Boundaries of the Firm and Boundaries of the Industry: New Perspectives from the Connection between Business History and Industrial Organisation.

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ABSTRACT – *Boundaries of the Firm and Boundaries of the Industry: New Perspectives from the Connexion between Business History and Industrial Organisation*. This paper focuses on recent developments of the *new business history* on a specific theme: the boundaries of firms and industries. Connexions with industrial organisation, and especially with neoinstitutionalism, have increasingly appeared in the literature on this theme. These connexions are developed according to two main tendencies which are discussed in the paper. We can show that the first uses economic models dealing with information problems as a benchmark for the analysis of historical facts, while the second offers the opportunity to refine some of the principles of industrial organisation by taking into account the emphasis of business history on a concrete problem of innovative firms and industries: the coordination of productive activities.

INTRODUCTION

Industrial history was formed in the fifties as a

sub-discipline of economic history and its original purpose was to trace the

individual course of entrepreneurs or firms. She acquired her autonomy by

further by expanding its field of study and becoming involved in the fields of

economic theory (Wilson, 1997, Jones, 1997). Thanks to this transformation,

recent industrial history, also known as "new business history", can

to define itself as the study and the explanation of the behavior of firms and the evolution

industries over long periods of time, placing the conclusions

within a broader framework of analysis that takes into account markets and

institutions in which these behaviors and developments manifest themselves. The

connections with the industrial economy have since developed and multiplied,

giving even place in the nineties to programs of

common research1. Within these research programs, the issues

on the borders of the firm and the industry were of interest

increasing. Recent contributions have sought to identify the determinants

from the transformation of market relations into internal relations with the firm, or

in cooperative relations, over certain periods of industrial history. They

have also attempted to explain the recomposition of industrial structures

over time, some firms become leaders while others

tend to disappear2 (Chandler, 1977, 1992, Williamson, 1985, Temin, 1991; Lamoreaux and Raff, 1995; Casson and Rose, 1997; Rosenbloom, 1997; Wilson, 1997; Chandler et al., 1997, 1998, 2000; Lamoreaux, Raff and Temin, 1998; Malerba et al., 1999, 2001; Fransman and Krafft, 2002; Krafft, 2002; Lazonick, 2002, 2003; Malerba and Orsenigo, 2002). In these circumstances, the question of the determination borders of the firm and industry has become a central issue in reconciliations between the industrial economy and industrial history.

This article is intended to determine to what extent this disciplinary decompartmentalization allows a change in the state of knowledge on the determinants of borders of the firm and the industry, and of their transformations during the time. The first objective of this text is to identify the two tendencies mainly used to make these connections between the two disciplines possible.

The first trend is to process archival material collected by historians and to submit it to economic questions. The challenge is to select and use the business and industry models that can contribute to organization and consistent interpretation of industrial facts observed in the long run. The second trend is to apprehend and to test conventional economic data through put questions prominently in archival work. The challenge is to carry out an analysis more critical of the economic results on the borders of the firm and the industry and to identify, on the basis of studies from industrial history, research news. The second objective of this text is to analyze, on this

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1. For example, NBER's Development of the American Economy, History Friendly Economic Modeling "by Bocconi, and" Innovative Enterprise and Historical Transformation From INSEAD.

2. Recent contributions place particular emphasis on the fact that the entry processes can be done either by creating start ups, or by diversifying firms already installed in other industries; in the same way, the output processes are analyzed in their diversity: output by change activity, bankruptcy, absorption in connection with a merger.

basis, the main changes and the possible progress that could be achieved

by these connections between industrial history and industrial economy
on the question of the borders of the firm and the industry. We will see that the
first trend, basing itself on the main approaches of the theory
neo-institutional (transaction, agency and contract costs analysis)
incomplete), only retains informational coordination issues
as relevant explanatory elements of the definition and evolution of frontiers
of the firm and the industry, even though other elements
to be taken into account. We will also show that the second trend is
present as an alternative route, emphasizing the problems of coordination
economic activities that are fundamental for firms and industries
in
innovative and require the development and use of new analytical frameworks
neo-institutional in the field of industrial economics, centered on
skills (dynamic skills analysis).
The article is structured as follows. It will be a question of showing, in a
first time, that the first trend focused on informational coordination
and which is conducted following the use of Chandler's work by
Williamson leads to a confirmation by the industrial history of the results of
dominant trends in the neo-institutional approach of the industrial economy.
We will use concrete cases studied by the new business history
(section 1). Then we'll see that the second trend that focuses on the
productive coordination and restores the spirit of Chandler's work, leads
to a real confrontation of the results of the industrial economy with those of
industrial history. This result will also be formulated on the basis of material
archives of the new business history, on the evolution and viability of companies
and innovative industries (section 2).

1. INFORMATION COORDINATION AS A MEETING POINT BETWEEN ECONOMY INDUSTRIAL AND INDUSTRIAL HISTORY

The search for models and analytical frameworks to understand the
Historical facts is a central problem of the new business history. This research
implies a development of connections between the industrial economy and
industrial history that was, at first, neither obvious nor immediate

(section 1.1). Subsequently, the neo-institutional analyzes provided a framework analysis to industry historians. So the theory of transaction costs justify the existence of large vertically integrated firms (section 1.2). The theory of the agency clarifies the relations between shareholders and managers of the firm, and the conflicts of interest between the different agents within the firm or between firms (section 1.3). The theory of incomplete contracts focuses on the concept of property and delimits the boundaries of the firm (section 1.4). This search for adequacy between neo-institutional approach and industrial history is a useful exercise, but it faces a number of limitations (section 1.5).

