

# **“Rethinking comparative sectoral analysis. The case of the consumer electronics industry in Argentina”**

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## **1. Introduction**

As a result of the transformations in the global capital accumulation process that have occurred since the middle of the 20th century and consolidated towards the 1970s under the so-called New International Division of Labour -NIDL- (Fröbel, Heinrichs & Kreye, 1980; Yeung, 2007; Starosta 2010a; Grinberg, 2016c), the analysis of the configuration of production (i.e. the division of labour) at an international level was boosted by the introduction of a new set of dimensions. Among them, it is possible to focus on those that, analytically, revolve around the fragmentation ('organisational fix') and delocalisation ('spatial fix') of productive processes (Yeung, 2007; Starosta, 2010a).

In that context, some scholars highlight the specific aspects of productive activities and the sectoral implications of the technical change for the explanation of differentiated national paths (Kaplinsky, 1989; Alcorta, 1999; Pérez, 2001). In particular, from a sectoral perspective, the process of fragmentation and delocalisation of productive processes and the numerous links established between firms have been approached widely by the authors of the Global Value Chains -GVC- framework (Gereffi & Korzeniewicz, 1994), later further broadened from its original formulation taking into account the increasingly complex relationships established in chains organisation (Gereffi, Humphrey & Sturgeon, 2005). Nevertheless, as other scholars have proposed, it is possible to state that such approach, even though it has contributed to the debate from different points of view (mainly technical and empirical), has not made enough emphasis on the general determinants of the global capital accumulation process in order to grasp the content of these phenomena (Starosta, 2010a; Grinberg, 2016c). Those authors focus on the inner dynamics of global capital accumulation as the content expressed in those new relationships between firms located in different countries and holding differentiated technical and organisational capacities (Starosta, 2010a & 2010b). Thus, they have identified as the axis that shapes the NIDL the shift in the material conditions of the production processes mediated by capitalist social relation of production, and consequently its expression in the differentiated accumulation conditions of individual capitals and in the exploitation of the labour force according to the type of productive attributes required to perform the different stages of the labour process (Iñigo Carrera, [2003]2013; Starosta, 2010a & 2010b; Grinberg, 2011 & 2016c; Charnock & Starosta, 2016).

Following this framework, this paper aims to analyse how material changes in production processes -technical features of the organisation of production- modified the configuration of capital accumulation under the NIDL, considering the case of the consumer electronics industry. With this, it is expected to propose a framework in which it is possible to find an unity

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for the dimensions of analysis usually set in motion for comparative sectoral analysis (productive attributes of the labour force; relative wages; technical specificities of the use-values; machinery and inputs used; scale of production, linkages of activities with the exploitation of natural resources; among others), within the global capital accumulation process and its particular forms at the national scale.

For that, the analysis will focus on the case of the consumer electronics industry in Argentina, since the mid-1970s. This sector is strongly associated with the NIDL consolidation process due to the scope of relocation and differentiation of the labour force in the different productive stages (Keller, 1983; Snow, 1983; Ernst, 2005; Starosta, 2009; Sturgeon & Kawakami, 2010). As a result, links between an increasing number of firms and diversification of products have been established (Sturgeon & Kawakami, 2010). However, in Argentina, the sector experienced a deep reversion in its degree of integration and assumed particular forms of development, closely following the incentives created by industrial policy (Nochteff, 1984; Filadoro 2007; Schorr & Porcelli, 2014; Sánchez, 2018).

The rest of the paper is organised as follows. The second section briefly presents the analytical framework of the inquiry, which considers the development of productive forces and the material aspects of production as the most general determination of the division of labour within particular social relations of production, whose scope under capitalism is global (Marx, [1867]2012; Iñigo Carrera, [2003]2013). On this basis, the third section develops the main features of the configuration of production under the NIDL, considering specific national patterns. The fourth section focuses on the general trends for the consumer electronics industry in the context of the NIDL and the fifth section analyses the path of this sector in Argentina as a particular case. Lastly, final remarks are presented in section six.

