



International Research Science and Development Center

---

---

International  
Research Science  
and  
Development Journal

---

---

[www.IRSDJournal.com](http://www.IRSDJournal.com)

International Research Science and Development Journal  
Vol. 1, No. 1, 2020, pp. 37-50.  
ISSN 2348-3008

## **Open innovation and closed innovation in organizations (Differences, principles, benefits and perspectives)**

**Seong Yeon Zhuang<sup>1</sup>, Seunghee Zhao<sup>2</sup>**

<sup>1</sup> Department of Engineering, University of Ulsan, Seoul, Republic of Korea

<sup>2</sup> Department of Industrial Engineering, Hanyang University, Seoul, Republic of Korea

---

### **Abstract**

The process of innovation in the past has depended on intellectual resources within the organization and efforts to develop and commercialize them within the organization. Today, the Open Innovation Paradigm invites companies to make more use of external ideas and technologies in their business, and to allow other companies to take advantage of their innovative ideas. Open innovation is an issue that has received a lot of attention from researchers and managers in recent years. In the case of open innovation, organizations explore the environment for technology and knowledge and do not rely solely on their own internal research and development. In the past, the innovation process has depended on intra-organizational intellectual resources and efforts to develop and commercialize them within the organization. Today, the open innovation paradigm invites companies to make more use of external ideas and technologies in their business, and to allow other companies to take advantage of their innovative ideas. Open innovation is an issue that has received a lot of attention from researchers and managers in recent years. Open innovation emphasizes that innovation is not for specific people, specific topics, and specific locations, but innovation can be sought in all people in all locations and all subjects. This paradigm emphasizes the epidemic and socialization of innovation. The purpose of this paper is to review the processes and generalities of open innovation and the factors affecting it.

**Keywords:** Open innovation, Organization, Closed innovation.

---

## **Introduction:**

### **1. Introduction**

Considering factors such as the short life cycle of technology, emerging technologies, costs and risks associated with technology, globalization of research and development processes, increasing the competition of firms in the market of their products and the growing importance of investment to finance the idea Businesses, foreign technology resources are very important, and knowledge flows are necessary for competition [1], but they do not work automatically, and companies need to develop their skills to move toward them. Rapid changes in the field of technology, increasing innovation costs, increasing competition in introducing products and technologies have led to an increase in the organization's need to interact with the environment and its external stakeholders by opening the organization's borders to exchange innovative ideas [2]. "Open innovation is an algorithm based on the assumption that if companies are looking to upgrade their technology, they can and should use foreign technology ideas, such as domestic ideas," he said. Use a variety of domestic and foreign routes to the market. " Open innovation is one of the phenomena that has been repeatedly expressed with different definitions [3].

The phenomenon of innovation is generally defined as the creation, creation or introduction of new phenomena; However, this view is very different from the scientific definitions and views on the phenomenon of innovation. Some of these definitions - scientific - are as follows: Innovation is the achievement of success in production and learning, as well as the use of new phenomena in the economic and social fields [4]. The strategy of modernizing and expanding the scope of products and services, as well as their related markets, is called innovation. Innovation is summed up in the presentation of new methods of production, supply and distribution. Introducing changes in management style, organizing work activities and working conditions, and workforce skills is called innovation [5]. All of these definitions are rooted in the views of management science experts; But what should not be overlooked is the fact that innovation requires commercialization and market delivery. Commercialization refers to the process of introducing and presenting a new product or method of production to the field of trade or the market [6].

## **2. Different types of innovation**

As mentioned in the above definitions, the phenomenon of innovation has different types and angles. Innovation can emerge in the form of offering a new product or service to the market [7]. In other words, by introducing products or services that have made significant changes to the market compared to the previous model, it is possible to innovate in the product or service. These changes mainly involve new features and applications. For example, the introduction of applications by banks to facilitate the payment of bills and the transfer of cash is an innovation in service [8].

Open Innovation and Facility Payment: Also, the supply of all-electric vehicles by automakers to the market is an example of product innovation. Innovation in the process is another form of innovation [9].

Open Innovation and Electric Vehicles: Clearly, implementing new or fully improved processes is also a form of innovation; this is mainly due to significant changes in the manufacturing process, the way goods are delivered or served to the customer, or the improvement of access to raw materials (logistics) or the distribution system [10]. For example, Some Company's action in launching online sales of products to the final consumer and delivery of goods at home is a kind of innovation in logistics. The Snap app is also a kind of innovation in logistics [11].

