

Toward a conceptual model of technology transfer by multinational corporations in the Moroccan context

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Abstract

Technology transfer is a process that involves transferring a set of knowledge and practices from one entity to another. This process can be facilitated through various means, such as multinational corporations (MNCs). In this context, this paper dissects technology transfer by multinational corporations in the Moroccan context. It presents a conceptual model of technology transfer based on a number of hypotheses established through a contextualization study. Four variables have been identified: Direct and indirect links, technological capability, absorptive capacity, and sector structure. Additionally, each variable has been broken down into several sub-variables. Thus, the model variables have been derived and theoretically justified, based on the previous research works of several authors in the field of technology transfer by MNCs. Each variable has been defined and presented in detail. Thus, the proposed conceptual model constitutes the backbone of any future work on evaluating the impact of technology transfer by multinational corporations. It can be utilized to conduct such studies in any sector of activity.

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1. Introduction

Multinational corporations (MNCs) are responsible for a significant portion of advanced technology transfer worldwide. They are considered a powerful and effective means of disseminating technology from developed countries to developing ones and are often seen as the sole source of new and innovative technologies not readily available in underdeveloped markets (Isaac K. S., et al., 2020). Technological progress plays a crucial role in economic growth and can also stimulate economic development and industrialization. Many countries lack the resources, research and development (R&D) and innovative skills needed to develop their own product and process technology, which is particularly true for developing economies. Therefore, foreign direct investment (FDI) represents an important means of accessing advanced technology (De Moortel, et al., 2018). The concept of technology transfer already has a long and rich history of theory and research. Furthermore, local firms are expected to keep up with the increasing technological advancements of MNCs and should possess various technological (physical) and absorption capabilities (know-how, R&D). Thus, strengthening these direct and indirect links, whose impact is assumed to be positive on technology transfer due to the presence of MNCs (Ismail B., et al., 2022).

The technology transferred through FDI to local firms can take two forms: hard technology and soft technology (Portelli, B. & R. Narula; 2003). Hard technology involves physical investment: factories, equipment, and machinery. Therefore, hard technology is supposed to include aspects of knowledge pertaining to machines and equipment. On the other hand, soft technology includes knowledge, management, organizational systems, and production processes. Soft technology is supposed to include aspects of disembodied knowledge resulting from the transfer of operational skills. FDI can affect host country firms, through technology transfer, in two ways: directly and indirectly (Vega-Gomez, F.I., & Miranda-Gonzalez, F.J. (2021).

Foreign firms inject foreign capital, technology, and management skills directly into their subsidiaries, resulting in increased productivity. This is known as the direct effect of FDI. The positive direct effect of FDI is examined and empirically confirmed in a large number of studies. However, foreign firms not only

affect their subsidiaries but also other firms in the same sector or even other sectors. Indirect effects are called spillovers or externalities. Spillovers can take the form of positive and negative externalities resulting from incoming foreign investment (Blomstrom and Kokko, 2000). They can occur internally between firms that may be in direct competition with foreign firms (intra-industry spillovers) and externally (inter-industry spillovers) to other firms in the host economy that are vertically integrated with foreign firms, such as suppliers (upstream spillovers) and customers (downstream spillovers) (Blomstrom, et al., 2000).

In this regard, technology transfer can be affected by several parameters and factors. This depends relatively on the level of development of the country and the sector concerned. Our main objective is to find and explain the existence of technology transfer in the Moroccan industrial context through the presence of MNCs and the technological spillovers generated by them. Indeed, we attempt to develop a model of technology transfer by MNCs by formulating research hypotheses based on a hypothetico-deductive approach. Such a model will be the backbone to empirically testing the hypotheses of the model in a given industrial sector. It aims to identify the variables that can impact technology transfer by MNCs.

To address this issue, this paper will be divided into four sections. In the first section, we start with a literature review on technology transfer by MNCs. Next, we focus on presenting the research methodology. Then, in section 3, we delve into describing the working hypotheses. Finally, we outline the conceptual model of this study. We will conclude with a discussion and conclusion.

2. Literature Review

Technology transfer (TT) is one of the most important mechanisms allowing numerous countries to rapidly acquire the social capacity needed to keep up with developed countries. This transfer can take several forms, such as FDI flows, which require an appropriate regime favorable to foreign capital. The concept of TT via multinational corporations, which enables the diffusion of technology to local firms through their subsidiaries in host countries, represents the crucial link of FDI externalities in host economies. Externalities arise when MNCs enter the market and local firms benefit from their knowledge of

manufacturing technologies, available markets, or technical support without incurring additional costs that absorb the gains from this operation (Kokko, 1994).