## **2. The material foundations of the production process and its organisation under capitalism**

### *2.1. General determinants of the division of labour*

The characteristic that distinguishes human beings is their aptitude to transform nature into a means for themselves through their conscious action (labour), in a process of (social) metabolism (Marx, [1867]2012: 215-216 & 223; Engels, [1876]2000; Iñigo Carrera, [2003]2013: 236-237). The working time that human beings employ to the control of nature for their reproduction (and here we do not speak only of the necessary time for that immediate purpose, but also of the time corresponding for the preservation of the environment) and the product obtained from it, gives a general idea of the level of development of productive forces in a society. This development of productive forces must necessarily be objectified into means of production that allow the increasing appropriation of natural forces to transform nature and appropriate it. Thus, society (social labour) is a process of metabolism that is reproduced with the knowledge acquired and objectified, that each generation not only sets into motion but enhances. The contemporary limits of productive forces bear that potentiality (with the corresponding technical forms of the production processes), under a particular form of labour organisation.

The unity of this social process come about through the individual processes of reproduction of the members of society, and "*being a process of social metabolism that is necessarily carried out through the processes of individual metabolism, the regulation of the first makes up the organic unity of the second*" (Iñigo Carrera [2003]2013: 237). Hence, the form of social labour organisation will determine forms of relationships among the members of society, social relations of production through which the labour of society is assigned among its members.

Thereby, it is possible to distinguish (only analytically) between the moment of the general organization of the labour process of society (which we will call here 'social scale of production') and the moment of the organisation of its constituent parts, that is, the scope of the different productive activities that enables the obtention of means of life and production (which we will call here 'individual scale of production')<sup>2</sup>. Within such analytical levels of the scale of production, the members of society deploy their ability to work. Besides, the reproduction of the whole process is also carried out in the individuality (subjectivity) of the members of society through the consumption of the necessary means of living (Iñigo Carrera, [2003]2013).

Both the unity of the reproduction of society, whose scale fall upon the totality of its members and reflects the collective labour power, as well as the productive capacity deployed by the different aliquots parts of society (being the most elementary the individual productive unit), will come up by the form of organisation of social labour specific to each moment of the development of the productive forces. In particular, each historical form of organisation of production will determine the individual scale (or the form of the different individual productive units). Which, in turn, determines the form in which the capacity of human beings to appropriate the environment is deployed, to produce use-values through their productive capacity objectified in the means of production and the corporeity of people<sup>3</sup>. Paraphrasing Marx, the form that takes on the division of labour will vary with the specific form of organisation of production and according to the corresponding historical level of development of productive forces (Marx, [1867]2012).

In this sense, the change in the material features of the production process -technical conditions- and the consequent enhancement of the productive attributes of the sum of the members that deploy such social process (in its current form, the collective labourer), while

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<sup>2</sup> Here we try to refer to analytical levels of the scale of production anchored in the material conditions of the labour process and its form of organisation. Although not presented in this paper, it is important to differentiate the 'levels' of the scale proposed here and those proposed by authors such as Taylor (1981), Smith (2003) or, from another perspective, the economies of scale of neoclassical economics. In particular, Smith (2003) pose the reproduction of space in capitalism as a process in which the relationship with nature assumes different levels of scale historically determined as material parts of social, economic and political action (regional, national, urban, state, etc.). So, it focuses on different levels of the social process from a geographical perspective and not on the more general aspects of the organisation of production through the material features of labour processes. In this sense, we consider that the aspect of scale that we try to develop here is analytically previous to the analysis of Smith (2003). That is, upon the scales determined by the material features of the labour process mediated by specific social relations, geographical regions will be developed, within which the organisation of production is carried out, and social action is expressed. For further discussion on this point, see Charnock & Starosta (2018). Lastly, it is relevant to say that both Smith (2003) and Taylor (1981) identify the global scale as the scope of analysis of national development processes.