1.1 The difficulty of the meeting between the industrial economy and history industrial

From the point of view of industrial history, the development of connections with the industrial economy was not easy, and only progressively as a commitment to stand out from economic history traditionnelle3. A certain number of hesitations and reservations on the part of the historians have hindered this process. Thus, Supple (1961) argued that the economy theory should not be regarded as a revealed truth, but rather as "an assortment of logical and conceptual mechanisms, some of which can be effectively used to bring out ways of approaching the historical material "(Supple, 1961: 85). Similarly, Hyde (1962: 9) thought that he was dangerous to consider theory as "a universal standard of measurement which could be used in a blind way by the historian ". This same author historians are better equipped to deal with raw facts than economists who are tied to a particular theory. More constructive positions will only appear recently. For Lee (1990 a and b), for example, industrial history can not only help refine and modify the theory in testing the models on the basis of concrete real-world experience, but also analyze the performance of firms using techniques familiar to economists.

According to Wilson (1997), this long distrust of economic analysis

was mainly due to a lack of knowledge of their evolution. For many
industrial historians, the only reference remained for a long time the theory
of the neoclassical firm that is unsuited to the problems they have to deal with. The
The main reasons for this inadequacy are the following (Jones, 1997):
• this vision does not explain the changes that are taking place in the
structure or in the organization of the firm. The only changes that are likely
to be described are exogenous, such as the impact of certain taxes or subsidies,
or new technology, price or quantity sold;
• the function of the contractor is reduced to that of a PLC that applies
known techniques to achieve well-defined objectives. Consequently,
the collective dimension of the firm is neglected and structural problems
or organization are evacuated;

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3. The traditional economic history is essentially the fact of the German historical school
and developed on the basis of an e
mpirical, refusing any analytical foundation.
It is with the New Economic History (Fishlow and Fogel, 1971) that appears for the first time
a desire to end the gap between the two branches of the economy that are economic history
and economic theory, which has developed on a hypothetico-deductive method
systematically isolating economic phenomena from their historical context. This effort
continued with the emergence of the New Institutional History (North, 1990) which highlights
the importance of institutional and organizational structures in understanding history
economic. The new industrial history is linked to these two currents, but it has forged a
certain specificity both in the themes studied (the firm and the industry) and in the method used
(the two trends mentioned above).

• the mechanical design of convergence towards equilibrium implies that,
in a context of perfect rationality with perfect information, research
balance is achieved without cost, delay and risk for the decision maker. When
feasible technologies, the price of inputs and production costs,
as all the future states of the market are known, maximization
becomes an exercise routine, immediately feasible since

no cost of information is necessary;

• the categories of perfect and imperfect competition, oligopoly or monopoly are defined to explain the preeminence of balance under different market structures. Industrial history specialists are instead looking for conditions in terms of organizational structures which at certain periods must be developed in order to ensure firm a sustainable competitive advantage.

Given these limitations, the search for models that can deal with endogenous changes, the entrepreneur, the complexity of internal structures (hierarchical or more decentralized), organizational innovations, the creation of market, etc. is necessary for the establishment of a genuine dialogue between industrial history and industrial economy. Historians are no longer ignorant of developments in the industrial economy, neo-institutional approaches have proved to be useful candidates for the implementation of their project.

1.2 The theory of transaction costs: opportunism and specificity of assets

It is with the connections Chandler-Williamson that the reconciliation history industrial - industrial economy has really started. The object of Chandler, in his book Visible Hand, is to study the industrial revolution that took place set up at the end of the 19th century in the United States and which gave birth to modern industrial system. The problem it raises is why the economy American market was largely dominated by large companies during of the 20th century. His method consists of undertaking business monographs and analyze the characteristics of large panels of firms that have been sustainably maintained on the market. It highlights two particular characteristics of that time. The first characteristic is that the firms that committed massively in capital-intensive activities have encountered a real problem of coordination: that of articulating mass production with a mass distribution. The second is that the problem of coordinating capital-intensive activities could not be solved automatically, that is to say, by the only forces of the market. In these capital-intensive industries, vertical integration (upstream or downstream) 4 has allowed firms to avoid

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4. In this perspective, the author analyzes the various integration phenomena that have could be observed at this time: integration by users of technologies in continuous process (cigarettes, matches, flour, breakfast cereals, soup, photographic film), by carriers of perishable products (meat, beer), and by machine manufacturers requiring special sales and distribution services (sewing machines, elevators).

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bottlenecks in supply and opportunities by coordinating different productive units. The author's argument is that coordination managerial position has been imposed in relation to market coordination in industries characterized by economies of speed, that is to say when fast and important enough to reduce unit costs.

Investments in the organizational capacity required to manage vertically connected businesses have proven to be the key to competitive success. Firms that did not undertake such investments disappeared s that those who have engaged them have established sustainable leadership positions on the market.