According to the literature, the clearest impact of MNCs is perceived in their contribution to the accumulation of know-how, TT, and physical capital. In economic theory, TT through FDI has been envisioned through various diffusion channels, including: the circulation of skilled labor from MNCs to local firms, imitation effects, intra and inter-firm linkages, technical assistance and insertion into a perpetually competitive market characterized by incentives for investment in research and development. (Blomström and Persson, 1983), (Blomström, 1989), and (L.S. Pinilla, et al., 2019) regard technology transfer as a process in which foreign technology flows through MNCs via positive spillovers. According to several empirical studies by authors (Joshua Akinlolu Olayinka and Sirinuch Loykulnanta, 2019; Driffield, 2001; Liu, 2002; Javorcik, 2004; Todo, 2006; Liu, 2008; Wei and Grazia, 2010; Hale and Long, 2011; Md Arif-Ur-Rahman and Kazuo Inaba, 2021), the evaluation of the TT approach and the presence of technological externalities is highlighted by the positive correlation between FDI presence and productivity improvement. However, other empirical studies emphasize that FDI promotes TT and enhances the productivity of local firms when the technological gap between local firms and MNCs is low and the absorption capacity of local firms is high (Kokko, 1994; Sjöholm, 1997; Kinoshita and Lu, 2006; L. Sugiharti, M.Z. Yasin, R. Purwono, 2022).

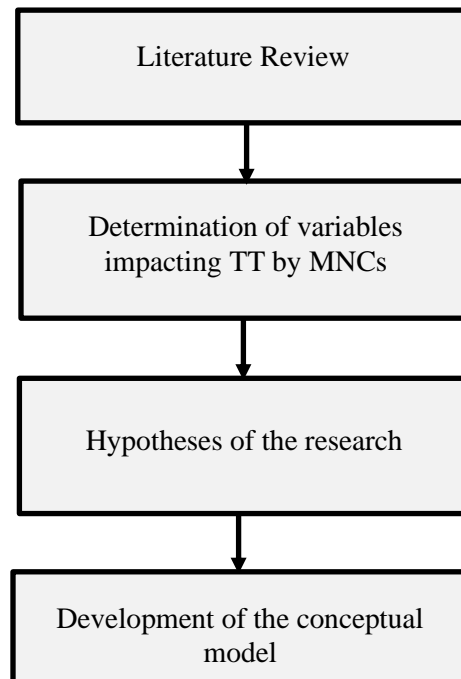
Building on this literature, there exists an exogenous model of technology transfer through FDI developed by Ronald Findlay in 1978 based on Veblen's (1915) relative delay effect and Gerschenkro's (1962) and Mansfield's (1961) contagious disease hypothesis. In this model, the means of technology transfer rely on the effect of technological gap that may exist between MNCs and local firms as exogenous factors. This model was criticized by Wang in 1988, who questioned it by attempting to endogenize TT through FDI disseminated by MNCs. In this context, Wang and Blomström (1989) propose a model in which TT is an endogenous process characterized by stimulating interactions between the strategies of MNCs and local firms in the context of R&D, innovation, learning, training, new technology transfer, etc.,.

In the present research, we position ourselves in Wang and Blomström's endogenous model given its alignment with the overall context of this paper, and it provides variables that clearly explain the phenomenon of TT through the presence of MNCs. This fits very well in the context of Moroccan industry.

3. Research Methodology

The methodology of this paper revolves fundamentally around four key elements: a literature review, extraction of variables impacting TT by MNCs, development of a conceptual model, and a proposition of hypotheses (Figure 1).

FIGURE 1 : METHODOLOGY OF RESEARCH



Source: *Developed by Authors*

3.1. Variables Impacting Technology Transfer by MNCs

Based on the literature review and in the context of Morocco, we have identified four main variables that can impact technology transfer by MNCs. These variables include direct and indirect links between firms, the technological capability of the firm, the absorptive capacity of the firm, and the sector structure.

3.1.1. Links Between Firms

The first variable selected from the literature review is the link between the MNC and the local firm. It is divided into two: direct and indirect. Indeed, the relationships established with MNCs constitute an important channel for the transfer and diffusion of technology to Morocco. The knowledge brought by multinational corporations is likely to be transferred intra and inter-industrially.

Direct links refer to direct operations between firms to ensure the transfer and diffusion of technology.