<sup>3</sup> To this end, to the human capacity, it is possible to add the material conditions imposed by nature, the source that supplies the matter that labour transforms into social wealth (Engels, [1876]2000).

enhancing the scope of the process of social metabolism (its complexity), transforms the specific branches of production through which it comes about. In this way, the different branches of production will assume particularities in terms of the individual scale of production. That is, the specific productive activities developed in each particular branch, the features and the number of use-values resulting from the process of production, the technical specifications of the means of production, the materials used, and, obviously, the productive attributes of the labour force necessary in each case.

Such is the starting point that we consider should be borne in mind when analysing the configuration of social production (the division of labour) and the specific characteristics that it takes on in each moment and place.

## *2.2. The determinants of the division of labour in the capitalist mode of production*

Now, the division of labour takes place in the form of historically determined societies, that is, under different modes of organising production and, therefore, under different forms of developing the productive capacity of the human being. The current form of carrying out social production, capitalist society, has as a distinctive feature the deployment of the labour of (part of) the members who integrate society private and independently from each other (Marx, [1867]2012), thus, independently with regard to knowledge of social needs (Iñigo Carrera, [2003]2013). In this sense, the capitalist mode of production can be distinguished from the previous ones because it is the first form of executing social production that acquires the kind of an indirect, general social relation. Within that context, the labour of each constituent part of society is deployed in a private and independent form, so, breaking with personal dependence relationships (Marx, [1867]2012). As a result, in this mode of (re)production of human life, the outcome of productive activity (the material product of labour) assumes the form of commodities, in which the general social relation between persons is carried, under the form of (exchange) value<sup>4</sup>.

Faced with the need for their reproduction, in the form of an indirect social relation, the commodity producers embody the movement of self-expansion of this social relation, that is, of capital in its accumulation process. Thereby, the content of this social relation becomes the quantitative increase of itself, the production of surplus-value (Marx, [1867]2012).

Further, the need to expand capital accumulation requires the expansion of the surplus-value obtained from the exploitation of the labour force. Since it does not have limits, the production of relative surplus-value is the most powerful way of doing it, allowing the reduction of the value of the labour force without affecting its consumption capacity, from the increase in the productivity of labour in those branches that directly or indirectly produce the

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<sup>4</sup> Here, we focus on productive work organised privately and independently, that is, productive in terms of value (of commodities), given that this is the scope (as a specific separation of the capitalist mode of production) of the organisation of the social reproduction that we intend to analyse in the present work. However, this does not take away relevance to the productive work carried out outside of these bounds, for example, domestic work. The work of that kind assumes the same level of relevance for the social reproduction process. Thus, in order to simplify writing, the term production and reproduction will be used to refer to the first scope of social work, but without disregarding that both 'areas of social labour' make up the reproduction of society.

means of life (Marx, [1867]2012). Such is the most general determination of the specific form acquired by the production process under capitalism, since the relative surplus-value production process is nothing more (nor least) than the form in which society develops the productive forces of social labour, through a specific use (exploitation) of the labour capacity of its members. In other words, that process transforms the material features of the labour process and the productive subjectivity of the labour force, which gives rise to changes in the division of labour (Charnock & Starosta, 2018). In turn, the resolution of this configuration of production, generally talking, comes from the process of formation of the general rate of profit among the individual capitals of the different branches<sup>5</sup> of social production, through which the unity of the social relation takes place (Marx, [1894]2011; Charnock & Starosta, 2018).

### *2.3. Some aspects of the configuration of productive activities in the capitalist mode of production*

Preliminarily, it is possible to see how within the framework of the general dynamics of the configuration of production in capitalism the concrete features of productive activities are transformed and reproduced. In the capitalist mode of production, when analysing the configuration of productive activities, the intervention over the environment (production processes) and the utilisation of use-values (consumption) appear as separate realms, although both constitute the unity of social (re)production. The different productive activities carried out by individual capitals in order to fulfil that reproduction assume specific forms that are associated with the existence of a multiplicity of partial technical forms of production for the intervention over nature to obtain the use-values necessary. Thus, those partial technical forms are the result, in each moment and place, of the specific social need to be covered<sup>6</sup> and the natural conditions on which production operates. These aspects will shape the technical features and the number of the resulting use-values, as well as the inputs, the means of production and the labour force (with the corresponding productive attributes) necessary to put into motion every particular activity.

