

Digital Ecosystems and Redefining the Nature of Small - and Medium - Sized Enterprises

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Abstract. *This paper examines the transformation of small- and medium-sized enterprises (SMEs) in the context of digital transformation, with particular emphasis on the emergence and expansion of digital ecosystems. Over the past two decades, the increasing diffusion of digital technologies and platform-based business models has generated profound structural changes in the organization of firms and in the mechanisms coordinating economic activity. While the literature has extensively addressed digital transformation and platform economies, less attention has been paid to the manner in which digital ecosystems redefine the nature and internal architecture of businesses. The study builds on institutional, evolutionary and organizational economics and aims to clarify how digital ecosystems modify the external environment of SMEs, and induce adjustments in their operational functions and management practices. The central research question investigates how participation in digital ecosystems reshapes firm boundaries, governance mechanisms, and long-term viability for SMEs. Methodologically, the paper adopts a conceptual and analytical approach based on the structured synthesis of the relevant academic literature and comparative institutional analysis. The findings indicate that digital ecosystems generate significant development opportunities for SMEs through enhanced connectivity, learning effects and access to markets, while simultaneously intensifying dependency risks and asymmetries in the bargaining power when faced with dominant platform actors. The paper is a contribution to the literature, and theory by offering an integrated analytical framework thereby linking the digital ecosystems with SME organizational transformation, and by outlining implications for managers, large firms and public authorities concerned with the sustainable digital development of SMEs.*

Keywords: digital ecosystems, digital transformation, platform economy, organizational change, governance mechanisms, institutional, evolutionary and organizational economics.

Introduction

Small- and medium-sized enterprises have been one of the pillars for developing economies and for implementing flagship technologies of the 3rd and 4th industrial revolution, and the wide-scale implementation of digital technologies generated ample mutations in the organization and functioning of economic and social agents. As result, the concept of digital transformation was defined as representing the changes generated by the use of digital technologies in all economic

and social activities, and its development proved that it had major implications in all spheres of the economic, social and cultural life, including the one of organizations and institutions.

The recent decades conjugated the transition towards post-industrial economies with the swift diffusion of digital technologies, and the emergence of digital transformation altered not only production processes, and business models, but also the institutional environment in which firms operate. One of the most significant manifestations is the rise of digital ecosystems (DE) which, organized typically around digital platforms, connect heterogeneous actors—firms, users, institutions and technologies—into networks of value co-creation. For SMEs, participation in such ecosystems creates new opportunities for market access, but also exposes them to new forms of dependencies and governance constraints.

Despite the growing academic interest in digitalization and platforms, less attention has been paid, and is being paid to how digital ecosystems redefine the nature of SMEs from an organizational and functional perspective. Thus, the core research question is how participation in DE reshape the nature, boundaries and internal architecture of SMEs.

Based on the literature, the paper advances three conceptual hypotheses: H1: DE alter fundamentally the external environment of SMEs; H2: participation in DE requires substantial reconfiguration of operational functions; H3: DE generate both development opportunities, and structural dependency risks for SMEs.

Literature review

The potential of generating in-depth changes in the way firms are organized, but also in carrying out economic and social activities was intuited within consolidated market economies already during the 1980s. Robey (1981) showed that changes induced in the use of computerized information systems within firms did not have a deterministic character, but were dependent on the goals of the managerial strategies. The possibility of increased managerial or entrepreneurial power was noticed along with the one of diminished employees/union power, as result of implementing the respective changes. Zuboff (1988) elaborated a first academic paper highlighting the extended potential of information-communication technologies to change radically the economic and social landscape, as well as the power balance between the various categories of stakeholders involved in firms' activity.

Venkthraman (1994) defined the concept of changing business model generated by the information technologies, highlighting the growth potential for efficiency, changes in the internal organization of the firms, as well as how the relationships with the external economic environment were redefined. The five broad types of changes induced by the use of information technologies within firms were identified, and delineated according to their impact: (i) local exploitation and internal integration are achieved in the context of maintaining the initial organization and determine “technical progress of evolutionary type” (incremental technical change) with low or average efficiency. (ii) The other three types of changes (redesigning business processes, reshaping business networks and redefining the business field) involve the implementation of the respective technologies concomitantly with rethinking the internal organization of the firms. Thus, the conditions are created for the emergence of “revolutionary technical progress” (disruptive technical change) characterized by a high level of efficiency, and implicitly by increased competitiveness and viability of the economic agents willing to adopt and support the respective type of change.