These links manifest in:

- Research and development (R&D) and technology transfer cooperation, which involve pooling the necessary resources to conduct research and development activities between two or more entities (Touscoz, 1973), (Gaillard J., 1999), (Schumpeter J., 2002), and (Shmeleva, N.; et al., 2021), on the one hand. On the other hand, R&D and technology transfer cooperation create positive technological spillovers by transferring management skills and tacit knowledge (Mazikana, Anthony Tapiwa, 2023). Thus, R&D and technology transfer cooperation ensure a transfer of knowledge and know-how that positively contributes to improving the productive efficiency of the local firm.
- Relationship with the partner, which encourages local firms to adopt new technologies. The MNC obliges its suppliers to participate in its value chain by requiring them to meet stricter quality standards and by reducing product lead times (Wang and Blomström, 1992).
- Indirect links, according to (L. Sugiharti, M.Z. Yasin, R. Purwono, 2022), Demena and Murshed (2018), Orlic et al. (2018), Findlay (1978), are generally manifested through competition, labor mobility, and imitation.

- Technology transfer through competition proves to be a relatively complex channel of technology transfer that generally depends on the competitiveness of local firms. The multinational corporation has the power to improve the productivity of local firms through its impact on competition. The spillover effect resulting from competition often manifests as follows: the presence of multinational corporations imposes a competitive constraint on local firms. This constraint forces local firms to become more competitive and efficient to optimize their production chains and modernize their technologies.
- Labor mobility is another means of technology transfer from MNCs to local firms. According to Sönmez (2013), labor recruited by MNCs acquires skills and knowledge of their technologies through practice, experience, and training. Thus, this workforce will transfer their knowledge, know-how, and savoir-faire to local firms if they are recruited by them (Keller 2004).
- Local firms can increase their productive efficiency through imitation or reverse engineering of technologies utilized by MNCs. Local firms can establish benchmark criteria against MNCs and analyze the new and improved technologies that these firms introduce into the sector (Blomström and Kokko 2002; Sönmez 2013), Ivus et al. (2017).

The table below presents the "links between firms" dimensions and its sub-dimensions with their theoretical justifications:

Table 1: Theoretical justifications of the "links between firms" dimension

Dimension	Sub-dimension	Theoretical Justifications
Direct/indirect links between firms	R&D Cooperation	L.S. Pinilla, et al. (2019), Touscoz (1973), Gaillard J., (1999), Schumpeter J., (2002), Shmeleva, N et al (2021).
	TT Cooperation	Mazikana, Anthony Tapiwa (2023); K. Sachpazidu-Wojcicka, (2020), Marjit et Mukherjee (2001), Hobday (1997), Teixeira et Mota, (2012).

Relationship with partner	J.J. Yun, E. et al., (2018) Wang et Blomström (1992), Arvanitis et Woerter, (2009), Duan, et al ; (2010), Lai, (2011), Goh (2005), Spencer (2008). Massa, L et al; (2022) Shmeleva, N; et al (2021).
Competition	L. Sugiharti, et al, (2022), K. Sachpazidu-Wojcicka, (2020),
Labor Mobility (learning through practice)	L.S. Pinilla, et al. (2019), Blomström et Kokko, (1998) ; Findlay (1978), Ben Hamida (2011) ; Demena et Murshed (2018) et Orlic et al. (2018), Jude (2016) , Sönmez (2013)
Imitation	

Source: *Developed by Authors*

3.1.2. Technological Capacity of the Firm

In an analysis of the impact of FDI on technology transfer to local firms, it is necessary to identify the technological capacities of the firm. In this context, based on previous works such as A.Peeters, D.Stokkink (2002), Ting Zheng & Marco Ardolino, et al. (2021), Joerres et al. (2016), Zirger and Maidique (1990), four sub-dimensions have been selected and theoretically justified by the literature:

- **Investment in R&D and Technology Transfer:** In a context characterized by the reduction and limitation of subsidies dedicated to R&D and conventions of the World Trade Organization (WTO), MNCs find a local partner firm to carry out R&D activities, either wholly or partially, to develop new products. This is done by sharing associated risks. Investments in R&D are a frequently used indicator to assess the local firm, as well as the efforts made by this partner to improve its knowledge and expertise. Such improvement will subsequently be brought to products and processes (Pisano, 1990; Morbey, 1988).
- **Adoption of Advanced Technologies:** Local firms must be in line with technological advancements to be able to meet increasingly stringent standards. Several empirical studies have shown a significant relationship between the adoption of advanced technologies and the productive capacity of the local firm (Bessant, 1993; Meredith, 1988).