Within this context of differentiated technical features for the productive activities according to their object of work (embodied in the individual capitals and expressed in the different organic compositions and rotation rates of capital)<sup>7</sup>, the process of formation of the general rate of profit determines the resolution of the configuration of production. The allocation of aliquot parts of social labour (the individual scale of production) in the capitalist mode of production, or the configuration of branches of production. Therefore, through this process, in the form of constant imbalances between branches, the society resolves its reproduction (Iñigo Carrera, [2003]2013; Graña, 2013; Charnock and Starosta, 2018).

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<sup>5</sup> Here, the mention to 'branch' of production refers to the division of labour between individual productive units, so producing the same qualitatively use-value. Instead, as will be noted forward, the mention to 'sector' of production or 'industry' refers to a set of branches orientated towards the production of a final product. Thus, within a 'sector' is there cross-branch competition (Starosta, 2010b).

<sup>6</sup> That is, the use-values necessary for the reproduction of society (either for the immediate consumption of the working class or the materials used in production or the means of production) according to the development of the productive subjectivity of the labour force.

<sup>7</sup> As aliquot parts of the total social capital, the technical compositions of the individual capitals will give rise to differences in the organic composition of the individual capitals, while at the same time they will rebound in different rates of rotation of the advanced capital (Marx, [1894]2011).

In the process of reproduction of individual capitals, the competition for higher profits implies a trend towards cost reduction. This can occur through the increase in labour productivity (associated with the introduction of technological innovations, means of production or also due to the reshaping of the work-process); through mechanisms that, without affecting the performance of the labour-force, allow to reduce production costs; or, on the basis of the place in which the labour process comes about (given natural conditions or specific historical conditions of the working class in each country) (Graña, 2013; Grinberg, 2016c). Among these, three cases will be relevant in the analysis that follows in the next section. In the first place, given that social consumption is dissociated from production, the location of the former (due to the previous development of the capital accumulation process in different regions) will play a central role in the location of the latter, considering the progress on communication and transportation activities productivity and the related production cost for those activities. Related to this, secondly, capital can obtain better conditions for its valorisation when the exploitation of the labour force can take place through the differentiation of the productive subjectivity of the collective labourer for the performance of the different stages of the productive processes. Finally, in those cases in which there are differentiated natural conditions, capital can obtain higher labour productivity and, potentially, cut the price of the commodities produced in such conditions.

Besides, the relative surplus-value production process involves as a general trend the rise in the scale of production, that is, the trend towards the concentration of capital understood as the expansion of the minimum necessary to produce under normal conditions (Marx, [1867]2012). Therefore, as a historical form of organising production, capitalism has a general trend towards concentration of production<sup>8,9</sup> (Iñigo Carrera, [2003]2013).

From the perspective of social scale of production, the progress over the appropriation of nature and its higher automation increasingly requires the existence of members of society that bear the capacity of such development -contemporary, the application of science in production. Therefore, the development of the material conditions of the labour process brings with it (as a unit) transformations in the productive attributes of the labour force (of the collective labourer)

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<sup>8</sup> As an issue to discuss in the future, we consider that such a trend does not necessarily hold for all branches of production in the development of the capital accumulation process. Namely, depending on the changes in the technical conditions of the labour process, the different individual capitals that shape the division of labour will not necessarily change its scale (or degree of concentration) in the same direction. Such individual scales may correspond to branches that because of the changes in the technical conditions of production lose historical potency or others in which the introduction of new means of production or inputs implies a reduction of scale. Therefore, although it would not eliminate the general trend, there could be elements that imply the reduction of the scale of certain individual capitals (new machines, fragmentation and delocalisation of production, product differentiation, etc.). For a discussion on the transformations in the individual scale of production from different points of view (plant, firm or product) in the context of the NIDL, see Kaplinsky (1989).