Open Innovation and Internet Sales: Because the Internet and smartphones have made it possible for citizens to access the taxi service anywhere in the city. Another type of innovation is marketing innovation; that includes implementing methods and using new marketing tools [12].

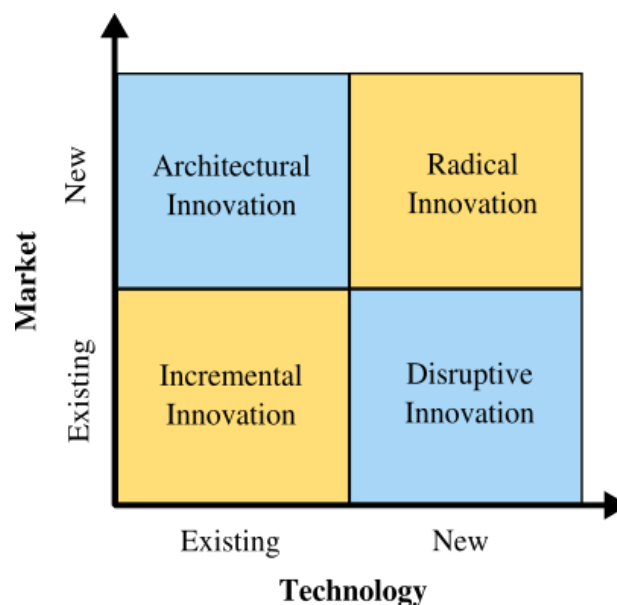
Open Innovation and Smartphone: Innovation in marketing involves significant optimizations in product design, packaging, price, distribution and product promotion. For example, Coca-Cola's first step in offering carbonated beverages in one-and-a-half-liter bottles was, for the first time, a kind of innovation in packaging marketing. Innovation in the structure of the organization is another type of innovation [13]. Organizational innovation involves the implementation of new organizational methods in the field of business and external relations [14].

Modes of open innovation practice for an enterprise		
Outside-in process	Inside-out process	Coupled process
Integrating external Knowledge, Customers and Suppliers	Bringing ideas to market, selling/licensing IP and multiplying technology	Couple outside-in and inside-out process, working in alliances with complementarities
Acquisition/Spin-in with/out VC Contract R&D, in-licensing Inward technology transfer	Spin-out/off with/out Internal VC Fund Out-licensing Outward technology transfer	Joint development, joint-venture, strategic alliance, networking
Mode	Exploration (R&D)	Exploitation (commercialization)
Customer-provider Strategic alliance Inter-firm alliance	Funding, licensing, outsourcing R&D partnership, joint-ventures Network	Outsourcing Partnership Network
	Technology exploitation	Technology exploration
	Venturing Outward IP licensing Employee involvement	Customer involvement External networking External participation Outsourcing R&D Inward IP licensing

**Source:** Developed by the author adapting Van de Vrande et al. (2009), Gassmann and Enkel (2004) and OCDE (2008).

### 3. Different degrees of innovation

Open Innovation and Gradual Innovation: Incremental Innovation includes a variety of improvements and improvements in technology; without changing the rules of engineering. Such as DVD technology that uses computer technology engineering rules [15]. Open Innovation and Fundamental Innovation: Radical Innovation includes fundamental changes in the rules of technology engineering. Like the evolution of the audio and video player industry with the advent of the compact disc, this was previously based on the cassette tape [16].