- **Technological Vigilance:** It is legitimate for Moroccan industry to survive in a context characterized by fiercer competition and the use of continually evolving technologies. This implies that firms must always be vigilant and alert to decode new ways to produce products by seeking optimization of the cost, quality, and time triad (Joerres et al., 2016). Thus, it becomes trivial to see the sensitivity of local firms to their technological surroundings.
- **Technical Skills of Employees:** They are considered a key factor in realizing innovation and technology transfer within firms (Lefebvre, 1991). However, the lack of qualified and less competent employees can hinder the innovation and technology transfer process (Bozeman et al., 2015). Therefore, the policy of protecting the leakage of qualified labor allows firms to engage in diverse and ambitious programs.

This reality allows for the formulation of the following hypothesis: The table below presents the "Technological Capacity" dimension and its sub-dimensions with their theoretical justifications:

Table 2: Theoretical justifications of the "Technological Capacity" dimension

Dimension	Sub-dimension	Theoretical justifications
Technological Capacity	Investment in R&D and TT	Porter (1990); A. Peeters, D. Stokkink (2002), Bougrain and Haudeville (2002), Zhang et al. (2010), Gamidullaeva, L.A.; Tolstykh, T.O. (2020)
	Adoption of Advanced Technologies	Ting Zheng & Marco Ardolino, et al. (2021), Bessant (1993), L. Sugiharti, et al. (2022)
	Technological Vigilance	Joerres et al. (2016), Romero et al. (2016), Julien et al. (1994); Gamidullaeva, L.A.; Tolstykh, T.O. (2020)
	Technical Skills of Employees	Silva, V. L., Kovaleski, et al; (2019). Akinc (1993); Schewe (1994), Bozeman, et al (2015)

Source: *Developed by Authors*

3.1.3. Absorption Capacity

The absorption capacity is the ability of local firms to use the skills acquired from MNCs and to increase the resulting financial benefits. It is the ability of local firms to discover new and valuable knowledge in order to first adopt it and then adapt it to their productive context. According to theoretical literature, absorption capacity also refers to the technological gap between the sender and the receiver in terms of technological skills. Furthermore, local firms must have a certain level of technological skills to be able to assimilate cutting-edge technologies.

This dimension is articulated around four sub-dimensions:

- **Learning Capacity:** Several studies highlight the important role of learning capacity as a fundamental condition for an industry to absorb foreign technology. (Bozeman et al., 2015), (Vega-Gomez, F.I., & Miranda-Gonzalez, F.J. 2021) have emphasized the crucial role of absorption capacity through the accumulation of knowledge and learning of human capital from MNCs. Indeed, a certain level of knowledge and technological learning capacity offers the local firm access to new technologies from MNCs. A labor force with good learning capacity is an essential link for absorption capacity. Therefore, a good reservoir of knowledge and learning capacity affects the quality and quantity of technologies to be transferred.
- **R&D Intensity and Innovation:** R&D and innovation activities at the level of multinational firms largely remain reserved for the home country of the MNC or, failing that, to a limited number in developed countries. However, Morocco must encourage local firms to follow the development of MNCs by carrying out innovation and R&D activities (Joerres et al., 2016). In this regard, the intensity of R&D and innovation plays a crucial role in building, developing, and sharing knowledge and know-how. Thus, the intensity of R&D significantly affects the level of local absorption capacity. This involves a pooling of efforts between MNCs and Moroccan industrial firms.
- **Technological Gap between the Multinational and the Local Firm:** This profoundly determines the importance of the technology transfer process. Two types of arguments have been distinguished in the

literature: firstly, "technological catch-up," which is based on the proposition that productivity gains are obtained proportionally to the technological gap between the two types of enterprises (Findlay, 1978). In this sense, the slower the local firm is compared to MNCs, the slower the technological catch-up process will be. However, the second proposition is based on the idea that when the gap between the two types of enterprises is too significant, the potential for positive spillovers through FDI is limited. This is due to the low absorption capacity of the local firm. In other words, if the local firm is too distant from the multinational, it is difficult for it to absorb the technologies transferred by MNCs (Haddad and Harrison, 1993) (L. Sugiharti, et al., 2022).