After 2015, in the context of the 4th industrial revolution, the concept of digital change was enriched especially by relating it to the mutations emerged in the business models, in supply

and demand value chains, as well as in the new demands for skilling the workforce employed in firms (Nwaiwu, 2018, Verina et al 2019, Trodkowa, 2019, Nadkarni et al. 2020).

Literature references presented about the definition of the digital transformation are not exhaustive. Vial (2019) identified a number of 23 definitions regarding digital transformation within 28 bibliographic references published over the period 2011-2017. It is underpinned that the definitions, having as topic digital transformation, take into account first the organizations and the effects on them. What differentiates definitions is the typology of the involved information technologies, and the nature of the changes induced by the use of the respective technologies.

The fact that, from a conceptual viewpoint, the digital transformation was redefined as the applicability field for new information-communication technologies reveals the stadial nature of the respective technological processes, as well as the challenges confronting economic and social agents regarding the good use of opportunities, and the diminishment of constraints and risks triggered by the wide-scale implementation of digital technologies, and by the changes occurred in the economic environment. The challenges facing firms depend both on the nature of the new facets displayed by the digital technologies and on the dimension related to financial power, and to the activity field of economic agents.

Therefore, it is important to study the potential effects that the substantial changes in the technological landscape have on the nature and architecture of the firms, and SMEs are one of the best ways for investigating the mutations induced by DE.

Methodology

The paper adopts a conceptual and analytical methodological perspective, based on a structured synthesis of the academic literature on the digital transformation, business ecosystems and SME development, by introducing relevant components of comparative institutional analysis. The objective of this methodological approach is theory development, rather than empirical testing, allowing for the identification of mechanisms through which DE reshape organizational structures and managerial practices.

The analysis is organized around two core dimensions: changes in the external economic environment induced by DE, and internal organizational adjustments, undertaken by SMEs in response to these changes.

Results and discussions

1. Digital ecosystems – factors of changing the external economic environment of small- and medium-sized companies

In the framework of digital transformation, as the opportunities for participants to connect to the economic activity expanded, DE were defined, and subsequently used in practice. Fiorina (2000) launched the idea of “digital ecosystem”, starting from the optimistic vision regarding the “digital rebirth” determined by the swift advance of information-communication technologies. Subsequently, Nachira (2002) charted the concept of “digital business ecosystem”. The respective concept has as inspiration source the concept of business ecosystem developed by Moore (1993).

As result, between economic agents might exist both competitive, and collaboration relationships. On this basis, the DE was defined as the network of interdependent digital actors (firms, platforms, users, institutions and technologies) involved in the cocreation of value based on shared digital infrastructures, data flows and governance mechanisms. The digital ecosystems

expand beyond traditional supply chains by emphasizing the value of the collaboration principles between the involved partners.

Digital ecosystems (DE) are defined by several characteristics, from which most important are: a) Access to a platform and ownership of a technical infrastructure for achieving objectives; b) Procedures for data processing and cooperation among the participants. c) Modularity meaning flexible participation to the digital ecosystem, non-compulsory, and no time restrictions. d) Governance mechanisms within the ecosystem of a formal nature (regulations, contracts, standards), and of an informal one (trust among partners, reputation, hierarchies based on professional and moral values).

The integration into the respective ecosystems of SMEs has a series of benefits related mainly to participation in networks of production and distribution. Because of the reduced size, the respective agents cannot obtain the benefits of scale economies unless integrated into networks. Thus, the premises are created for achieving economies of scale, with positive effects on lowering costs and facilitating the assimilation of new products. At the same time, driver effects and learning curves are generated based on the shared experience, and these might lead on long-term to competitiveness increases of the companies. On this basis, important steps might be made in obtaining technological agility. At the same time, the conditions are created for a better understanding regarding the behavior of customers, a fact that stimulates the adoption of some marketing strategies, and the lowering of expenditures that are presumed in case of a sudden change in the structure of production (services).

Another consequence of including companies in some digital ecosystems is the “streamlining” of the borders for the participating economic agents. In other words, the expansion of digital technologies, but also of the digital ecosystems stimulate the cooperation between companies, which obviously leads to higher flexibility in the internal organization of the companies, as well as to building joint working teams for ensuring efficiency increase for the entire digital ecosystem.

