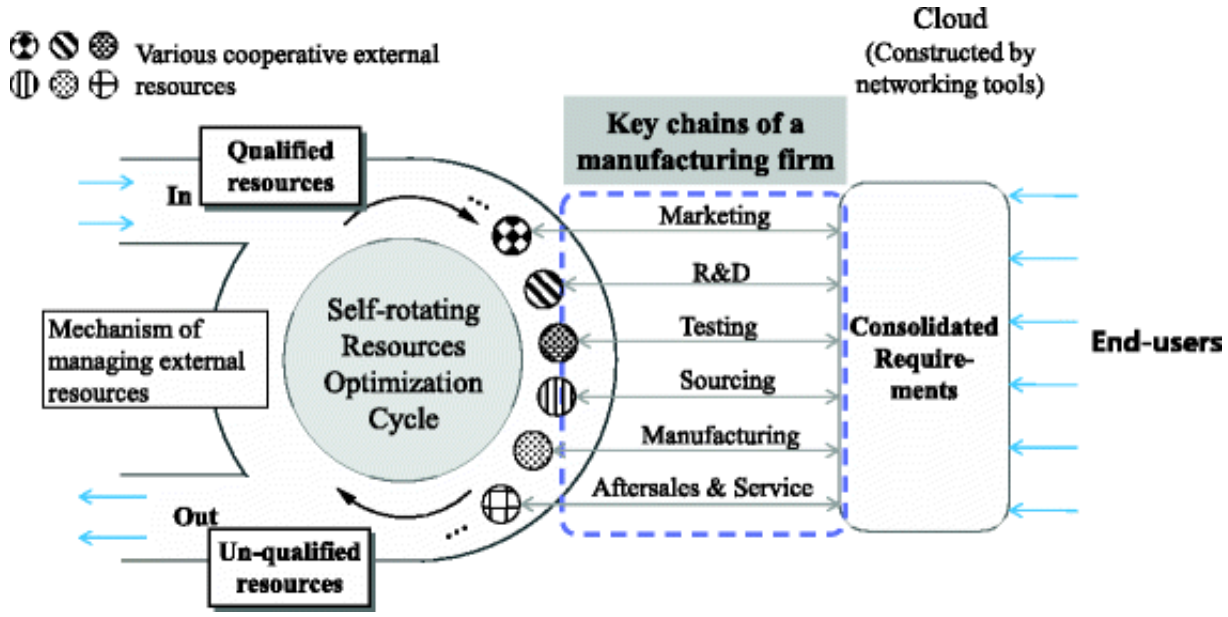


FIGURE 2

TOI BUSINESS COLLABORATION MODEL

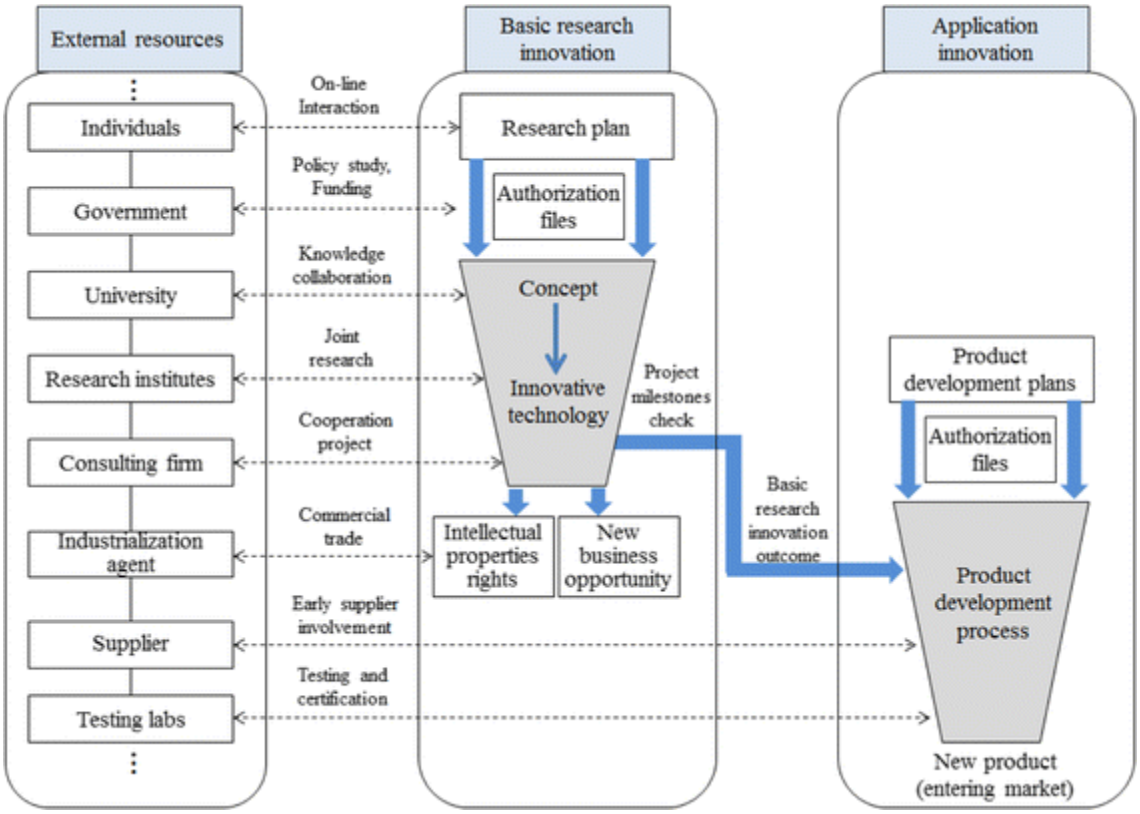
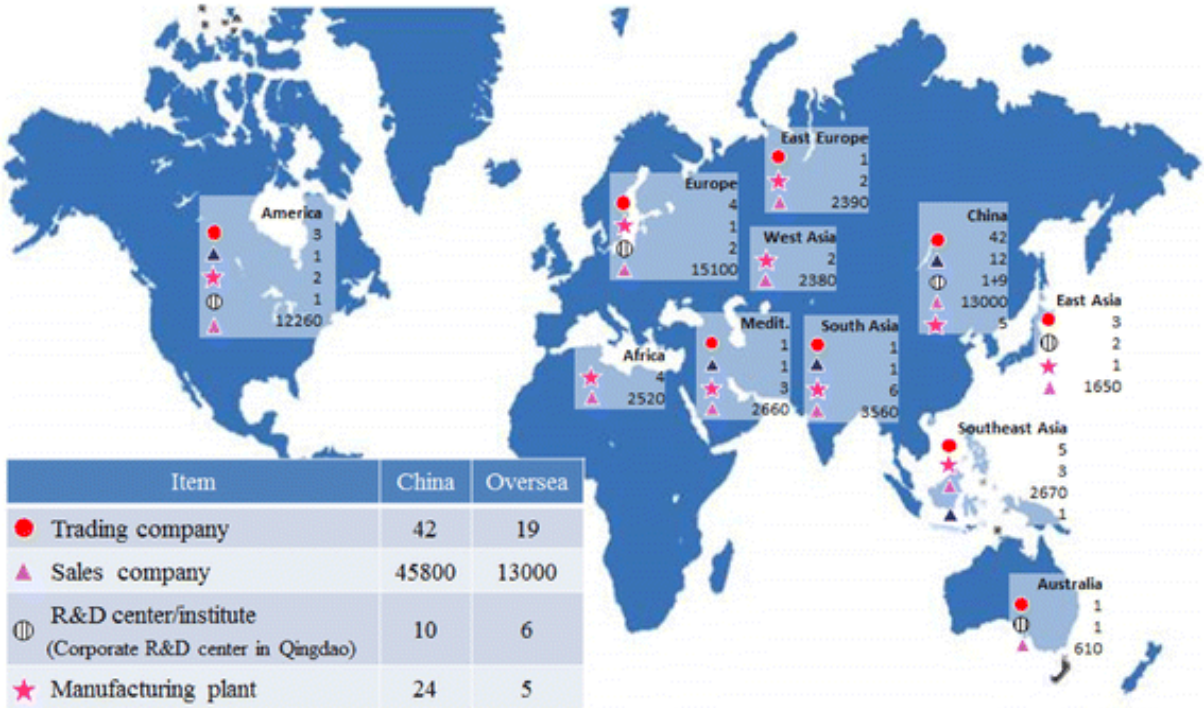


FIGURE 3

HAIER'S R&D SYSTEM BUILT INTO ITS GLOBAL NETWORK (SOURCE: INTERVIEW WITH HAIER GROUP)

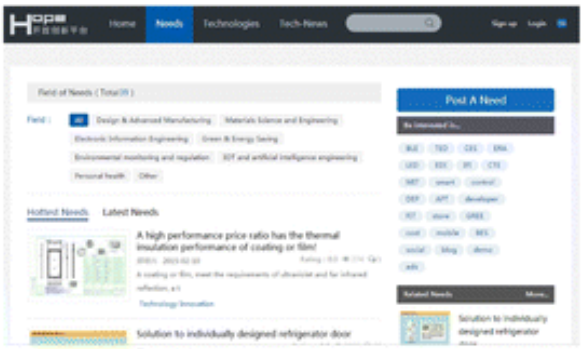


Item	China	Oversea
Trading company	42	19
Sales company	45800	13000
R&D center/institute (Corporate R&D center in Qingdao)	10	6
Manufacturing plant	24	5
Industrial park	6	15

FIGURE 4

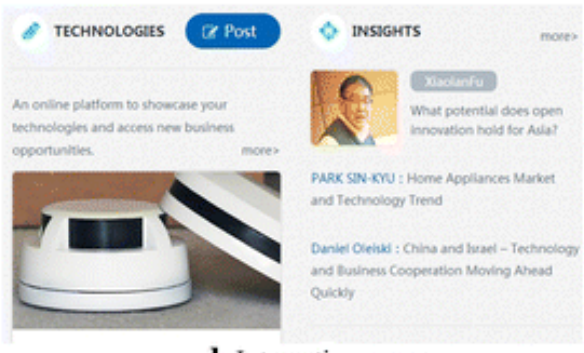
HAIER'S TECHNOLOGY OPEN INNOVATION PLATFORM WEBPAGES' SHOWCASE

a Welcome page



b Market requirements display

c Inputs from external resource



d Interaction space

e Project management module of Haier's technology open innovation platform (linked with **InnoCentive** platform)