Williamson, in Chapter 5 of his 1985 book, uses the different case of vertical integration explored by Chandler in order to propose elements of empirical verification of his theory of transaction costs. Williamson offers firms minimize transaction costs in certain situations:

firms emerge to manage investments characterized by a high degree of specificity of the assets, because their irrecoverable nature exposes the to hold-up threats involving the expropriation of their profits. So, the general presumption is that stronger (respectively weaker) costs will be the other costs, the stronger the chance to see realizing the allocation of resources within the framework of a firm (respectively a market). For Williamson, vertical integration is a prime example of his theory of the firm. He even qualifies this particular governance structure of "Paradigmatic problem par excellence" (Williamson, 1985: 150). The author acknowledges that the empirical checks that it engages in using the Chandler's monographs are rudimentary and can be

to be discussed. However, he submits that, overall, they support the proposal
vertical integration (upstream, downstream and lateral) is more
compatible with the economics of transaction costs than with other explanations.
In his view, in particular, a predictive theory of vertical integration
mainly appealing to asset specificity and opportunism issues
who as a result.
Three results can be deduced from this project of confrontation between
Chandler's industrial history work and those in terms of transaction costs
from Williamson. The first is that Williamson finds an explanation of the
domination of the American economy by large companies. The integration
vertical has proven to be an optimal governance structure (minimizing
transaction costs) because it solved the problems
opportunism linked to the specificity of the assets. The second is that Williamson shows
the superiority of transaction cost theory over analyzes
standard on a study object that is integration. Sophisticated shapes
integration (exotic integration) can be studied, while the interpretations
traditional techniques boil down to highlighting the technical determinants
of this form of organization (mundane integration). Indeed, traditional analyzes
only think about production costs, whereas Williamson

proposes to study the minimization of the sum of the costs of production and
transaction. The author also shows that the Chandlerian notion of economies
of speed is fuzzy and leads to parsing errors. One of the
Williamson's arguments are based on the idea that downstream integration into the
field of perishable products, described by Chandler, is unjustified and therefore
wrong since, unlike other integration cases (technologies in process
machines requiring special services of sale and
distribution), it does not involve specific assets. This is the third result
of Williamson: show that the specificity of the assets of transactional analysis
is also more explanatory in scope than the Chandlerian concept
savings of speed. This notion refers to the need to control the
technical complementarities. In this sense, the Chandlerian interpretation does not

does not distinguish, according to Williamson, standard analyzes that insist on complementarities techniques leading to minimization of production costs. She is also unable to account for the diversity of forms of integration.

Following Williamson, work has proliferated to develop a framework of empirical analysis corresponding to the theory of transaction costs (cf. Wiggins, 1991; Shelanski and Klein, 1995; Coeurderoy and Quelin, 1997; Ménard 2000). The problem of measuring transaction costs, or at least their characterization in an empirical context, appeared to be in a prime time a real difficulty. However, the current approach is to break down transaction costs into their different attributes (specificity of assets, uncertainty, frequency of transactions) and to measure in isolation the impact of each on the optimal mode of governance. Even if this approach does not correspond not to the original Williamsonian schema, in which the three attributes are intimately related and can not be analyzed in isolation, it does, however, indicate the efforts considered have been made to translate the cost analysis of transaction in an empirically usable grid, particularly in the works of industrial history. A number of contributions also focused on on the generalization of the multidivisional form in American companies, European and Japanese (Wilson, 1968, Kocka, 1971, Morikawa, 1975; Reader, 1975; Hannah, 1983; Grieves, 1989). The work of the new business history explore here a theme already studied by Chandler, which relates to the determination an internal structure to ensure the best dissemination and processing some information. Their analytical framework combines cost analyzes of transaction to agency analysis.

1.3 Agency theory: asymmetry of information and incentives

Problems of imperfection and, more specifically, asymmetry of information are at the heart of agency analyzes (Tirole, 1988). These deal with the how institutions can be structured and conducted more effectively, given these informational issues. We find at Raff and Temin (1991) a presentation of the links between this literature and the organization

firms as we can observe in history. While it is true that
exchanges between industrial history and agency analyzes have focused on
the main thing about problems internal to the firm (relationship manager - owner
the firm; relationship manager - manager; relationship manager - employee), others
works are interested in phenomena that occur at the borders of firms
and which are likely to change the industrial structures.
In some situations, managers have different interests from the owners
of the firm and these have only a limited ability to verify what
actually do the first ones. The main analysis - agent shows that the holders
capital may have an interest in investing in different mechanisms of
monitoring or setting up compensation structures for
encourage managers to act in their interest. The important questions are therefore,
in this first case, the control combinations and control systems
compensation which can function optimally in specific situations,
as well as the costing of the use of coordination
managerial. Industrial history shows that these questions have arisen
concretely and have solved by the implementation of devices close
of those recommended by agency theory. So, De Long (1991) shows
how the control procedures put in place by the financiers within the
J.P. Morgan bank involved an increase in corporate performance
clients. Lamoreaux (1991) analyzes how information problems
have influenced lending policies of US banks. Finally, the analyzes
of agency are a basic analytical framework to understand the government
(Jenkinson and Mayer 1992, Schleifer and Vishny 1997, Holmstrom
and Kaplan, 2001; Tirole, 2001). Information asymmetry affects the terms
contracts on which investors are willing to participate, but also the
structure and strategy (particularly in terms of mergers and acquisitions and employment)
firms obtaining the funds. This asymmetry of information also has strong
consequences on the population of firms, especially as the needs of firms
in external finance vary during the business cycle (Calomiris and Hubbard,
1995).
In a second case, the theory of the agency can be extended to the analysis

interactions between managers of different levels. Problems of asymmetry
information are always at the heart of the analysis, as are the
arbitrations between control and compensation. Carlson (1995) uses these arguments
to analyze the case of Thompson-Houston Electric Company whose operation
has been disturbed by such conflicts of interest. Even if the managers of this
were all stakeholders in the success of the company, their different
possible visions of the business led to conflicting policies
preventing optimal operation. Similarly, Johnson (1991) shows that the
misinterpretation or misuse by senior managers of
financial accounting information has led to significant inefficiencies
in production.