Dotsch (2024) shows that in the conditions of digitalization, the streamlining of companies’ borders occurs for both internal and external ones. In these circumstances, the theory of the firm is subjected to some rather substantial challenges. On one hand, Coase’s theory according to which the external borders of the firm are determined by the transaction costs is negated to a certain extent, and the premises of Williamson’s theory are considered, stating that within the company the optimum calculability of the transaction costs is not performed, this leading subsequently to determining the respective borders based on some other criteria (environment economy). In the context of digitalization, as general trend, the changes in the organization of labor induce incentives for streamlining the borders of the firm for both the internal, and the external ones, and the integration of companies in digital ecosystems, emphasize the respective trend.

Even if a phenomenon of firms’ borders streamlining is present, in the context of the aforementioned technological and organizational changes, we consider that it is still useful to analyze the characteristics of the external environment of the firm, and hence to deduct opportunities and constraints that emerge regarding the viability of the respective economic agents on medium- and long-term.

For small- and medium-sized firms the integration in some digital ecosystems implies actually an adjustment to the rigors of the external environment. It is the consequence of the fact that the way in which digital ecosystems are built and their long-term viability are both dependent on the actions of large companies that play a determinant role in their operation (Jacobides et al. 2019). Actually,

small- and medium-sized companies must negotiate carefully the participation conditions to digital ecosystems and to be aware about both benefits and costs of such participation.

The negative outcomes are related to lower competitiveness of the considered firms, which would allow them to stand against large corporations that dominate the market, or might impose oligopolistic practices. At the same time, there is the risk of excessive increase of the dependence on the characteristics of digital platforms, and of losing the strategic autonomy of the firm.

Digital platforms have a certain heterogeneity, a fact that influences indirectly the results of the firms integrated into them. Any deficiency in the organization and functioning of the respective platforms' spreads to the small- and medium-sized companies that are involved in their activities. Actually, the conditioning of the outcomes obtained by the partners included in the digital platforms can be noticed based on their capability (basic functions and types of services provided to the users). Cenamor et al. (2019) notices that the level of digital platforms' capability is conditioned by several categories of factors. First, technical factors such as the actual development level of the platforms, the average digitalization level at national level, or the readiness degree of firms to be integrated into the platforms. Second, a certain influence is played by the institutional factors, such as the vision on which the digital ecosystems are built, the role of small- and medium-sized enterprises in them, and the national regulations regarding access to digital platforms, as well as the support provided by public authorities for the access of small- and medium-sized enterprises to digital platforms, or to building digital ecosystems.

It is noticeable that the external environment of small- and medium-sized companies involved in digital ecosystems (platforms) is complex, presenting both opportunities and restrictions for expanding their activity and strengthening their position on the market. As result, the economic-financial outcomes, and the viability of the respective category of economic agents depend to a large extent on the changes in the internal environment of the firms that the managers (owners) are willing to implement.

2. Adjusting the internal environment of the small- and medium-sized companies to changes induced by the participation to digital ecosystems

The integration of small- and medium-sized companies in digital ecosystems imposes realizing vast structural changes and is recommendable to begin the respective changes from the concept of "enterprise architecture" adjusted for the particularities of the small- and medium-sized companies.

In this context, it might be considered that a first rank factor for the viability of the small- and medium-sized companies integrated into digital ecosystems is ensuring a digital infrastructure compatible with the requirements of platforms to which the cooperation links are established.

Considering the given financial restrictions with which firms are faced, it is important to make use of adequate methods for purchasing the components of the digital infrastructure. Concomitantly with undergoing the various stages of building and developing the digital infrastructure, it is necessary to pay attention to ensuring information security and data protection regarding the activity of the firm and of its clients. The data published by Eurostat (2025) show the existence of a gap between large companies and small companies. In 2024, for the entire European Union, 35.50% of the companies had defined written procedures for ensuring the safety of information systems. The respective share is relatively low, but represents to a large extent an effect of the low share in the case of small enterprises (10 – 49 employees), respectively 30.31%. in the case of medium-sized enterprises the share is by 56.25%, and in the case of large enterprises by 81.48%. the moderate level of the considered indicator is noticeable in the case of medium-sized

companies, as well as the significant gap between large and small enterprises regarding the concern for ensuring information safety of the firms.