The table below presents the "Absorption Capacity" dimension and its sub-dimensions with their theoretical justifications:

Table 3: Theoretical justifications of the "Absorption Capacity" dimension

Dimension	Sub-dimension	Theoretical justifications
Absorption Capacity	Learning	Silva, V. L., Kovaleski, J. L. et al. (2019), L.S. Pinilla, et al. (2019),
	Capacity	Xu (2000), Lundvall et Boras (1997), Ben Hamida (2011), Demena et Murshed (2018), Mäkinen et Vilkkko (2014), Bozeman, et al. (2015), Vega-Gomez, F.I., & Miranda-Gonzalez, F.J. (2021)
	R&D Intensity and Innovation	Lee, Kao and Yang (2014), Joerres et al. (2016), Daghfous (2004), Lenox & King (2004), Demena et Murshed (2018), Joshua Akinl & Sirinuch (2019)
	Technological Gap Level	L. Sugiharti, M.Z. et al. (2022), Vernon R. (1966), Findlay (1978), Kokko (1994), Jabbour et Mucchielli (2007), Jordaan (2008), Hamida et Gugler (2009)
Adaptation Capacity	Gebhardt, et al (2015), Chameaux (1994), Durand (2000)	

Source: *Developed by Authors*

3.1.4. Sector Structure

The sector structure is an important dimension for technology transfer in the industrial sector in Morocco. Indeed, the more attractive and efficient the sector structure is, the more fluid and remarkable the technology transfer from MNCs to local firms will become. This has been confirmed by several theoretical studies in this field, such as (Benhar, 2008; Ellioua & Benamer, 2021). Thus, following these theoretical studies, three sub-dimensions have been identified:

- **Sector Infrastructure:** This is a sub-variable that assesses the satisfaction rate of industrial firms regarding the quality of infrastructure in general, and the transportation, telecommunications, road, air, rail, and maritime links in particular (Gamidullaeva, et al. 2020).
- **Sector Governance:** This is also a crucial sub-dimension to promote technology transfer in the industrial sector in Morocco. In this context, the Moroccan state has deployed several actions since 1999 when His Majesty the King Mohamed 6 called on various parties to outline the main guidelines for attracting large multinational companies operating in various industrial sectors.
- **Sector Grouping or Cluster:** This is the third sub-dimension of the sector structure. It aims to connect actors in terms of geographical, intellectual, and cognitive proximity. It is a fertile ground for the contribution of knowledge and skills. A cluster is a conducive environment to attract FDI and the implementation of MNCs on the one hand and on the other hand, it is a place to confront local firms with MNCs. This leads to inter-firm technology transfer and technological innovation in a faster and more efficient manner (Liu, C.; Yan, S. 2022).

The table below presents the "Sector Structure" dimension and its sub-dimensions with their theoretical justifications:

Table 4: Theoretical justifications of the "Sector Structure" dimension

Dimension	Sub-dimension	Theoretical justifications
Sector Structure	Sector	Englander and Gurney (1994); Galan et Martin (1998), Dauty et
	Infrastructure	Larré (2004). Gamidullaeva, L.A.; Tolstykh, T.O. (2020)
	Sector Governance	Das (1999); Hamdan, et al (2018), Bozeman, et al (2015), Maribel G. & David U. (2019)
	Sector Network Degree	Becchetti et Rossi (2000); Decarolis et Deeds (1999), Liu, C.; Yan, S. (2022)

Source: *Developed by us*

4. Research Hypotheses

Based on the descriptions of the dimensions and sub-dimensions presented in the previous section, we have formulated the hypotheses presented in the table below. These hypotheses can be statistically tested in a given industrial sector.

Table 5: Research Hypotheses

H1: Links between industrial firms positively impact technology transfer		
Inter-firm Relationship	Cooperation in R&D	H1.1: Cooperation in R&D positively impacts technology transfer.
	Cooperation in TT	H1.2: Technology transfer positively impacts technology transfer.
	Relationship with the partner	H1.3: Relationship with the partner positively impacts technology transfer.
	Competition	H1.4: Competition through spillover effects positively impacts technology transfer.
	Labor force circulation	H1.5: Workforce circulation has a positive effect on technology transfer.
	Imitation	H1.6: Imitation has a positive effect on technology transfer.
H2: Technological capacity positively impacts technology transfer in the industrial sector		