Manager - employee relations are the subject of the third case. Davis (1996)
reviews the incentive mechanisms that business leaders have put in place
exercise in the United States in the early 20th century to persuade employees to act
in the interest of the company. These incentive mechanisms focus on the introduction of
a feeling of ownership of the company at the level of employees. Korczinski
(1999
) explains the emergence of workers' unions in the
construction in the United Kingdom during the period 1960-1980 as a means of
fight against opportunistic practices developed by employers and which
expressed by retentions of information in relation to clients or
slowdowns in production in order to get customers payments
additional.

Finally, and this is the fourth case, access to information problems can
to involve recompositions of certain industries. Thus, the supply systems
stores in the English colonies were, for the goods of
luxury and during the period 1880-1914, managed by specific agencies
(Crown Agents) who acted as intermediaries between the manufacturing carried out in
England and distribution within settlements (Sunderland, 1999). When the
English colonies realized that agencies could perform a number
information manipulation on the quality of goods, a control system

was set up allowing colonies to buy directly from the manufacturers
without going through the intermediary agency. Industrial recomposition took the
in this case, the disappearance of a certain type of actor who appeared
yet fundamental in the previous configuration.

1.4 The theory of incomplete contracts: information incompleteness
and allocation of property rights

According to Grossman and Hart (1986), the main authors of this current of analysis,
property is the power to "exercise control". A reasoning in
Incompleteness of contracts is perfectly suited to the study of
ownership, since all rights to the property can not be written in a
contract, except at prohibitive cost. Property rights are therefore "specific"
if they appear in the contract and "residuals" in the opposite case. For the authors,
the boundaries of the firm are not determined by a difference in
payment system that the firm would establish between its employees and its contractors,
as the theory of the agency suggests. These borders are also independent
greater ability of the firm to put in place mechanisms
prevention of opportunism, as in transaction cost analysis.
These boundaries are in fact dependent on the entity holding the residual rights of
control, that is, the control of decision variables as a last resort.
There is a confirmation of this work in industrial history, even
if the contributions are fewer here than those using the analyzes of
transaction or agency costs. The results are also more nuanced than
in the works mentioned above. Thus, Lamoreaux (1998 and 2001) shows

that the analysis in terms of residual rights of control, from Hart (1995), is
often presented in the field of industrial economics as one of the
more efficient and finer to distinguish the phenomena of integration
pure of the other contractual forms, it faces important problems
empirical and historical verification. Based on a study of organizational choices
by entrepreneurs in the 19th century, the author shows that
arguments developed by Hart do not explain the arbitration between
integration and partnership of a contractual nature. This conclusion would tend to

reinforce Cheung's (1983) claim that it is impossible to build
a usable definition of the firm, that is to say, who would distinguish it precisely
other forms of contracts. However, Lamoreaux stresses that we need
such a definition since, in the historical analysis, we see that some
entrepreneurs have opted for an integrated structure while others have rather
turned to a contractual structure.

1.5 The limits of trade between industrial economy and industrial history
in terms of informational coordination

Neo-institutional approaches in terms of agency, transaction costs
incomplete contracts play a particularly important interpretative role
in industrial history work, particularly in relation to the analyzes
neoclassical of the firm. Studies conducted by the authors of the new business
history show that the institutional forms, as well as the contours of
industry, change in response to informational coordination issues
(private information, opportunism) that prevails in trade
merchants. Imperfection or asymmetry of information on drafting and execution
contracts, on the appropriation of earnings, on the behavior of
contractors, justifies the transition from market coordination to coordination
within the boundaries of the firm, or to coordination by hybrid forms
cooperation. Similarly, the problems
information systems (between established firms,
or between established firms and incoming firms) may be at the heart of
input-output models that shape the boundaries of the industry. It is however
possible to identify at least two limitations inherent to this work. The first
relates to the use of the "comparative institutional analysis" method
which relates to the determination and comparison of the respective efficiencies of
different forms of possible institutions, but does not offer any information on
the conditions of emergence and viability of institutional or industrial forms.
The second concerns the reduction of complex phenomena of coordination
from industrial activities to explanations related only to the imperfection
or the asymmetry of information of commercial exchanges.

1) Comparative Institutional Analysis

The comparative institutional analysis is defined by Williamson (1989:
136). It makes it possible to arbitrate between the different institutional forms in order to

determine the optimal structure according to a criterion of minimization of
transaction costs. This method is not exclusive to cost models
transaction, since it is also used in agency analysis and
in the approach in terms of incomplete contracts. So, in these two analyzes,
we seek to compare the costs and benefits of different institutional forms
(firm, market, cooperation) in order to bring out the optimal form,
that which corresponds to an efficient solution of the problems of incentives. This
method does not stand out significantly from the optimization approach
intertemporal, nor of the logic of mechanical convergence towards a balance of
Neoclassical theory, two features rejected by historians
of the new business history. In this case, the problems of evolution of the forms
institutional and predominant over time some modes are
reduced to a problem of instant calculation of the optimal solution. The temporality,
in which the actors interact concretely and coordinate themselves progressively,
is neglected while it is essential for historical analysis. Of
the context in which these phenomena develop is obscured
from the outset (Cohendet and Gaffard 1990, Amendola and Gaffard 1992, Garrouste
1997; Ravix, 1997; Loasby, 1999 and 2001).