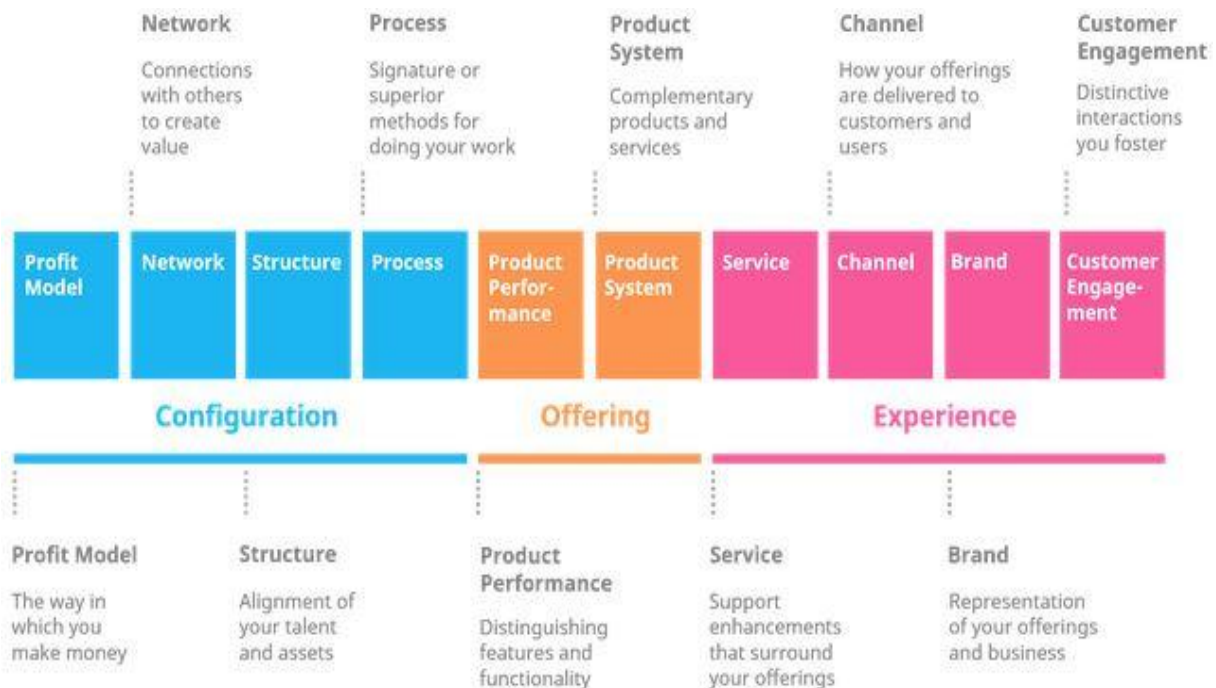


**Disruptive Innovation:** Disruptive Innovation involves fundamental innovation that succeeds in capturing the technology market of the previous generation [17]. Replace it altogether. Such as low-energy lamp technology, this was completely replaced by incandescent lamps by fundamentally changing the engineering rules of lighting lamps [18].

**Innovation in Technology Architecture:** In this way, innovation is the only connection between the components that undergoes transformation. Miniaturization is an example of innovation in technology architecture [19]. Another example of this kind of change was the introduction of tablets to the market, which take full advantage of smartphone technology.

**Open Innovation and Modules:** The ability to produce a family of products based on the basic characteristics of a product is called the ability to produce a platform [20]. One of the determining factors in the ability to develop different products from the same platform is the modularity factor. Modularity refers to the ability to separate and reconnect components of a system; which causes flexibility and scope of application of a system [21].

The difference between cars with automatic transmission technology and cars with manual transmissions can be defined by the fundamental modular innovation made in the torque transfer module (gearbox) [22].