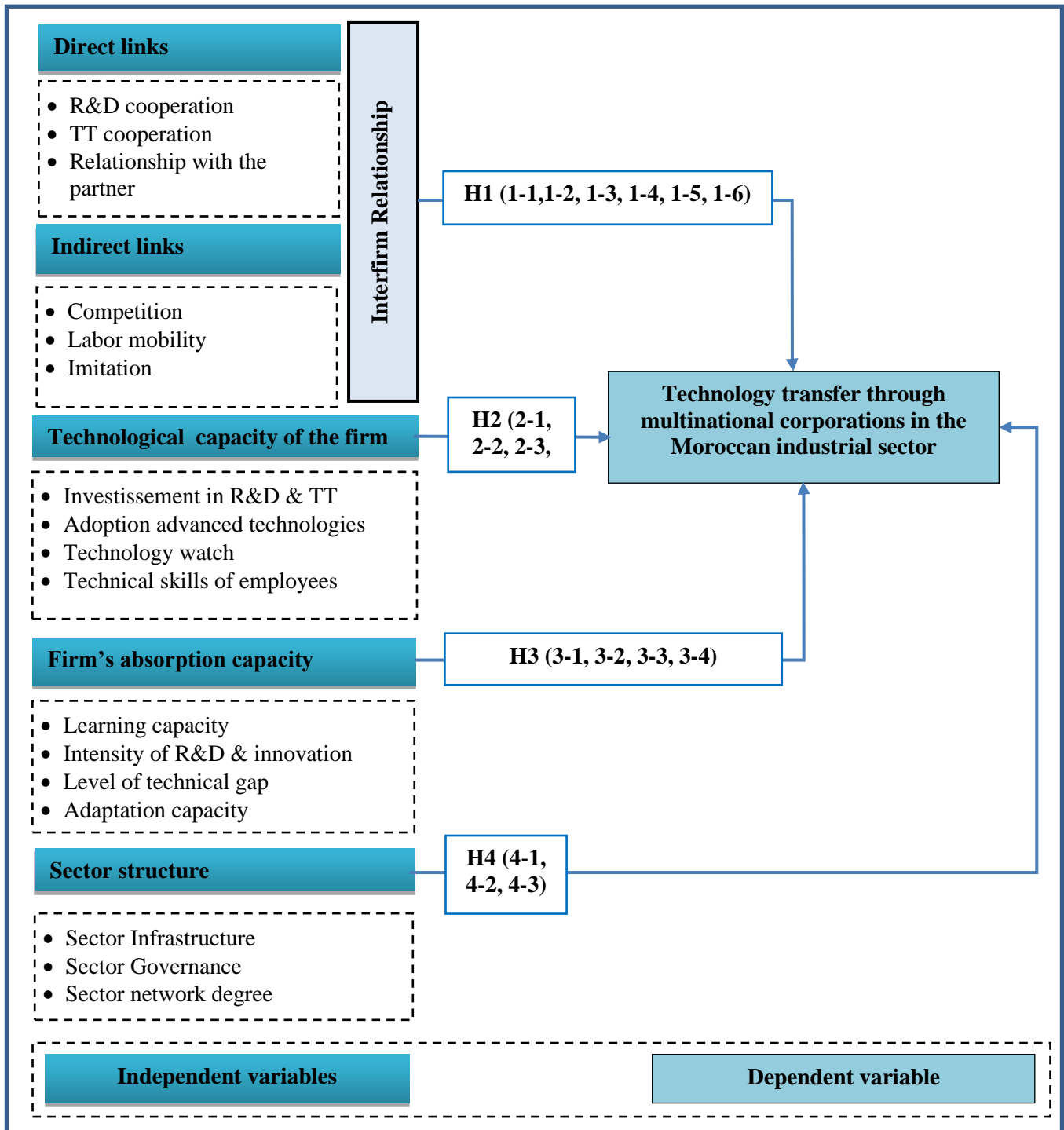
Technological capacity of the firm	Investment in R&D and TT	H2.1: Investment in R&D and TT positively impacts technology transfer.
	Adoption of advanced technologies	H2.2: Adoption of advanced technologies positively impacts technology transfer.
	Technological vigilance	H2.3: Technological surveillance positively impacts technology transfer.
	Technical skills of employees	H2.4: Technical skills of employees positively impacts technology transfer.
H3: The absorption capacity of the industrial firm positively impacts technology transfer		
Firm's absorption capacity	Learning capacity	H3.1: Learning capacity positively impacts technology transfer.
	Intensity of R&D and innovation	H3.2: R&D intensity positively impacts technology transfer.
	Level of technological gap	H3.3: The level of technological gap has a positive effect on technology transfer.
	Adaptation capacity	H3.4: Adaptation capacity has a positive effect on technology transfer.
H4: The structure of the Moroccan industrial sector positively impacts technology transfer		
Sector structure	Sector infrastructure	H4.1: Sector infrastructure positively impacts technology transfer.
	Sector governance	H4.2: Sector governance positively impacts technology transfer.
	Sector network degree	H4.3: Sector network degree positively impacts technology transfer.

Source: *Developed by Authors*

5. Conceptual Model

Based on the hypotheses presented above, we have constructed the following conceptual model (Figure 2). It will serve as a roadmap for conducting any test or verification of the various proposed hypotheses related to technology transfer by FDI's from MNCs in the Moroccan industrial sector.