2) Reducing problems of coordination of economic activities
informational coordination issues

Focusing on information problems is not a problem in
itself. Industrial economics models have focused on these issues
since the 1970s and have achieved major breakthroughs in this
field. The difficulty is real, however, since this focus is likely
to obscure other issues, in particular that of the coordination of
productive activities (Richardson, 1960 and 1972, Loasby, 1991). This difficulty
appears in industrial history works. Let's go back to the examples previously
treaties. Problems of coordination of industrial activities (articulation
mass production - mass distribution) are, for Chandler, the key element

explanatory note of the phenomenon of vertical integration. These problems will be
occulted or more exactly transformed by Williamson to appear only
as informational coordination issues. So when Williamson
Interpreter Chandler, integration is justified by the existence of
opportunistic in the capital-intensive industries, with assets having a strong
degree of specificity. Chandler's contribution is watered down and the status of the audit
empirical that Williamson performs is more than a confirmation of his
model of a real confrontation between industrial economy and history
industrial.

These two limits allow us to advance the following reasoning, which we
Let's develop in an argumentative way in the next section. When the questions
emerging from industrial history work relate to the processes of
change in firms and industries, neo-institutional models

previously used show their weaknesses. Indeed, coordination problems
economic activities occurring within firms or industries
innovations predominate over information coordination issues
usually treated in agency, transaction cost and
incomplete contracts. We will see then that the industrial history informs
thinking about the firm and the industry, emphasizing that
the imperfection of information does not only concern the sphere of trade,
but that can be observed also in the production. In addition, history
industry
it makes it clear that institutions and industries are emerging and
evolve not to constrain the behavior of agents or firms in order to
to reveal hidden information or to repress opportunistic phenomena,
but rather to promote the behavior of agents and firms
create and maintain competitive advantages (Krafft 2000, Krafft and Ravix 2000).

Finally, from the point of view of firm and industry analysis, recent work
industrial history suggests that neo-institutional analysis remains
a theoretical framework that can be used and useful. It should be noted, however, that the neoinstitutional approach

does not stop at agency analysis, transaction costs or
incomplete contracts. After making major advances in the study
conflicts of interest and information problems in transactions, this
approach has evolved by focusing on the role of productive information and
problems of coordination of the economic activities associated with it. The
analysis in terms of skills, in particular, seem to be an interesting way
research carried out in this perspective. Recent history works
in any case argue for a detailed exploration of this type of analysis
Institutional.

2. THE COORDINATION OF INDUSTRIAL ACTIVITIES AS THE FIELD OF CONFRONTATION BETWEEN INDUSTRIAL ECONOMY AND INDUSTRIAL HISTORY

The analysis that we propose here will reveal that, in some cases, it is the
problems of coordination of industrial activities which are at the heart of the work
of industrial history, and not the problems of informational coordination.
For this, it is first necessary to present the contribution of Lazonick who will
restore Chandler's real problematic to the innovative firm
2.1). Chandler himself disputes the interpretation of his work in
an optic of pure informational coordination. He insists that
The neo-institutional analyzes that formed the basis of this interpretation are not
not suited to the innovative firms he has studied, and that the problems of
coordination of industrial activities require the development of analytical frameworks
new ones whose approaches in terms of dynamic skills constitute
undoubtedly one of the interesting foundations (section 2.2). We propose
an application of this reasoning through a confrontation of works
industrial history with these new analyzes, first of all at
internal level to the firm (section 2.3), then at the level of the industry boundaries
(section 2.4).

2.1 From Information Coordination to Coordination of Activities Industries: Chandler's Analysis of the Innovative Firm

In his 1991 book, Lazonick identifies the weaknesses of the first attempt
reconciliation between industrial history and industrial economy carried out

by Williamson. For Lazonick, Williamson's interpretation of most
cases identified by Chandler is abusive and often even erroneous. Criticism is wearing
the purely ad hoc nature of the empirical verification undertaken by
Williamson, as well as the negligence of Chandler's analysis of
from his monographic work5. Lazonick's contribution is to show
on the one hand, contrary to what Williamson presents, the economies of
speed of Chandler do not equate to problems of technical coordination
and, on the other hand, vertical integration does not appear under the influence of
opportunistic behavior as Williamson argues. On the basis of four
case (Duke, Kodak, Swift and Singer), Lazonick indicates that if an innovation
technology is an important element in the development of
the company is not the determining factor. Integration of innovation
technology, and therefore the resolution of a technical coordination, required the
implementation of new forms of organization within firms, but
especially the creation of a mass market, corresponding to the mass supply, which has
required vertically integrated forms of organization. Often, moreover,
production and distribution networks were being developed well before
that the use of technological innovation is operational6. The commitment
in a capital user program involved to make sure at the same time
a constant input flow such that the productive capacity is actually used
and a sufficient flow of output such that the entire production is sold
in a market that initially did not exist. If these two conditions were not
verified, the amount of unrecoverable costs incurred was likely to
cause the existence of the innovative firm.
In the words of Lazonick (1991: 198-199), the pro
bleme was to succeed in
transform high fixed costs into usable resources, ie costs
weak units. Chandler (1992) confirms that economies of speed implied
to control the production capacity and intensity of use of this
capacity, so that the increase in fixed and irreversible costs is counterbalanced
low unit costs of final production. It is by commitment
triple investment - development of distribution networks,

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5. A fundamental element of Lazonick's book is to show that one must not analyze the Williamson - Chandler relationship as a simple meeting of the theory with the facts. To get a clear view of the problem, it is necessary to interpret this relationship as the confrontation of two theories about a particular object that is vertical integration. So, Williamson offers a adaptation theory in which the structure of the environment would determine the behavior of the company. On the other hand, Chandler develops a theory of innovation where the voluntarist strategy

Environmental Action Plan would determine the organization of the firm (Lazonick, 1991: 288).