Sources: a), b), c) and d) cited from hope.haier.com; e) Interview with Haier Group

TABLE 1

INTERACTION METHODS DURING OPEN INNOVATION BETWEEN A MANUFACTURING ENTERPRISE AND EXTERNAL RESOURCES

Center of open innovation	**External resources**			**Interaction methods during the open innovation process**
	Category	**Functionality**	**Major resources**	
Manufacturing enterprise	Industrial entity	To provide services for the core manufacturing enterprise related to the industrialization stage of the open innovation process, such as engineering & design ideas, material supply, testing, etc.	Supplier	Strategic collaboration and Early Supplier Involvement (ESI) in the R&D stage
			Partner enterprise	Set up joint-venture or project and develop innovative technology/product
			Small firm (capitalized by the manufacturing enterprise)	Allocated research and development
			Testing labs	Allocated testing and certification work for testing labs, or set up joint labs
			Industrialization agent	Venture Capital (VC) or Direct Capital (DC) to promote the industrialization of the innovation
			OEM/ODM	Allocated R&D or system assembly project
	Non-industrial entity	To provide services for the core manufacturing enterprise during the open innovation process in terms of basic knowledge innovation, application innovation, management innovation, talent cultivation, funding support, etc.	Individuals	Individuals have feedback or innovative inputs for the manufacturing enterprise
			University	University-firm collaboration in terms of science & research projects, talent cultivation, etc.

			Research institutes	Technology licensing or transfer, R&D assignments/allocations
			Innovation intermediaries	Commercial transactions in terms of the distribution of requests and collection of service for the enterprise
			Consulting firm	Consultation services mainly including technology and management innovation
			Law firms/IP management agency	Provide lawsuit dispute/intellectual property rights services as requested by the core manufacturing enterprise
			Association	Standards/regulations development
			Government	Approve state key lab, funding or tax reductions/exemptions

TABLE 2
HAIER'S TYPICAL INNOVATIVE PRODUCTS DEVELOPED BY TOI

No.	Innovative product	Description	Major external resources	Contributions of external resources	Remarks
1	Wireless TV	No cables; TV operated through a wireless charging function	MIT (University, USA)	Provided wireless technology and solutions with patents for Haier	The marketing requirements surveying the combined commercialization of wireless TV was executed by Haier
			Wireless Power Consortium (WPC, standard consortium)	Provided a platform for Haier and other members to develop standards for such a product	Acquired WPC certificate (Qi logo) to facilitate future market entry issues

2	Waterless washing machine	Uses new washing media (micro ball) instead of water; saves water resources and protects the environment.	DOW (Strategic supplier, USA)	System design of waterless washing machine, and also jointly developed the new washing media with Bayer	P&G also joined in the development and provided solutions for increasing the washing capacity of the micro ball
			Bayer (Strategic supplier, Germany)	In charge of the development and supply of the micro ball	3 M (USA) also sent samples for Haier's consideration
			China Academy of Science (CAS, Research institute)	Mechanical design and mechanical analysis of the washing machine	CAS is the leading research institute in China
3	Networking refrigerator	The product was designed not only as a storage compartment but as a communications terminal to connect to other home appliances	International Electrotechnical Commission (IEC, Standard association)	Provided a platform for Haier and other members to develop international product specifications combining communications standards	There is a special working group under the IEC Standard Management Body mainly in charge of smart home standards
			iTopHome (Networking appliances industry alliance, China)	Integrated supply chains for networking refrigerators to develop China's national standards and promote its commercialization	The outcomes of iTopHome concerning standards are in line with the requirements of IEC standards

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TRANSLATED VERSION: SPANISH

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INTRODUCCIÓN

Con la llegada de la era de Internet, las empresas manufactureras se enfrentan a nuevos desafíos y oportunidades en el competitivo mercado local y global global global. Impulsadas por el rápido desarrollo de la globalización del mercado, las empresas manufactureras deben hacer mayores esfuerzos para satisfacer las demandas individuales del mercado mediante la utilización de recursos globales y la innovación abierta. Desde (Chesbrough 2003) presentó por primera vez el concepto de innovación abierta, el estudio de la innovación abierta se ha vuelto cada vez más popular entre académicos y profesionales por igual. La innovación abierta se define como el proceso de fortalecimiento de la interacción y la colaboración de múltiples socios involucrados en un ecosistema empresarial, para ofrecer conjuntamente un producto o solución innovador. Esto significa que las asociaciones exitosas de innovación abierta serán útiles para explorar soluciones significativas e innovadoras para satisfacer los requisitos de los clientes. Además, el abastecimiento, la integración y el desarrollo de productos e innovaciones en el modelo de negocio a través

de asociaciones externas "ganadoras" son de gran interés para las empresas manufactureras, para captar el máximo valor comercial de sus inversiones (Muhdi 2011; 2012).