The existence of a digital infrastructure creates the conditions for a considerable increase in the capacity for data processing, with positive consequences on all operational functions of small- and medium-sized enterprises. At the same time, the premises are created for changes in the management type and methods employed for ensuring the viability of the respective economic agents.

The large-scale access to data regarding customers and the possibility of their swift processing favors the expansion of the distribution function of goods (services) and therefore the use of relatively more complex marketing methods, while the facilities provided by social networks, provide for the possible increased involvement of the customer (Sharabati et al. 2024).

The raw materials and production/services supply function might be improved. The implementation of the various components of digital transformation contributes not only to assuming some realistic objectives for the production/services level, but also to a series of changes in the organization of the production and labor with the effect of rendering more flexible the supply, reducing the delivery terms, along with production costs decreases, maintaining them at the lowest levels possible. This might contribute to increasing the resilience of supply chains and to creating value added, as result of diminishing costs and strengthening the position on certain segments of the market.

This inclusion in DE favors the expansion of the research-development function inside small- and medium-sized enterprises. Thus, by building cooperation relationships among partners and the use of some marketing methods, or of other forecasting instruments, networks might be constituted at the level of the digital ecosystem for research-development-innovation activities. The collaboration relationships might include both interactions among small firms, but also “divisions of labor” between large companies dominating the ecosystems and small companies. The actual forms of cooperation should be the outcome of negotiations between the interested parties based on the “win-win” principle, and providing for provisions regarding intellectual property rights.

c) By including SMEs in the framework of DE the premises are created for sensible changes in the financial-accounting function. Thus, the inclusion in a DE has effects on: a) increasing the data automation degree regarding daily activities; b) using specialized and compatible quality software by all partners for operational accounting; c) access of SME to digital storage facilities for the financial-accounting data; d) increasing the analysis capacity and short-term projections regarding the evolution of prices for raw materials, production costs, distribution expenditures of goods (services), the financial situation of the firm.

Undergoing the various stages of the digital transformation, and in particular, the inclusion into DE determines changes of the personnel function within SMEs. The increasing sophistication of information technologies requires the employment of experts with strong analytical competences for ensuring the long-term performance of companies.

This requirement is a must especially in the case of small firms that show gaps against large companies. The Eurostat data (2025) show that in 2024, 20.05% of all enterprises with over 10 employees registered in the European Union had employed experts in information-communication technologies. Among the enterprise classes there were considerable gaps regarding the respective share, respectively: 78.44% in the case of large enterprises, 43.03% in the case of medium-sized enterprises, and 14.04% in the case of small enterprises. At the same time, large gaps existed also regarding the share of companies organizing training courses for the above-mentioned professional

category, as in 2023 the shares were 11.44% for all enterprises taken into account, but 61.41% for large companies, 26.37% for medium-sized enterprises, and 7.11% for small enterprises. These gaps show high differences in the advancement of digital transformation between large and small-sized enterprises. These two indicators highlight the sensible differences in the demand for the respective professional category, and in the financial availabilities for employing and improving the professional training in the respective class of firms. It is noticeable that small enterprises have stronger financial restrictions.

The large-scale use of technologies specific to digital transformation, and in particular the integration into the various DE reshapes fundamentally the personnel function within SMEs at several levels: a) The adoption of new criteria is necessary in recruiting new employees that can face the new requirements imposed by the technological changes, along with identifying adequate forms of continuing training. It is important to find ways for avoiding personnel fluctuation in the case of those who benefitted from the various forms of improving vocational training provided by the firm. b) It is necessary to adopt new methods for evaluating personnel based on the implemented technologies allowing for assessing the activity with a high degree of objectivity and taking into account the actual conditions of organizing the production and labor in the firm. c) It is necessary to effect changes in the organization of labor so that balance is ensured between fulfilling the requirements for increasing labor productivity and competitiveness of the firm on one hand, and for avoiding excessive control of workers' labor on the other hand. The experiences gathered up to date show that work on digital platforms needs to be regulated, in order to avoid physical and mental overload of the employees.

Consequently, the analyzed operational function, after the predictable changes mentioned previously, becomes one of maximum importance for integrating SMEs in the DE. Remodeling the personnel function should be correlated with substantial changes in the management style and methods, and in the organizational culture.