6. See Lazonick (1991: 238-247).

downstream marketing and marketing, and definition of a necessary organization to the coordination of the whole - that a solution has been found to the problem coordination of mass production with a mass distribution, and that a sustainable competitive advantage could be gained. This phenomenon, on the other hand, was not not observable in the user industries of work, because of the nonexistence, in this case, a degree of fixity and especially irreversibility of investments. The justification of the dominance of the integrated forms is therefore not reducible to a opportunism problem related to the specificity of assets in play7.

2.2 The role of analysis in terms of skills in interpretation innovation situations

In a 1992 article, Chandler returned to his own conception of industry and the role that firms play in this context.

For him, the firm must be at the center of the analysis and its main function, which is to produce before exchanging, requires a special interest. In these conditions, he is led to reject neoclassical interpretations, as well as those in terms of agency or transaction costs (Chandler, 1992: 85-86).

In the neoclassical approach, the firm is a technical unit whose program is to maximize some objective function from a set given information, which does not correspond to the concrete problems of production as we can analyze them in history. In agency or transaction costs, the base unit is not the firm but the transaction and

the study of exchange relations are privileged. Only the analysis in terms of evolution skills seems to grasp the logic of the empirical phenomena that it collected and analyzed. Thus, Chandler wants to link his work to the analyzes in terms of the dynamic skills of the firm, whose origins are at search at Marshall, Schumpeter, Penrose, and whose main authors are currently D. Teece, G. Dosi, W. Lazonick and R. Nelson (ibid., 86) 8.

This position of Chandler in relation to the dominant theories of firm is quite interesting. First and foremost, because he questions certain uses of his work - in particular those made

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7. The following quote may be used to illustrate the point, and especially to show that Williamson takes liberties in Chandler's quotes: "Referring to Chandler's material on Swift, Williamson demonstrated his unwillness (or inability) to understand the Chandlerian emphasis on high throughput and savings of speed. Paraphrasing Chandler on Swift's Reasons ultimate success, Williamson argued that "despite the opposition from the railroads and butchers, Swift's 'high quality and low prices' combined with 'careful scheduling' prevailed. Compare this statement with the quote from Chandler that I have just reproduced and emphasized. For Williamson, it was not worth mentioning the other factors - "high volume and the speed ... of product flow" - that Chandler included in the phrase "careful sheduling" (the factor that Williamson did quote) Swift attained the "high quality at low prices" (Lazonick, 1991: 242-243).

8. We could add to this list authors such as R. Langlois, P. Robertson, B. Loasby, N. Foss and M. Fransman, who have since contributed significantly to the development and the recognition of the analysis in terms of dynamic skills.

to develop the refrigerated wagons, did not engage in this activity. For the Kodak case, the innovation was also systemic since it involves the development of a printing system photographic images "on tape" (or on a roll), replacing the traditional system "on plate". This system, which initially targeted photography professionals, did not work commercially because the users were forced to change their devices in order to use it.

Kodak has therefore developed a new camera with integrated film that has
was launched on the market in order to conquer a clientele of amateurs. The
The skills structure was also inadequate, since Kodak did not have
competitor on this activity. In addition, the retail network did not exist to
this brand new market. In both cases vertical integration was chosen
immediately. For the Duke and Singer companies, innovation was also systemic,
however, there were networks of independent retailers that could
initially provide a skills structure that responds to the needs of
new requirements in the distribution. When Duke made operational
Bonsack machine allowing mass production, the cigarette market
did not exist. Consumers preferred cigar, pipe, chewing tobacco
or snuff. In fact, a network of retailers was already organized for these products.
Similarly, Singer used independent networks to distribute his product
(sewing machines) during the development period of an internal network,
period required for training and learning of qualified employees.

We can then summarize these results in the following table:
TABLE 1
THE ORGANIZATIONAL STRUCTURE BASED ON THE NATURE OF INNOVATION
AND THE AVAILABILITY OF SKILLS
Imperfection of information Systemic innovation
No skill structure Vertical integration
(eg Swift, Kodak)
Existing skill structure
(in production or distribution)
Vertical disintegration
(ex: Duke, Singer)
This reading grid, with a focus on systemic innovation and
Information imperfection problems (existing skills structure
or not) that are related to the implementation of this innovation, can also help
to the interpretation of other cases of industrial history. A confrontation of this
analysis grid with industrial history work is carried out in both

following paragraphs by mobilizing a series of work on the industry
(Bresnahan and Raff, 1991, Langlois and Robertson, 1995, Raff, 1995,
1998). This confrontation will show that, both in the case of the determination of
boundaries of the firm only in that of the boundaries of the industry, the productive aspects
are predominant in relation to informational aspects.

2.3 Innovation and evolution of the firm's borders

Agency analyzes explain the boundaries of the firm according to the
specificity of the remuneration systems. These can be justified by a
risk sharing between an employer (characterized by neutrality with respect to
risk) and employees (characterized by risk aversion). These
may also be justified by the employer's ability to reveal a
private information of its employees. Does this theory explain the
major trends in the evolution of the remuneration systems of firms?
This question can be answered by referring to the history of the industry
during the 1910-1930 period in the United States12. This story
industrial sector is marked by two main elements that call into question the
interpretations in terms of agency. First, compensation systems

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12. See statistics and surveys on payment systems by US Department
of Labor, Bureau of Labor Statistics in 1926, as well as by the National Industrial Conference Board
1930 (Raff 1995, Langlois and Robertson 1995).

depend directly on the way in which the tasks of different employees
to be coordinated, that is, the organization of production. This first
result emphasizes the predominance of productive information over information
transactions to explain the evolution of the firm's borders and
employee compensation systems. In addition, given the diversity of
modes of production used by firms during that time, different
forms of task coordination have emerged and have generated a great deal of
diversity of pay schemes. This second result indicates that firms
innovators in the automotive industry who, like Ford, have embraced
the production

mass and remuneration / day from 1913-1914, coexisted for a long time
period with other firms having retained the skills structure and the
previous compensation schemes. We must wait until the end of the years
twenty to observe a convergence towards the mass production system and the
payment by the day.