En la actualidad, un gran número de empresas manufactureras de diferentes industrias, como los bienes de consumo, la electrónica y los equipos, se han beneficiado enormemente de la adopción de estrategias de innovación abierta para enriquecer sus procesos de innovación interna (Serrono y Fischer 2007). Muchas de estas empresas compiten por ganar a través de la implementación de una estrategia de innovación abierta, cooperando con varios socios en una cadena de valor, incluidas universidades e institutos, e incluso otras empresas, abriéndose de manera flexible a asociaciones externas y confiando cada vez más en sus colaboraciones con recursos externos (Etzkowita 2008; Leydesdorff 2003). Un buen ejemplo es la práctica de innovación de Procter & Gamble (Huston y Sakkab 2006), cuyo éxito se atribuye en gran medida a colaboraciones innovadoras con socios externos, por lo que aproximadamente el 50% de los nuevos productos de Procter & Gamble provienen ahora de fuera de la empresa matriz. Clasificar los recursos innovadores e integrarlos en una estrategia de innovación abierta se ha considerado generalmente un problema demasiado complicado para las empresas manufactureras y, por lo tanto, esta cuestión no se ha estudiado adecuadamente.

Por lo tanto, el objetivo de este documento es desarrollar un nuevo modelo de innovación abierta. Las preguntas de investigación de este documento consisten en 1) ¿qué tipos de recursos externos podrían identificarse para facilitar el desarrollo de la innovación abierta? 2) ¿Qué tipo de modelo de negocio se necesita para desarrollar la colaboración entre las empresas manufactureras y los recursos externos durante un proceso de innovación abierto? 3) ¿Cómo puede una empresa manufacturera adoptar un determinado mecanismo para gestionar eficazmente esos recursos externos?

Esta investigación hace varias contribuciones para mejorar el modelado de una estrategia de innovación abierta que puede mejorar las capacidades innovadoras de las empresas manufactureras sobre la base de la investigación existente. En primer lugar, se construye un nuevo modelo general de innovación abierta. En segundo lugar, se discute el ciclo de innovación abierta de la tecnología, que incluye la gama de recursos y mecanismos externos para gestionar los recursos externos, y se presenta un modelo de negocio junto con un estudio de caso.

Este documento se estructura de la siguiente manera: Revisión de la literatura crítica y motivación para la sección de estudio analiza los antecedentes de investigación y la motivación para el presente estudio; La base teórica de una sección de estrategia de innovación abierta proporciona una base teórica para la estrategia de innovación abierta propuesta. En la sección Modelo de negocio de innovación abierta, se presenta un modelo de negocio para la innovación abierta global; mientras que en gestión de recursos externos en una sección de sistema de innovación abierta, los recursos externos se clasifican en primer lugar y se detallan los mecanismos utilizados para gestionar estos recursos externos. En Un modelo de colaboración empresarial de tecnología de innovación abierta se discute en un modelo de colaboración empresarial de la sección TOI. Una sección de estudio de caso presenta un estudio de caso, centrado en la práctica de innovación abierta de una empresa manufacturera típica china. Las conclusiones del estudio se presentan en la sección Conclusión.

CONCLUSIÓN

La innovación abierta desempeña un papel cada vez más vital en el apoyo al desarrollo continuo de una empresa manufacturera. Para integrar los recursos externos de manera más eficiente, es esencial clasificar las categorías de recursos y construir un mecanismo relevante, en virtud del cual la optimización de los recursos externos se pueda ejecutar en un ciclo de innovación auto rotativo.

Además, se presenta un modelo de negocio global de innovación abierta, para identificar la relación lógica entre la empresa manufacturera y sus usuarios finales y recursos externos. Además, un TOI se discute específicamente en este documento, en el que se analiza la clasificación de los recursos externos y un mecanismo de selección de recursos externos, y se muestra para ayudar a seleccionar recursos calificados y excluir recursos no calificados del modelo de negocio. El resultado podría ser una referencia para que las empresas manufactureras coordinen la eliminación gradual y gradual de los recursos externos durante el

proceso de TOI. Además, nuestro documento indica la viabilidad del modelo propuesto en este documento con el estudio de caso TOI de Haier Group. Por lo tanto, este documento ha proporcionado un nuevo modelo de innovación abierta, que permite la gestión de los recursos externos, que falta en la literatura actual. El modelo de estrategia de innovación abierta propuesto puede ser útil en otras empresas para una gestión eficiente de los recursos externos y un mejor rendimiento.

Hay algunas limitaciones que deben estudiarse más a fondo, entre ellas: 1) los autores se centran en el desarrollo de un marco de mecanismo genérico; y valdría la pena considerar un mecanismo particular adecuado para la gestión de un recurso externo específico; (2) es necesario explorar más estudios de casos de diversos orígenes industriales. A este respecto, la estrategia de innovación abierta propuesta combinada con el marco del mecanismo genérico podría verificarse más a fondo y ser de referencia para otras empresas.

TRANSLATED VERSION: FRENCH

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Voici une traduction approximative des idées présentées ci-dessus. Cela a été fait pour donner une compréhension générale des idées présentées dans le document. Veuillez excuser toutes les erreurs grammaticales et ne pas tenir les auteurs originaux responsables de ces erreurs.