In the case of SMEs integrated into DE it is important to consider changes in the management style and methods. One of considerable importance is gaining an important strategic component. Digital ecosystems are both connective and modular and it is essential that the participation to DE begins with a costs-benefits type of analysis, by negotiating all aspects that the respective participation involve, and thereafter to determine the degree to which the various components of the firm's activity are integrated into the digital ecosystem. At the same time, the regulation of all aspects regarding intellectual ownership rights should not be neglected, in particular in view of research-development activities.

It is important for the development strategy to envisage realistic objectives regarding the change and expansion of the digital infrastructure. Determining the objectives should begin from anticipated technological changes on medium-term, and the estimates regarding the market position of the firm, the financing possibilities for renewing the digital infrastructure, concomitantly with ensuring the financial equilibrium on short-term. At the same time, of particular importance is to pay attention to improving the coordination methods for the activities developed inside the firm, but also for those that presuppose interactions with the partners from the digital ecosystem.

Next to adopting a strategic vision, the management of the company will have to promote changes in the style and methods, and in the organizational culture so as to support the cooperation between the employees of the firm, but also the cooperation with the representatives of the other entities participating to the DE. This would imply providing for more flexibility in the

organizational structure, and improving communication between the various operational compartments. Designing new methods for training and motivating the personnel have the potential of triggering positive effects, together with the use of methods for stimulating creativity, additionally to generating favorable conditions for consulting employees, or their representatives about the current situation and the development perspectives of the firm.

3. Directions of action for other stakeholders for integrating SMEs in digital ecosystems and making use of new development opportunities

Exploiting the opportunities for SMEs by integration into DE depends not only on the quality of the development strategies, and the efforts made by the managers of the respective companies, but also on the behavior of some stakeholders from outside the companies. We consider, in particular, large companies that have a determinant contribution to the creation and development of the digital ecosystems, on one hand, and the public authorities, on the other hand.

Hence, it is recommendable that large companies that create and plan the future development of some DE (platforms) analyze minutely the capabilities of the various types of small- and medium-sized enterprises that they intend to include in the respective ecosystems.

It is necessary to aim for establishing symbiotic relationships between large companies and SMEs, and exploring the opportunities for obtaining some synergy effects out of the respective relationships. At the same time, the involvement within digital ecosystems of small- and medium-sized enterprises should be realized only based on their agreement and by being fully aware of it, without large enterprises exercising any type of pressure.

Public authorities might favor the participation of small- and medium-sized enterprises within digital ecosystems in two main ways: a) by supporting the building-up of the digital infrastructure making possible the emergence of digital ecosystems (platforms), and b) by advising small- and medium-sized companies and their representative organizations about the opportunities of integrating in and participating to DE (platforms), as well as about the consequences that are of various nature and that result from this action; c) by initiating surveys and building statistical databases regarding the functioning of the digital ecosystems (platforms) and the role played in this context by SMEs. This approach requires defining adequate indicators for the activities developed within the DE by highlighting the role played by SMEs.

Subsequently, studies might be realized to identify the possible barriers in the integration of the various types of enterprises, as well as the opportunities for increasing the driver effects that could result from expanding digital ecosystems (platforms).

Conclusion

The integration into digital ecosystems (platforms) of small- and medium-sized enterprises has major implications on the nature of the respective economic agents. Actually, the hypotheses are confirmed according to which SMEs are one of the essential constructs in the framework of any economic system; however, some characteristics of this class of enterprises change depending on the specifics of the economic mechanisms, and on the trends in technological change.

The emergence and expansion of the digital ecosystems as part of the digital transformation implies both opportunities and restrictions for the viability of SMEs as result of the fact that they present both shared elements, and heterogeneities caused by the field of activity, history, the vision of managers regarding the mission of the firm, the implementation of technological changes, management style and organizational culture.

Participation in digital ecosystems has, among other effects, the one of “streamlining” the borders between small- and medium-sized companies. As any “openness” of an economic system, it has both positive and negative effects. Therefore, reconfiguring the operational functions is required for optimizing opportunities. The main objectives in redefining the nature of the firm are: a) ensuring a swifter answer to the changes in the demand for provided goods/services; b) adhering to supporting technological development at the level of the DE; c) diminishing financing restrictions of the firm; d) improving the vocational training level of the employees and increasing the number of analytical experts. Moreover, changes are required in the management style and methods, and in the organizational culture. It is necessary to adopt measures that would allow for increasing collaboration levels among employees, stimulating creativity and improving thus the climate for the overall future development of the company.