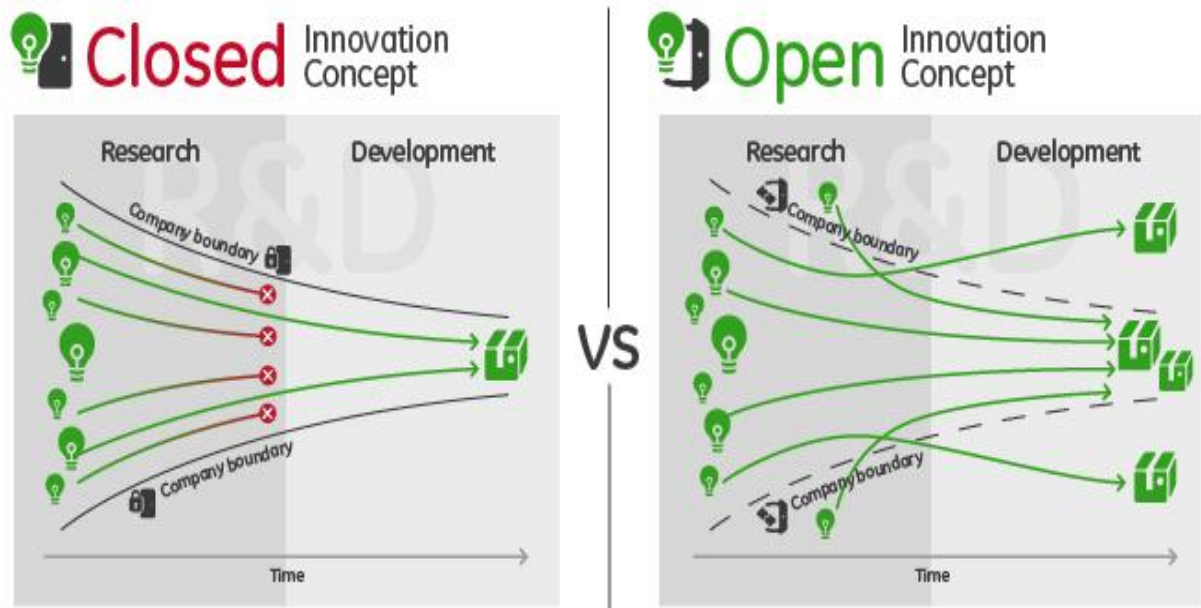


#### 4. Open innovation and closed innovation

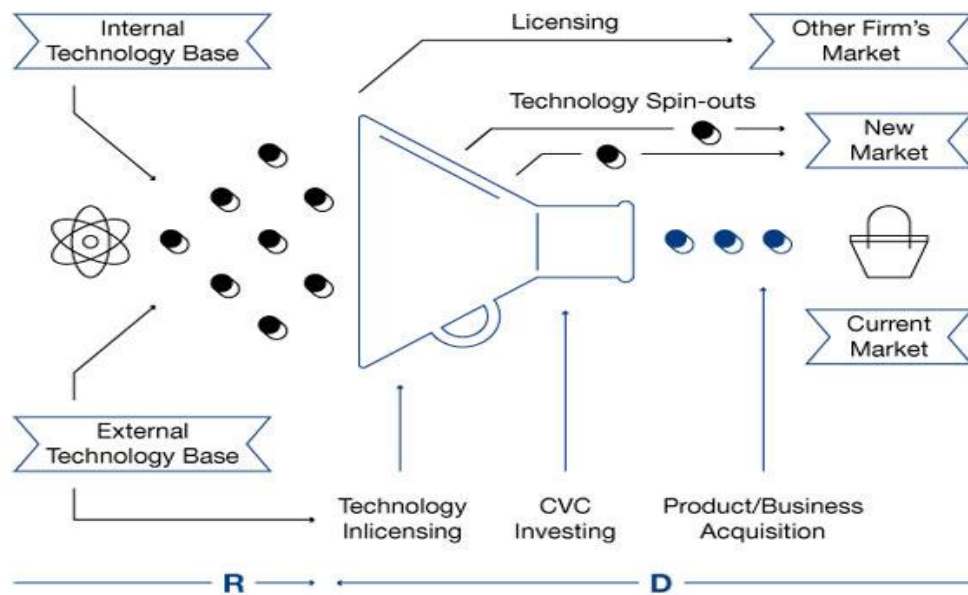
The term innovation was first coined by Joseph Schumpeter. He linked innovation to economic development and introduced it as a new combination of wealth-generating resources [7]. It should be noted that innovation is not just a one-time phenomenon, but a continuous process consisting of an organizational decision-making process at all stages, from the development of a new idea to its implementation. Innovation today is defined as an interactive process for problem solving and learning [9]. Factors such as declining access to resources, the similarity and shortness of life of strategies, maintaining youth and agility, competition in global markets, etc., led organizations to innovate and create revolutionary ideas. Although innovation can occur in product, service, technology, paradigm, etc., strategic innovation is the concept of competition in the existing industry that redefines and enhances customer values [11].

CLOSED VS OPEN INNOVATION	
Closed	Open
Mostly internal ideas	Both internal and external ideas
Low workforce mobility	High workforce mobility
Low role of venture capital	Active role of venture capital
Few new businesses	Many new businesses
All the best people working within company	Not all the best people working within company, tapping into knowledge and expertise of individuals outside the company
R&D creates profit only when the company invents, develops and markets everything themselves	External R&D can create value
Develop the product internally and be the first to market	External R&D can generate profit by forming forces with outside parties
Aim to get the innovation to the market first	It is more important to develop a better business model than to be the first in the market
Have the intellectual property (IP) under internal control	Profit from licensing IP and buy others' IP when required

**Closed Innovation:** Closed innovation is the traditional pattern of innovation. In this traditional view, companies necessarily consider the innovation phenomenon to be an endogenous phenomenon and emphasize the need for the company to control the innovation process [14]. However, Henry Chesbrough emphasizes that intra-organizational research and development can no longer be considered the sole driver of innovation. Because the way companies are dialogized and commercialized has changed completely [17].