INTRODUCTION

Avec l'avènement de l'ère de l'Internet, les entreprises manufacturières sont confrontées à de nouveaux défis et opportunités sur le marché local et mondialisé concurrentiel. Poussées par le développement rapide de la mondialisation des marchés, les entreprises manufacturières doivent faire davantage d'efforts pour répondre aux demandes individuelles du marché en utilisant les ressources mondiales et par l'innovation ouverte. Depuis que (Chesbrough 2003) a présenté pour la première fois le concept d'innovation ouverte, l'étude de l'innovation ouverte est devenue de plus en plus populaire parmi les universitaires et les praticiens. L'innovation ouverte est définie comme le processus de renforcement de l'interaction et de la collaboration de multiples partenaires impliqués dans un écosystème d'affaires, afin de fournir conjointement un produit ou une solution innovant. Cela signifie que des partenariats d'innovation ouverte réussis seront utiles pour explorer des solutions significatives et innovantes pour satisfaire les exigences des clients. En outre, l'approvisionnement, l'intégration et le développement de produits et d'innovations de modèles d'affaires par le biais de partenariats externes « gagnant-gagnant » sont d'un grand intérêt pour les entreprises manufacturières, afin de saisir la valeur commerciale maximale de leurs investissements (Muhdi 2011; Nakagaki et coll. 2012).

À l'heure actuelle, un grand nombre d'entreprises manufacturières de différentes industries, telles que les biens de consommation, l'électronique et l'équipement, ont grandement bénéficié de l'adoption de stratégies d'innovation ouverte pour enrichir leurs processus internes d'innovation (Serrono et Fischer, 2007). Bon nombre de ces entreprises rivalisent pour gagner grâce à la mise en œuvre d'une stratégie d'innovation ouverte, en coopérant avec divers partenaires d'une chaîne de valeur , y compris les universités et les instituts, et même d'autres entreprises , en s'ouvrant avec souplesse à des partenariats externes et en s'appuyant de plus en plus sur leurs collaborations avec des ressources externes (Etzkowita, 2008; Leydesdorff, 2003). Un bon exemple est la pratique d'innovation de Procter & Gamble (Huston et Sakkab 2006), dont le succès est attribué en grande partie à des collaborations novatrices avec des partenaires externes, grâce à laquelle environ 50 % des nouveaux produits de Procter & Gamble proviennent maintenant de l'extérieur de la société mère. La classification des ressources innovantes et leur intégration dans une stratégie d'innovation ouverte ont généralement été considérées comme un problème trop

compliqué pour les entreprises manufacturières et, par conséquent, cette question n'a pas été suffisamment étudiée.

Par conséquent, l'objectif de ce document est de développer un nouveau modèle d'innovation ouverte. Les questions de recherche de ce document se composent de (1) quels types de ressources externes pourraient être identifiées pour faciliter le développement de l'innovation ouverte? (2) quel type de modèle d'affaires est nécessaire pour développer la collaboration entre les entreprises manufacturières et les ressources externes au cours d'un processus d'innovation ouvert? (3) comment une entreprise manufacturière peut-elle adopter un certain mécanisme pour gérer efficacement ces ressources externes?

Cette recherche apporte plusieurs contributions pour améliorer la modélisation d'une stratégie d'innovation ouverte qui peut améliorer les capacités d'innovation des entreprises manufacturières basées sur la recherche existante. Tout d'abord, un nouveau modèle global d'innovation ouverte est construit. Deuxièmement, le cycle de l'innovation ouverte sur le plan technologique est discuté, y compris l'éventail des ressources et des mécanismes externes pour gérer les ressources externes, et un modèle d'affaires en conjonction avec une étude de cas est présenté.

Cet article est structuré comme suit : l'examen de la littérature critique et la motivation de la section d'étude traitent du contexte de recherche et de la motivation de la présente étude; Les fondements théoriques d'une section de stratégie d'innovation ouverte fournissent une base théorique pour la stratégie d'innovation ouverte proposée. Dans la section Modèle d'affaires de l'innovation ouverte, un modèle d'affaires pour l'innovation ouverte globale est présenté; tandis que dans la gestion des ressources externes dans une section du système d'innovation ouverte, les ressources externes sont d'abord classifiées et les mécanismes utilisés pour gérer ces ressources externes sont ensuite détaillés. Un modèle de collaboration d'affaires de la technologie d'innovation ouverte est discuté dans un modèle de collaboration d'affaires de la section TOI. Une section d'étude de cas présente une étude de cas, mettant l'accent sur la pratique d'innovation ouverte d'une entreprise manufacturière chinoise typique. Les conclusions de l'étude sont présentées dans la section Conclusion.

CONCLUSION

L'innovation ouverte joue un rôle de plus en plus vital dans le soutien au développement continu d'une entreprise manufacturière. Afin d'intégrer plus efficacement les ressources externes, il est essentiel de classer les catégories de ressources et de construire un mécanisme pertinent, en vertu duquel l'optimisation des ressources externes peut être exécutée dans un cycle d'innovation auto-rotatif.

En outre, un modèle d'affaires global d'innovation ouverte est présenté, afin d'identifier la relation logique entre l'entreprise manufacturière, ses utilisateurs finaux et ses ressources externes. En outre, un TOI est spécifiquement discuté dans ce document, dans lequel la classification des ressources externes, et un mécanisme externe de sélection des ressources sont analysés, et montré pour aider à sélectionner des ressources qualifiées et à exclure les ressources non qualifiées du modèle d'affaires. Le résultat pourrait être une référence pour les entreprises manufacturières afin de coordonner l'élimination progressive et l'élimination progressive des ressources externes pendant le processus d'ing. En outre, notre document indique la faisabilité du modèle proposé dans ce document avec l'étude de cas haier Group TOI. Par conséquent, ce document a fourni un nouveau modèle d'innovation ouverte, permettant la gestion des ressources externes, qui manque dans la littérature actuelle. Le modèle de stratégie d'innovation ouverte proposé peut être utile dans d'autres entreprises pour une gestion efficace des ressources externes et une meilleure performance.