FIGURE 2: CONCEPTUAL MODEL OF THE RESEARCH



Source: Developed by Authors

6. Discussion and Conclusion

Technology transfer is currently considered a crucial means for developing countries to acquire and benefit from technology from developed countries. To succeed in this transfer, a combination of several factors and dimensions is necessary. This, of course, is relative to the context of each country and depends on its level of development and its openness to other economies. Indeed, Morocco, being a developing country, has implemented several policies and strategies for the development of the industrial sector. Several multinational firms operating in various sectors have chosen Morocco to expand their production ranges. In this context and within the framework of this work, we have attempted to seek a model of technology transfer by MNCs adapted to the Moroccan industrial sector. To achieve this, after a detailed literature review, we were able to identify hypotheses to understand the impact of each identified dimension on technology transfer by MNCs in the Moroccan industrial sector. These hypotheses have allowed us to develop a conceptual model that can be explored, tested, and empirically analyzed in each industrial sector. This presents an important avenue for the scientific community to understand the level of technology used in each sector and to determine the variables that impact technology transfer in a given sector.

In terms of extending this work, a questionnaire will be developed based on this conceptual model and will be administered to various stakeholders in the Moroccan industrial sector for quantitative analysis. This will help identify the variables that truly impact technology transfer by MNCs in the context of the chosen industrial sector in Morocco.

Conflicts of Interest

The writers have disclosed no conflicts of interest.

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REFERENCES

- Blomstrijm, M., A. Kokko et M. Zejan (2000). Investissement direct étranger : stratégies des entreprises et des pays hôtes". *Macmillan Press : Londres*
- Blomstrom, M., Kokko, A. & Zejan, M., (2000). Foreign Direct Investment: Firm and Host country Strategies, *London: Macmillan Press, and New York: St. Martin's Press.*
- Bozeman, B.; Rimes, H.; Youtie, J. (2015). The evolving state-of-the-art in technology transfer research: Revisiting the contingent effectiveness model. *Res. Policy*, 44, 34–49.
- Branstetter, Lee & Chen, Jong-Rong, (2006). The impact of technology transfer and R & D on productivity growth in Taiwanese industry: Microeconometric analysis using plant and firm-level data, *Journal of the Japanese and International Economies, Elsevier*, vol. 20(2), pages 177-192, June.
- De Moortel, K.; Crispeels, T. (2018). International university-university technology transfer: Strategic management framework. *Technol. Forecast. Soc. Chang*, 135, 145–155
- Driffield, N. et J. H. Love., (2003). Investissement direct étranger, approvisionnement technologique et retombées inverses". *L'école de Manchester*, 71 (6), p. 659-671.
- Gaillard J. (1999). Les coopérations scientifiques et techniques avec les Pays du Sud. Peut-on partager la science. *Paris: Karthala*, 289 pages.
- Gaillard, Jacques. (1999). Les enjeux des migrations scientifiques internationales : De la quête du savoir à la circulation des compétences. *L'Harmattan*.
- Gamidullaeva, L.A.; Tolstykh, T.O. (2020). Implementation of cross-industry projects on the principles of ecosystem as a new vector of innovative development. *Innovations*, 8, 65–74.
- Hamdan, A.R.; Fathi, M.S.; Mohamed, Z. (2018) Evolution of Malaysia's technology transfer model facilitated by national policies. *Int. J. Eng. Technol.* 7, 196–202.
- Indlay, R. (1978). Relative Backwardness, Direct Foreign Investment, and the Transfer of Technology: A Simple Dynamic Model. *The Quarterly Journal of Economics*, 92, 1-16.
- Isaac, K. S., Ibidunni, A., Kehinde, O. J., Ufua, D., Elizabeth, K. B., Oyo-Ita, D., & Mathias, C M. (2020). The role of multinational corporations in global economic practice: literature review. *Journal of Management Information and Decision Sciences*, 23(5), 619-628.
- Ismail B., Asmau I. D., Sophia K. & Muzaare G. (2022). Multinational Corporations, Knowledge and Technology Transfer in Nigeria: An examination of Etisalat Telecommunications Engineering Postgraduate Programme (ETEPP), *International Journal of Research and Innovation in Social Science (IJRISS)*, 6(5), DOI:10.47772/IJRISS.2022.6527
- J.J. Yun, E. Jeong, Y. Lee, K. Kim, (2018). The Effect of Open Innovation on Technology Value and Technology Transfer: A Comparative Analysis of the Automotive, Robotics, and Aviation Industries of Korea, *Sustainability*, 10
- K. Sachpazidu-Wojcicka, (2020). Open Innovation Process via Technology Transfer and Organizational Innovation *Eur. Res. Stud. J.*, XXIII, pp. 52-61, 10.35808/ersj/1535
- Keller, Wolfgang. (2004). International Technology Diffusion. *Journal of Economic Literature*, 42 (3): 752-782.
- Kokko, A. (1996). Productivity spillovers from competition between local firms and foreign affiliates. *Journal of International Development*, 8 (4), 517-530.
- L. Sugiharti, M.Z. Yasin, R. Purwono, M.A. Esquivias, D. Pane, (2022). The FDI Spillover Effect on the Efficiency and Productivity of Manufacturing Firms: Its Implication on Open Innovation, *J. Open Innov. Technol. Mark. Complex.* 8, 10.3390/joitmc8020099
- L.S. Pinilla, R.L. Rodríguez, N.T. Gandarias, L.N.L. de Lacalle, M.R. Farokhad, (2017) Practical Model to Boost Technology Transfer in Manufacturing, Sustainability, *TRLS 5–7 Advanced Manufacturing Centres*, 11,