Open Innovation: In contrast to closed innovation perspective, there is open innovation perspective; which emphasizes the permeability of the organization's borders. The Open Innovation Perspective was first introduced by Henry Chesbro of the University of California, Berkeley [18]. "Since there are always a lot of valuable ideas outside of the firm, companies need to be active in buying and selling intellectual property ideas," Checkrow said. Intellectual property means a type of property that includes intangible assets derived from people's ideas. Common types of intellectual property include copyright, patents, trademarks, and trade secrets [19]. Technology-based assets should not be considered independent of the company's business model. In other words, companies in the path of technological progress can and should use ideas and paths within and outside the organization to accelerate innovation and improve the market [20]. Henry Chesbrou defines open innovation as follows; Purposeful Inflow and Outflow of Knowledge in order to accelerate intra-organizational innovation and to expand markets through the platform for the application of innovations outside the organization [21]. In other words, open innovation is the source of finding, integrating, and expanding innovation in the development of products and business systems through a win-win foreign partnership channel to achieve maximum business value through investment in research and development [22].



The Open Innovation Pattern looks at R&D as an open system and believes that valuable ideas can come from inside or outside the company, and that these ideas can be marketed through the company or outside the business. This method has the same value for internal and external ideas. Open innovation is sometimes confused with the Open Source movement in software development. Some of the concepts between the two are the same, such as the idea of creating large sources of external information to create value, but they also have fundamental differences [23]. Open innovation sees the business model as a source for Value Creation and Value Capture. The business model maintains the company's position in the industry's value chain and takes into account the company's specific interests, while the open source movement focuses on value creation throughout an industry's value chain, and proponents of the movement oppose recording value [24].

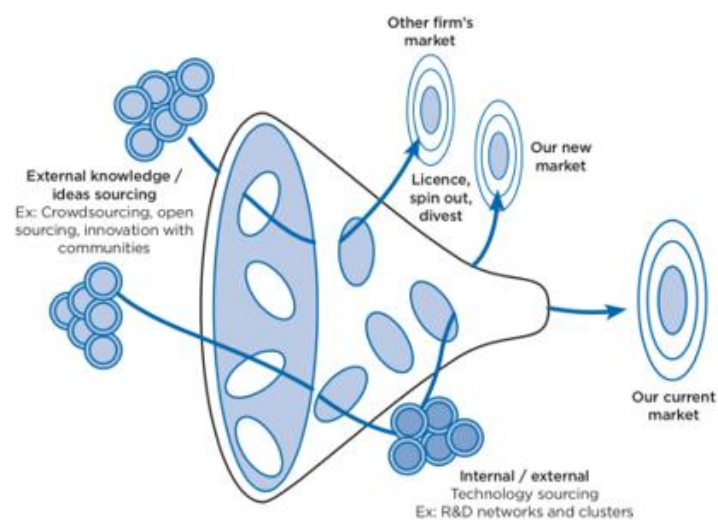
In fact, open innovation believes that useful knowledge is very widespread and distributed, and even the most capable research and development units should look at identifying, making connections, and using foreign knowledge resources as a key process [9]. Ideas that once only sprouted in large corporations may now be crystallized under different circumstances and in an individual invention or a high-tech startup in Silicon Valley or even in the research of an educational institution [3]. These conditions may not exist in any business environment, and people need to look carefully at the infrastructure and conditions that make open innovation dynamic. Open innovation considers the ability to absorb and use foreign knowledge as one of the most important capabilities of any company [25].



## 5. New Innovation Framework for Using Technology

The new innovation framework has completely changed the past, and companies will seek to turn their technology into a product and market it in a variety of ways, rather than simply creating technology for their own use [1]. On the other hand, in the new framework, companies no longer want to create technology only inside the company and are ready to use the knowledge resources outside the company [15]. Also, in this context, not only do companies not want to maintain the intellectual property of innovation exclusively and prevent the use of others, but they also manage their intellectual property in such a way that in addition to improving their business model, the possibility of more profitability for Provide others. In this regard, it pays special attention to start-ups based on small and medium technology and knowledge-based companies [14]. The first perspective is the globalization of research and innovation. As research into technology and the development of products and services progresses toward globalization, it has become easier for companies to access innovation resources, and this fact has led to an increase in the capacity to attract companies and improve their access to existing technological knowledge and capabilities. It has become all over the world [21].