Il y a certaines limites à étudier plus avant, notamment : (1) les auteurs se concentrent sur l'élaboration d'un cadre de mécanisme générique; et il serait utile d'envisager un mécanisme particulier adapté à la gestion d'une ressource externe spécifique; (2) il est nécessaire d'explorer d'autres études de cas provenant de divers milieux industriels. À cet égard, la stratégie d'innovation ouverte proposée, combinée au cadre du mécanisme générique, pourrait être vérifiée plus avant et pourrait être de référence pour d'autres entreprises.

TRANSLATED VERSION: GERMAN

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

ÜBERSETZTE VERSION: DEUTSCH

Hier ist eine ungefähre Übersetzung der oben vorgestellten Ideen. Dies wurde getan, um ein allgemeines Verständnis der in dem Dokument vorgestellten Ideen zu vermitteln. Bitte entschuldigen Sie alle grammatikalischen Fehler und machen Sie die ursprünglichen Autoren nicht für diese Fehler verantwortlich.

EINLEITUNG

Mit dem Aufkommen des Internetzeitalters stehen produzierende Unternehmen vor neuen Herausforderungen und Chancen auf dem wettbewerbsfähigen globalisierten lokalen und globalen Markt. Angetrieben von der rasanten Entwicklung der Marktglobalisierung müssen die produzierenden Unternehmen größere Anstrengungen unternehmen, um die individuellen Anforderungen des Marktes durch den Einsatz globaler Ressourcen und durch offene Innovation zu erfüllen. Seit (Chesbrough 2003) das Konzept der offenen Innovation erstmals vorgestellt wurde, ist die Studie über offene Innovation bei Akademikern und Praktikern gleichermaßen immer beliebter geworden. Offene Innovation ist definiert als der Prozess der Stärkung der Interaktion und Zusammenarbeit mehrerer Partner, die an einem Unternehmensökosystem beteiligt sind, um gemeinsam ein innovatives Produkt oder eine innovative Lösung zu liefern. Dies bedeutet, dass erfolgreiche offene Innovationspartnerschaften nützlich sein werden, um sinnvolle und innovative Lösungen zu erkunden, um den Anforderungen der Kunden gerecht zu werden. Darüber hinaus sind die Beschaffung, Integration und Entwicklung von Produkten und Geschäftsmodellinnovationen durch "Win-Win"-Externe Partnerschaften von großem Interesse für produzierende Unternehmen, um den maximalen kommerziellen Wert ihrer Investitionen zu erfassen (Muhdi 2011; Nakagaki et al. 2012).

Derzeit profitierten zahlreiche produzierende Unternehmen aus verschiedenen Branchen wie Konsumgüter, Elektronik und Ausrüstung stark von der Einführung offener Innovationsstrategien zur Bereicherung ihrer internen Innovationsprozesse (Serrono und Fischer 2007). Viele dieser Unternehmen konkurrieren um den Sieg durch die Umsetzung einer offenen Innovationsstrategie, indem sie mit verschiedenen Partnern in einer Wertschöpfungskette – einschließlich Universitäten und Instituten und sogar anderen Unternehmen – zusammenarbeiten, indem sie sich flexibel für externe Partnerschaften öffnen und sich zunehmend auf ihre Zusammenarbeit mit externen Ressourcen verlassen (Etzkowita 2008; Leydesdorff 2003). Ein gutes Beispiel dafür ist die Innovationspraxis von Procter & Gamble (Huston und Sakkab 2006), deren Erfolg weitgehend auf innovative Kooperationen mit externen Partnern zurückzuführen ist, wobei rund 50 % der neuen Produkte von Procter & Gamble inzwischen von außerhalb der Muttergesellschaft stammen. Die Klassifizierung innovativer Ressourcen und ihre Integration in eine offene Innovationsstrategie wurde im Allgemeinen als zu kompliziertes Problem für die unternehmenden Unternehmen angesehen, und daher wurde diese Frage nicht ausreichend untersucht.

Ziel dieses Papiers ist es daher, ein neues Modell für offene Innovation zu entwickeln. Die Forschungsfragen dieses Papiers bestehen darin, (1) welche Arten externer Ressourcen identifiziert werden könnten, um die Entwicklung offener Innovation zu erleichtern? (2) Welches Geschäftsmodell ist erforderlich, um die Zusammenarbeit zwischen produzierenden Unternehmen und externen Ressourcen während eines offenen Innovationsprozesses zu entwickeln? (3) Wie kann ein verarbeitendes Unternehmen einen bestimmten Mechanismus zur wirksamen Verwaltung dieser externen Ressourcen anwenden?

Diese Forschung leistet mehrere Beiträge zur Verbesserung der Modellierung einer offenen Innovationsstrategie, die die innovationsorientierten Fähigkeiten von Fertigungsunternehmen auf der

Grundlage der bestehenden Forschung verbessern kann. Zunächst wird ein neuartiges offenes Innovationsmodell erstellt. Zweitens wird der offene Technologie-Innovationszyklus diskutiert, einschließlich der Vielzahl externer Ressourcen und Mechanismen zur Verwaltung der externen Ressourcen, und es wird ein Geschäftsmodell in Verbindung mit einer Fallstudie vorgestellt.