To understand these elements, it is necessary to briefly trace the evolution
of the automotive industry. When the auto industry is born, the process
production is very decoupled. The automobile is a luxury product and the actors
are more assemblers than producers. Within each company, a
small group of people is responsible for assembling the car from the beginning up
the end of the production process, as was done for cars with
horses. The pace of work of each assembler is not constrained by the
work of another. It can be said that, in this system, the main requirement is to
produce as much as possible, and only those workers who can respond to this
requirement continue to be paid. In addition, the owners of the company are not
owners of the work tools, it is the employees who are supposed to
hold and maintain them. In this case, the mode of production makes that one
distinguishes an employee from an independent worker with difficulty: the borders of
the firm are difficult to determine. The payment method depends directly on
mode of production: the quantity being paramount, the workers are paid at the
piece.

This nascent industry will experience two upheavals introduced by
the Ford company. The first is the implementation of the progressive assembly, which
implies that the work of the employees does not stop when there are stocks. The
employee work becomes more interdependent, and there is a need to coordinate
the pace of work. The second is the American-system production of parts,
which involves the production of standardized parts. Investments in
the production tool are then carried out by the firm itself and no longer by the
employees. In this new configuration, the assembly line becomes a
where inputs and activities need to be closely coordinated. In
when excess production occurs because of poor coordination,
this can lead to significant losses especially when the production rate

is high. The boundaries of the firm become clearer in this case: it
is a set of activities closely related technically and economically,
and implemented by skilled workers. In this new context,

the method of payment can no longer be fixed according to individual performance,
performance of a working group, but based on the overall performance of the
the company. The realization of the production process involves all
workers, the remuneration is the same for each specialized worker in the
firm.
The analysis of this period reveals a systemic innovation within
of the automotive industry. It's all the tasks and how to coordinate them
which had to be redefined. However, this systemic innovation has been
adopted at different rates according to the companies that made up the industry.
Some firms did not integrate this systemic innovation: they complied
in the old way of producing, using the skill structure
existing, and have kept blurred boundaries. Other leading firms (Ford,
General Motors, Chrysler) have chosen to build a new
necessary skills for the implementation of systemic innovation and have
adopted a much more organized structure. The diversity of these firms, their
characteristics in terms of productive choices, also had implications
on the phenomena of input-output, and therefore on the definition of the boundaries of
industry. We will now study them.

2.4 Innovation and evolution of industry boundaries

Since we are interested in the evolution of innovative industries, one of the
reference models is the life cycle model (Gort and Klepper, 1982;
1997, 2002a, 2002b). The basic assumption is that the innovative industry is assimilated
to a living organism whose characteristics evolve and change
over time according to well-defined steps. The major result of this
literature is that the market structure, spotted by the number of firms installed,
is directly related to the stages of diffusion of innovation in the industry.
This time again, a return on the industrial history will show that this result is
questionable, in that it only takes into account information problems between

firms to explain the phenomena of innovation.

The indust

e automobile stands as the field of application

ideal life cycle patterns (Klepper and Simons, 1997, 2000).

It is indeed in this industry that we can verify the great relationships

highlighted in this approach. Using the database provided by the

Federal Trade Commission over the period 1899-1960, we get the results

following. The output growth rate of this industry is rising sharply

until 1919 (25.8% per annum), then sinks until 1929 (11.5% per annum). In

the years 1930-1937, the growth rate is down, but goes up slightly

at the end of the period. In accordance with the life cycle, the growth of the output

is strong in the initial phases, then slows down over time. The process

I / O are also evolving in line with the life cycle. The entrance is

concentrated in the early years of industry development, since

in the period 1902-1910, it averages 48 new firms a year, with

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a peak of 84 entries for the year 1907. After 1910, the entry rate decreases: it

is 16 entries per year in the period 1911-1921 and becomes negligible after

1921. In 1909, the exits exceed the entrance and the shakeout13 accelerates during

of the twenties, to become maximum in the thirties. Market shares

firms fluctuate widely in the early years and stabilize

considerably from the moment when the leading firms begin to monopolize

growing shares of the market. So, in 1937, the three firms Ford, General

Motors and Chrysler hold 88% of the market. These firms will maintain their

leading position until the sixties. First-movers maintain themselves

in the market significantly better. The phenomena of entry are

are produced in successive waves over five periods (1895-1904, 1905-1909,

1910-1916, 1917-1922, 1923-1967). Entrants belonging to these different

waves have the same survival rate up to the seventh year but after this

seventh year, the first wave entrants have a much higher survival rate

high as the entrants of the next four waves. Innovation substitution

product - process innovation is observable. Product innovation is maximum

in 1905: these are major innovations designed to define the basic structure
automobiles. This innovation then decreases and is replaced by innovation
a process that continues to grow until the mid-1930s14.
The analysis of these different relationships is as follows. In accordance with reasoning
of Gort and Klepper, entry and exit depend on the possibility of
firms to capture the information necessary to discover profit opportunities
during the different periods15. So, in the early stages of emergence
of industry, these are firms from technologically related markets, or
founded by individual inventors, who are the driving forces of development
Of the industry. Indeed, it is they who create information in order to
precisely shape the new product. During this period, information
is easily transferable from one industry to another, profit opportunities are
important and this has a positive effect on entry. In the growth phases
and mature, it is this time the established firms that are the actors of
industrial dynamics, thanks to the information they have accumulated
experience. Information plays the role of barrier to entry and opportunities
profit are then reduced for potential entrants, but also for
Installed firms that perform process innovation in a less efficient manner.
Experimentation induces significant cost differences, it is at the origin
the disappearance of firms. Entrance is significantly