Large companies play a major role in creating and ensuring the sustainability of the digital ecosystems, and the public authorities should support the integration of small- and medium-sized enterprises by providing assistance and other support methods. At the same time, proper assessments are necessary about the micro- and macro impact of this new challenge for the various categories of economic agents.

The paper shows that digital ecosystems represent a structural factor redefining the nature of small- and medium-sized enterprises. Participation in such ecosystems modifies both the external environment of SMEs and their internal organizational architecture, impacting operational functions, management styles and governance mechanisms.

The analysis underscores that digital ecosystems generate significant opportunities for SME development, but also introduce dependency risks that require sound managerial and institutional answers. Large companies play a decisive role in shaping ecosystem architecture, while public authorities can contribute by supporting digital infrastructure development and reducing asymmetries in access.

The main limitation of the study derives from its conceptual nature. Future research may extend the proposed framework through empirical investigation based on harmonized statistical data, or firm-level case studies in order to further validate and refine the analytical insights developed. Moreover, in the future, as the volume of statistical information increases one possible research direction could be the correlation between the technological level and the involvement degree in the digital ecosystems on one hand, and the impact of participating in digital ecosystems on the organizational culture in small- and medium-sized enterprises.

References

- Cenamor J. et al. (2019) - How entrepreneurial SMEs compete through digital platforms: The roles of digital platform capability, network capability and ambidexterity, *Journal of Business Research*, Volume 100, Pages 196-206, ISSN 0148-2963, <https://doi.org/10.1016/j.jbusres.2019.03.035>.
- Coase, R. H. (1988). The Nature of the Firm: Origin. *Journal of Law, Economics, & Organization*, 4(1), 3–17. <http://www.jstor.org/stable/765011>
- Dotsch.J. J. (2024) Expanding the boundaries of the firm lessons from digitalization, *Gradus* Vol 11, No 1, ISSN 2064-8014
- Eurostat (2025) - Digital economy and society. Statistics Explained, Eurostat, Brussels,
- Fiorina, C., (2000) "The digital ecosystem", World Resources Institute Conference: Creating digital dividends, Seattle, Washington, October 16

- Jacobides M.G., et al. (2019) *-What does a successful digital ecosystem look like?* Boston Consulting Group, https://web-assets.bcg.com/img-src/BCG-What-Does-a-Successful-Digital-Ecosystem-Look-Like-June-2019_tcm9-223032.pdf
- Moore, J.F. (1993) Predators and Prey: A New Ecology of Competition. *Harvard Business Review*, 71, 75-86.
- Nadkarni, S., et al. (2020) Digital Transformation: A Review, Synthesis and Opportunities for Future Research. *Management Review Quarterly*, 71, pp. 233-341. <https://doi.org/10.1007/s11301-020-00185-7>
- Nachira, F. (2002). *Toward a network of digital business ecosystems fostering the local development*, http://www.digital-ecosystems.org/refs/2002_dbe_discussionpaper.pdf
- Nwaiwu F. (2018) Review and Comparison of Conceptual Frameworks on Digital Business Transformation. *Journal of Competitiveness*, 10(3), 2018, pp. 86–100;
- Robey, D. (1981) Computer information systems and organization structure, *Communication of the ACM*, pp. 679-687
- Sharabati, A.-A. A., et al. (2024). The Impact of Digital Marketing on the Performance of SMEs: An Analytical Study in Light of Modern Digital Transformations. *Sustainability*, 16(19), 8667. <https://doi.org/10.3390/su16198667>
- Trodkowa K. (2019) Digital Transformation: Theoretical background of digital change, *Management Sciences*, vol. 24, 4/2019, pp.32-37
- Venktharaman N. (1994) IT-Enabled Business Transformation: From Automation to Business Scope Redefinition, *Sloan Management Review* 35, pp. 73–87
- Vial, G. (2019). Understanding digital transformation: A review and a research agenda. *SI: Review Issue*, 28(2), 118–144. <https://doi.org/10.1016/j.jsis.2019.01.003>
- Williamson, O.E. et al. (eds) (1993) *The Nature of the Firm. Origins, Evolution, and Development*, Oxford University Press
- Zuboff, S. (1988) *In the Age of the Smart Machine. The Future of Work and Power*, New York: Basic Books, 1988