Dieses Papier ist wie folgt aufgebaut: Kritische Literaturrezension und Motivation für den Studienteil diskutiert den Forschungshintergrund und die Motivation für die vorliegende Studie; Die theoretische Grundlage eines Abschnitts über eine offene Innovationsstrategie bildet eine theoretische Grundlage für die vorgeschlagene offene Innovationsstrategie. Im Bereich Open Innovation Business Model wird ein Geschäftsmodell für die offene Gesamtinnovation vorgestellt; Während bei der Verwaltung externer Ressourcen in einem offenen Bereich des Innovationssystems zunächst externe Ressourcen klassifiziert werden und die Mechanismen zur Verwaltung dieser externen Ressourcen dann detailliert sind. Ein Business Collaboration-Modell offener Innovationstechnologie wird im Bereich Unternehmenszusammenarbeit im Bereich TOI diskutiert. Eine Fallstudie stellt eine Fallstudie vor, die sich auf die offene Innovationspraxis eines typischchinesischen Fertigungsunternehmens konzentriert. Die Schlussfolgerungen der Studie werden im Abschnitt Schlussfolgerung vorgestellt.

SCHLUSSFOLGERUNG

Offene Innovation spielt eine immer wichtigere Rolle bei der Unterstützung der Weiterentwicklung eines produzierenden Unternehmens. Um externe Ressourcen effizienter zu integrieren, ist es wichtig, die Ressourcenkategorien zu klassifizieren und einen relevanten Mechanismus aufzubauen, unter dem die Optimierung der externen Ressourcen in einem sich selbst drehenden Innovationszyklus durchgeführt werden kann.

Darüber hinaus wird ein allgemeines offenes Innovations-Geschäftsmodell vorgestellt, um die logische Beziehung zwischen dem produzierenden Unternehmen und seinen Endnutzern und externen Ressourcen zu identifizieren. Darüber hinaus wird in diesem Dokument ein TOI speziell erläutert, in dem die Klassifizierung der externen Ressourcen und ein externer Ressourcen-Screening-Mechanismus analysiert und gezeigt werden, um bei der Auswahl qualifizierter Ressourcen und dem Ausschluss nicht qualifizierter Ressourcen aus dem Geschäftsmodell zu helfen. Das Ergebnis könnte eine Referenz für fertigungsverarbeitende Unternehmen sein, um das schrittweise Ein- und Aussetzen externer Ressourcen während des TOI-Prozesses zu koordinieren. Darüber hinaus zeigt unser Papier die Machbarkeit des in diesem Papier vorgeschlagenen Modells mit der toi-Fallstudie der Haier Group. Daher hat dieses Papier ein neues Modell für offene Innovation geliefert, das die Verwaltung externer Ressourcen ermöglicht, die in der aktuellen Literatur fehlen. Das vorgeschlagene Modell der offenen Innovationsstrategie kann in anderen Unternehmen für eine effiziente Verwaltung externer Ressourcen und eine verbesserte Leistung nützlich sein.

Es gibt einige Einschränkungen, die weiter untersucht werden müssen, darunter: (1) die Autoren konzentrieren sich auf die Entwicklung eines allgemeinen Mechanismusrahmens; und es wäre sinnvoll, einen besonderen Mechanismus in Betracht zu ziehen, der für die Verwaltung einer bestimmten externen Ressource geeignet ist; (2) Es müssen weitere Fallstudien aus unterschiedlichen industriellen Schichten untersucht werden. In dieser Hinsicht könnte die vorgeschlagene Strategie für offene Innovationen in Verbindung mit dem Rahmen für den allgemeinen Mechanismus weiter überprüft werden und für andere Unternehmen von Bezugsgröße sein.

TRANSLATED VERSION: PORTUGUESE

Below is a rough translation of the insights presented above. This was done to give a general understanding of the ideas presented in the paper. Please excuse any grammatical mistakes and do not hold the original authors responsible for these mistakes.

VERSÃO TRADUZIDA: PORTUGUÊS

Aqui está uma tradução aproximada das ideias acima apresentadas. Isto foi feito para dar uma compreensão geral das ideias apresentadas no documento. Por favor, desculpe todos os erros gramaticais e não responsacule os autores originais responsáveis por estes erros.

INTRODUÇÃO

Com o advento da era da internet, as empresas manufatureira enfrentam novos desafios e oportunidades no competitivo mercado local e global global. Impulsionadas pelo rápido desenvolvimento da globalização do mercado, as empresas manufatureiras devem fazer maiores esforços para atender às demandas individuais do mercado, utilizando recursos globais e através da inovação aberta. Desde que (Chesbrough 2003) apresentou pela primeira vez o conceito de inovação aberta, o estudo da inovação aberta tem se tornado cada vez mais popular entre acadêmicos e profissionais. A inovação aberta é definida como o processo de fortalecimento da interação e colaboração de múltiplos parceiros envolvidos em um ecossistema de negócios, para entregar conjuntamente um produto ou solução inovadora. Isso significa que parcerias bem-sucedidas de inovação aberta serão úteis para explorar soluções significativas e inovadoras para satisfazer as necessidades dos clientes. Além disso, a sourcing, integração e desenvolvimento de produtos e inovações de modelo de negócios por meio de parcerias externas "ganha-ganha" são de grande interesse para as empresas de manufatura, para capturar o valor comercial máximo de seus investimentos (Muhdi 2011; Nakagaki et al. 2012).