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13. Klepper and Miller (1995) propose a definition of shakeout: an industry does not know
no shakeout if the number of firms installed does not fall below 70% of maximum peak
or if, having fallen below this threshold, this number rises to at least 90% of the peak. According to both
only 27 of the 46 industries originally studied by Gort and Klepper (1982) actually
suffered a shakeout.
14. However, the data show that product innovation is boosted again from
This evolution can not be analyzed in the life cycle.
15. This reasoning is formalized by Jovanovic and McDonald (1994).

Outputs are important and shakeout is inevitable. In this interpretation,
therefore, the input-output is explained by the greater or lesser possibility

access to information that, as the case may be, alleviates or weighs on cost curves means.

Industrial history provides lighting different about the shakeout phenomenon found during the Great Depression. If the economic data aggregated industry level implied that the shakeout had taken place in accordance with the requirements in terms of life cycle, the data of the historian show that this was not necessarily the case16. Indeed, the conclusions of the life cycle are that the industry was evolving in a prosperous way and then it has undergone a strong contraction. In fact, if we mobilize the historical archives, we see the existence of a much more complex structure17. In particular, between two peaks of 1929 and 1933, the total number of firms installed is approximately equal half of the initial total and entry stagnates at around 10%. There is therefore clearly a shakeout. However, it is useful to complete the reasoning of interest in the characteristics of the firms, that is, those which remained in industry from 1929 to 1933, those that came out, and those that came forward as new entrants.

From this comparison of the characteristics, it appears that firms that disappeared were very different from the firms in the other two categories. Indeed, in 1929 when the Great Depression hit, automobiles were being manufactured according to two radically distinct technological modes. On the one hand, the three leaders (General Motors, Ford, Chrysler) were then the precursors of the production mass and modern production methods; on the other hand, the others firms used a more artisanal and labor-intensive technology. As As we have seen, the exit process that followed has traditionally been analyzed in terms of access to information and cost curves. In fact, this is not what happened. The depression was not a transition period during from which the least efficient firms have disappeared; it can not be considered as a moment of passage from one period to another in the life cycle.

The Great Depression is a period of profound change in the industry. Indeed, the cost differences that are important in the present case are not production costs as they can be expressed in the cost curves.

To analyze the exit process, you have to take into account the adjustment costs,
that is, the irrecoverable costs borne by certain firms and not
others. In fact, if the fixed costs of the mass production factories were large,
they were mostly irrecoverable. When the three leading firms were

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16. These data, in this case, are essentially surveys - censuses of
producers in the years 1929, 1931, 1933 and 1935, the originals of which are available and
copies of which were made in the form of microfilms. The point of these documents is that it is possible
to organize them as a panel and to apply to them the most sophisticated statistical methods. These
documents can be supplemented by archival elements (photos, newspapers of the time, etc.).
17. See Bresnahan and Raff (1991), Raff (1998).

faced with weak demands, they could not release recipes
important, but most importantly, they could not get out of the industry easily. the
On the contrary, the other labor-intensive firms followed a different logic.
These firms were much more flexible and massively out of the industry.
A reorganization of the industry took place, whose determinant is the commitment
(or not) in a systemic innovation involving investments
irreversible and an internal reorganization to develop new
skills, reducing the imperfection of productive information.
We could conclude this analysis by qualifying the choice of flexible firms
purely rational, unlike that of firms that incur costs
unrecoverable and suffered significant losses during the Great Depression.
However, this reasoning remains, on this point still, very partial. In
Indeed, what we can observe is that the three leading firms have, from this
time, put in place the conditions for their durability. By committing these costs
these firms have built the production methods and equipment
that enabled them to cope with a mass demand that, despite
phases of depression, remained the dominant market requirement. These firms
therefore developed the productive activities that corresponded to the configuration
of the market and to control in the long term the articulation between the productive sphere
and the market sphere. The other firms, on the other hand, have failed: they have

disappeared during the Great Depression and could not return to the industry through then, because the barriers to entry were too great.

CONCLUSION

This article introduced the two main trends adopted by the literature to consider the connections between industrial and industrial history, this in the context of the study of the boundaries of the firm and the industry. This presentation shows that the first trend uses economic models as a grid for reading historical facts, while the second trend gives industrial history work the possibility of refining grids of reading the industrial economy.

Three results can also be deduced from this presentation. All first, the first trend is to read the results of economic models in the light of history, while the second emphasizes economic issues that are unresolved in mainstream literature. We thus passes from a simple attempt to confirm the results of the economy industrial history to a real confrontation of the two disciplines. Then, in the first trend, the meeting between industrial economy and industrial history implies to take into account only the transactional aspects to define the boundaries of the firm and the industry. In the second tendency, on the other hand, the confrontation between industrial economy and history industrialization leads to considering the productive aspects as determinants of these borders. Finally, the first trend considers the results of the analyzes

as given and indisputable tools, while the second explicitly emphasizes their limits and encourages the search for new concepts and analytical frameworks.

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