Structural perspective: The next perspective is the structural perspective. This view suggests that the division of labor in the innovation process is increasing. There is a tremendous trend in research and development outsourcing and innovative collaborations. One of the drivers of this issue is the reduction of costs and more specialization due to the complexity of products and technologies [19].



User and Customer Perspective: The third perspective is the view of users and customers who are integrated with the innovation process and they are mentioned as factors available to the company to understand the hidden needs of customers and their practical knowledge [25]. This has increased the participation of users and customers in the innovation process of companies. Suppliers' Perspective: Another view is suppliers' perspective. In this view, the participation and integration of suppliers in the innovation process can have a significant impact on improving the performance of companies in most industries [10].

Cultural perspective: Finally, the cultural perspective is expressed. From a cultural perspective, moving toward open innovation requires starting with the way people think and behave. One of the obstacles to open innovation is the "not invented here" syndrome [26].

## **6. Conclusion:**

It seems that what is referred to as open innovation in the current context should be viewed with more hesitation; because on the one hand, the freshness and virginity of this concept and on the other hand, its effectiveness is not very well documented and reasoned. Open innovation seems to be more of a successful slogan than a scientific finding or a promising paradigm. Another is that companies' perceptions and business incentives are practically at odds with the concept of open approach. But real open innovation can be implemented with a radical perspective on this paradigm; And that is moving towards free and global innovation. In this case, a good idea does not just about own a person, so it can be shared, used, and developed for free; while inventors are paid to invent, not for previous inventions. The open innovation model is in fact the opposite of vertical and traditional models in which the production of a product is the result of research and development within companies. If we want to express the concept of open innovation in one sentence, open innovation means using useful internal currents (knowledge of internal revenues) and knowledge outside the company in order to accelerate internal innovation. Open innovation is a model that advises companies to value as much as they value the company's internal ideas, as well as the ideas that exist and flow in the world outside the company, so that they can access different markets. Advance companies' technology. Open innovation processes combine internal and external ideas in the form of different architectures and systems, and use business models to define the requirements of architectures and systems. This business model uses internal and external ideas to create value while defining internal mechanisms to claim part of that value.

**References:**

1. Alberti, F.G. and Pizzurno, E. (2017), "Oops, I did it again! Knowledge leaks in open innovation networks with start-ups", *European Journal of Innovation Management*, Vol. 20 No. 1, pp. 50-79.
2. Bellantuono, N., Pontrandolfo, P. and Scozzi, B. (2013), "Different practices for open innovation: a context-based approach", *Journal of Knowledge Management*, Vol. 17 No. 4, pp. 558-568.
3. Bican, P.M., Guderian, C.C. and Ringbeck, A. (2017), "Managing knowledge in open innovation processes: an intellectual property perspective", *Journal of Knowledge Management*, Vol. 21 No. 6, pp. 1384-1405.
4. Biscotti, A.M., Mafrolla, E., Giudice, M.D. and D'Amico, E. (2018), "CEO turnover and the new leader propensity to open innovation: Agency-resource dependence view and social identity perspective", *Management Decision*, Vol. 56 No. 6, pp. 1348-1364.
5. Cillo, V., Rialti, R., Bertoldi, B. and Ciampi, F. (2019), "Knowledge management and open innovation in agri-food crowdfunding", *British Food Journal*, Vol. 121 No. 2, pp. 242-258.
6. Dezi, L., Battisti, E., Ferraris, A. and Papa, A. (2018), "The link between mergers and acquisitions and innovation: A systematic literature review", *Management Research Review*, Vol. 41 No. 6, pp. 716-752.
7. Doloreux, D. and Lord-Tarte, E. (2013), "The organisation of innovation in the wine industry: Open innovation, external sources of knowledge and proximity", *European Journal of Innovation Management*, Vol. 16 No. 2, pp. 171-189.
8. Duarte, V. and Sarkar, S. (2011), "Separating the wheat from the chaff – a taxonomy of open innovation", *European Journal of Innovation Management*, Vol. 14 No. 4, pp. 435-459.
9. Elmquist, M., Fredberg, T. and Ollila, S. (2009), "Exploring the field of open innovation", *European Journal of Innovation Management*, Vol. 12 No. 3, pp. 326-345.
10. Formica, P. and Curley, M. (2018), "In Search of the Origin of an 'Open Innovation' Culture", Formica, P. and Curley, M. (Ed.) *Exploring the Culture of Open Innovation*, Emerald Publishing Limited, pp. 1-54.