Atualmente, um grande número de empresas fabris de diferentes indústrias, como bens de consumo, eletrônicos e equipamentos, têm se beneficiado muito com a adoção de estratégias de inovação aberta para enriquecer seus processos internos de inovação (Serrono e Fischer 2007). Muitas dessas empresas competem para vencer através da implementação de uma estratégia de inovação aberta, cooperando com vários parceiros em uma cadeia de valor — incluindo universidades e institutos, e até mesmo outras empresas — abrindo-se flexívelmente para parcerias externas e colocando cada vez mais dependência de suas colaborações com recursos externos (Etzkowita 2008; Leydesdorff 2003). Um bom caso em questão é a prática de inovação da Procter & Gamble (Huston e Sakkab 2006), cujo sucesso é atribuído em grande parte a colaborações inovadoras com parceiros externos, pelo qual cerca de 50% dos novos produtos da Procter & Gamble agora se originam de fora da empresa-mãe. Classificar recursos inovadores e integrá-los em uma estratégia de inovação aberta tem sido geralmente considerado um problema muito complicado para as empresas de manufatura e, portanto, essa questão não tem sido adequadamente estudada.

Portanto, o objetivo deste artigo é desenvolver um novo modelo de inovação aberta. As questões de pesquisa deste artigo consistem em (1) quais tipos de recursos externos poderiam ser identificados para facilitar o desenvolvimento da inovação aberta? (2) que tipo de modelo de negócio é necessário para desenvolver a colaboração entre empresas de manufatura e recursos externos durante um processo de inovação aberta? (3) como uma empresa de manufatura pode adotar um determinado mecanismo para gerenciar esses recursos externos de forma eficaz?

Esta pesquisa faz várias contribuições para melhorar a modelagem de uma estratégia de inovação aberta que possa melhorar as capacidades inovadoras das empresas de manufatura com base na pesquisa existente. Em primeiro lugar, um novo modelo global de inovação aberta é construído. Em segundo lugar, discute-se o ciclo de inovação aberta tecnológica, incluindo a matriz de recursos externos e mecanismos para gerenciar os recursos externos, e um modelo de negócio em conjunto com um estudo de caso é apresentado.

Este artigo está estruturado da seguinte forma: Revisão crítica da literatura e motivação para a seção de estudo discute o histórico da pesquisa e a motivação para o presente estudo; A base teórica de uma seção de estratégia de inovação aberta fornece uma base teórica para a estratégia de inovação aberta proposta. Na seção modelo de negócios de inovação aberta, é apresentado um modelo de negócio para a inovação aberta global; enquanto na Gestão de recursos externos em uma seção de sistema de inovação aberta, os recursos externos são, em primeiro lugar, classificados e os mecanismos utilizados para gerenciar esses recursos externos são então detalhados. Um modelo de colaboração de negócios de tecnologia de inovação aberta é

discutido em um modelo de colaboração de negócios da seção TOI. Uma seção de estudo de caso apresenta um estudo de caso, com foco na prática de inovação aberta de uma empresa de fabricação típica chinesa. As conclusões do estudo são apresentadas na seção Conclusão.

CONCLUSÃO

A inovação aberta desempenha um papel cada vez mais vital no apoio ao desenvolvimento contínuo de uma empresa de manufatura. Para integrar os recursos externos de forma mais eficiente, é essencial classificar as categorias de recursos e construir um mecanismo relevante, sob o qual a otimização dos recursos externos pode ser executada em um ciclo de inovação auto-rotativo.

Além disso, é apresentado um modelo geral de negócio de inovação aberta, para identificar a relação lógica entre a empresa de manufatura e seus usuários finais e recursos externos. Além disso, é discutido especificamente um TOI neste artigo, no qual são analisados a classificação dos recursos externos e um mecanismo de triagem de recursos externos, e mostrado para ajudar na seleção de recursos qualificados e na exclusão de recursos não qualificados do modelo de negócio. O resultado pode ser uma referência para as empresas de manufatura coordenarem o afago-in e a eliminação de recursos externos durante o processo TOI. Além disso, nosso artigo indica a viabilidade do modelo proposto neste artigo com o estudo de caso TOI do Grupo Haier. Por isso, este artigo proporcionou um novo modelo de inovação aberta, possibilitando a gestão dos recursos externos, o que está em falta na literatura atual. O modelo de estratégia de inovação aberta proposto pode ser útil em outras empresas para uma gestão eficiente de recursos externos e melhor desempenho.

Existem algumas limitações a serem estudadas, incluindo: (1) os autores se concentram no desenvolvimento de um quadro de mecanismos genéricos; e valeria a pena considerar um mecanismo específico adequado para a gestão de um recurso externo específico; (2) é necessário explorar mais estudos de caso de uma variedade de origens industriais. Nesse sentido, a proposta de estratégia de inovação aberta combinada com o quadro do mecanismo genérico poderia ser mais verificada e pode ser de referência para outras empresas.