10.3390/su11184890

- Liu, C.; Yan, S. (2022). Transnational technology transfer network in China: Spatial dynamics and its determinants. *J. Geogr. Sci.* 32, 2383–2414.
- Maribel G. & David U. (2019). Effectiveness of Technology Transfer Policies and Legislation in Fostering Entrepreneurial Innovations Across Continents: An Overview. *Journal of Technology Transfer*, 44(5), 1347.
- Massa, L.; Ardito, L.; Petruzzelli, A.M. Brokerage, (2022). dynamics in technology transfer networks: A multi-case study. *Technol. Forecast. Soc. Chang.* 183, 121895.
- Mazikana, Anthony Tapiwa, (2023). The Role and Contribution of Multinational Corporations to Technology Transfer and Development in Less Developed. Available at SSRN: <https://ssrn.com/abstract=4386654> or <http://dx.doi.org/10.2139/ssrn.4386654>
- Pagani, R.; Zammar, G.; Kovaleski, J.; Resende, L. (2016). Technology transfer models: Typology and a generic model. *Int. J. Technol. Transf. Commer.* 14, 20–41.
- Portelli, B. et R. Narula (2003) "Investissement direct étranger par le biais d'acquisitions et implications pour la mise à niveau technologique : Preuve de cas de Tanzanie". Série de documents de travail sur la mondialisation en tant que processus de transformation, n° 05/03, Université d'Oslo, Norvège
- Portelli, B., & Narula, R. (2004). « Investissement direct étranger par le biais d'acquisitions et implications pour la modernisation technologique, cas de la Tanzanie ». *Mémoire de recherche sur le mérite*.
- Schumpeter, Joseph A. (2002). The economy as a whole: Seventh chapter of The Theory of Economic Development. Industry and Innovation; Sydney Vol. 9, N° 1/2, 93-145.**
- Shmeleva, N.; Gamidullaeva, L.; Tolstykh, T.; Lazarenko, D. (2021). Challenges and Opportunities for Technology Transfer Networks in the Context of Open Innovation: Russian Experience. *J. Open Innov. Technol. Mark. Complex.* 7, 197.
- Silva, V. L., Kovaleski, J. L., & Pagani, R. N. (2019). Technology Transfer and Human Capital in the Industrial 4.0 Scenario: A Theoretical Study. *Future Studies Research Journal: Trends and Strategies*, 11(1), 102–122. <https://doi.org/10.24023/FutureJournal/2175-5825/2019.v11i1.369>
- Sönmez, Alper. (2013). Multinational Companies, Knowledge and Technology Transfer: Turkey's Automotive Industry in Focus, Berlin: Springer Science & Business Media.
- T. Zheng, M. Ardolino, A. Bacchetti, M. Perona, (2021). The applications of Industry 4.0 technologies in manufacturing context: A systematic literature review, *Int. J. Prod. Res.*, 59 pp. 1922-1954, 10.1080/00207543.2020.1824085
- Vega-Gomez, F.I., & Miranda-Gonzalez, F.J. (2021). Choosing between Formal and Informal Technology Transfer Channels: Determining Factors among Spanish Academicians. *Sustainability*, 13, 2476.
- Wang, J., & Blomström, M. (1992). Foreign investment and technology transfer: a simple model. *European Economic Review*, 36 (1), 137-155.
- Zirger, BJ, Maidique, MA. (1990). A model of new product development - an empirical-test. *Management science*, 36(7), 867-883. 10.1287/mnsc.36.7.867