11. Hitchen, E.L., Nylund, P.A., Ferràs, X. and Mussons, S. (2017), "Social media: open innovation in SMEs finds new support", *Journal of Business Strategy*, Vol. 38 No. 3, pp. 21-29.
12. Holgersson, M. and Granstrand, O. (2017), "Patenting motives, technology strategies, and open innovation", *Management Decision*, Vol. 55 No. 6, pp. 1265-1284.
13. Hossain, M. (2013), "Open innovation: so far and away forward", *World Journal of Science, Technology and Sustainable Development*, Vol. 10 No. 1, pp. 30-41.
14. Hsieh, C.-T., Huang, H.-C. and Lee, W.-L. (2016), "Using transaction cost economics to explain open innovation in start-ups", *Management Decision*, Vol. 54 No. 9, pp. 2133-2156.
15. Lazzarotti, V., Manzini, R. and Pellegrini, L. (2010), "Open innovation models adopted in practice: an extensive study in Italy", *Measuring Business Excellence*, Vol. 14 No. 4, pp. 11-23.
16. Liu, Q., Zhao, X. and Sun, B. (2018), "Value co-creation mechanisms of enterprises and users under crowdsourcing-based open innovation", *International Journal of Crowd Science*, Vol. 2 No. 1, pp. 2-17.
17. Muller, A. and Hutchins, N. (2012), "Open innovation helps Whirlpool Corporation discover new market opportunities", *Strategy & Leadership*, Vol. 40 No. 4, pp. 36-42.
18. Muzamil Naqshbandi, M. and Kaur, S. (2014), "Do managerial ties support or stifle open innovation?", *Industrial Management & Data Systems*, Vol. 114 No. 4, pp. 652-675.
19. Öberg, C. (2016), "Acquisitions and Open Innovation – A Literature Review and Extension", *Mergers and Acquisitions, Entrepreneurship and Innovation (Technology, Innovation, Entrepreneurship and Competitive Strategy, Vol. 15)*, Emerald Group Publishing Limited, pp. 31-58.
20. Peris-Ortiz, M., Rueda-Armengot, C. and Estelles-Miguel, S. (2019), "The effect of managing different types of work on open innovation: A micro-organizational perspective", *Journal of Organizational Change Management*, Vol. 33 No. 1, pp. 1-15.
21. Ratten, V. (2019), "The effect of cybercrime on open innovation policies in technology firms", *Information Technology & People*, Vol. 32 No. 5, pp. 1301-1317.

22. Roldán Bravo, M.I., Lloréns Montes, F.J. and Ruiz Moreno, A. (2017), "Open innovation in supply networks: an expectation disconfirmation theory perspective", *Journal of Business & Industrial Marketing*, Vol. 32 No. 3, pp. 432-444.
23. Roldán Bravo, M.I., Ruiz Moreno, A. and Llorens-Montes, F.J. (2016), "Supply network-enabled innovations. An analysis based on dependence and complementarity of capabilities", *Supply Chain Management*, Vol. 21 No. 5, pp. 642-660.
24. Sydow, J. and Berends, H. (Ed.) *Managing Inter-organizational Collaborations: Process Views* (Research in the Sociology of Organizations, Vol. 64), Emerald Publishing Limited, pp. 213-237.
25. Wang, X. and Xu, M. (2018), "Examining the linkage among open innovation, customer knowledge management and radical innovation: The multiple mediating effects of organizational learning ability", *Baltic Journal of Management*, Vol. 13 No. 3, pp. 368-389.
26. Zanjirchi, S.M., Jalilian, N. and Shahmohamadi Mehrjardi, M. (2019), "Open innovation: from technology exploitation to creation of superior performance", *Asia Pacific Journal of Innovation and Entrepreneurship*, Vol. 13 No. 3, pp. 326-340.