<sup>9</sup> Regarding the features of each branch concerning capital concentration process and the increase in the scale of production, *"it is necessary, in any case, recognise that -although these advantages derived from the scale are general to the production and distribution- not all productive capital "enjoys" them in equal magnitude. It is the technical conditions of each sector that determine the increase in labour productivity and the magnitude of the cost savings derived from the rise in the scale, which may be in some cases small and in others considerable. In particular, Gold (1981) and Chandler (1994) point out that in "work-intensive" sectors, economies of scale exist, although they tend to be smaller than those enjoyed by the "capital-intensive" sectors. In the former sectors, there are usually more significant advantages of scale in the commercialisation; thus the commercial firms tend to be the most important in the chain"* (Graña, 2013: 49-50).

(Charnock and Starosta, 2018). Here again, it is valid the distinction between the social scale of production (the productive potentiality of the collective labourer) and the features of the individual scale (individual capitals that concentrate relatively simple or complex work). Thus, the productive attributes of the labour force are also an essential aspect when analysing the scale of the different productive activities in the face of technical change.

Lastly, based on the above mention aspects related to the concrete forms of reproduction of individual capitals, it is possible to introduce an additional issue related to the general rate of profit formation process -via its differentiation-.

In the process of production of relative surplus-value, there will be increases in productivity and, consequently, in the number of use-values produced, which does not necessarily imply that the increase in demand will occur at the rate necessary to absorb the total increase in production. Thus, market size cannot embrace all the firms, an aspect that derives in the existence of firms that cannot maintain the pace of accumulation (Starosta, 2010a; Graña, 2013). At this point, a residual demand (unsatisfied by the technical features of normal capitals) opens the possibility of the persistence of firms that are lagging behind those that manage to develop the productive forces (small firms). These laggards, setting lower labour productivity in motion and having higher production costs, cannot appropriate the average rate of profit -they do not participate in the process of its formation- (Iñigo Carrera, [2003]2013)<sup>10</sup>.

The valorisation of small capitals is governed by the interest rate (Starosta, 2010a), and the condition for them to remain active is that the profit they make allows them to cover their production costs plus such rate. However, it could also happen that the production price of the branch locates at a level that allows these capitals to appropriate a profit that more than compensates the interest rate given their production costs. That case opens a set of possibilities related to the form that the configuration of production (the division of labour) will take in that branch and, therefore, how the individual scale of production will come about. In the case that small capitals sell below the production price of the branch (but obtaining the interest rate), these could eliminate normal capitals from the competition process, since they could sell cheaper than these (which would be forced to relocate in other branches) (Iñigo Carrera, [2003]2013; Starosta, 2010b). Moreover, if this occurs, the normal capitals, through relations with small capitals in the circulation process, could appropriate part of the surplus-value that exceeds the compensation for the interest rate, enhancing their accumulation process (Starosta, 2010a & 2010b).

Thereby, considering the different kind of individual capitals is fundamental when analysing critically the division of labour in the capitalist mode of production, since the relationships between differentiated firms (normal capitals and small capitals) -and hence their respective productive and value appropriation capacity-, derives from the inner dynamics of capital accumulation process -with specific aspects in each branch of production-, in opposition

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<sup>10</sup> "The active participation of individual industrial capitals in the formation of the general rate of profit has as a condition that these capitals reach the level of concentration required to operate on the sufficient scale to put into motion the productive capacity of labour that determines the value of commodities. The individual capital that has this attribute is 'normal' for the branch in which it operates. The production of relative surplus-value imposes the constant increase in the mass of value that must be accumulated in order to function as a 'normal' individual capital" (Iñigo Carrera, [2003]2013: 137).

to other approaches that find the foundation of that linkage in the governance strategies of leading firms in each chain (Starosta, 2010a & 2010b; Grinberg, 2016c).

To summarize, as a result of the general dynamics of the capitalist mode of production, in the analysis of the division of labour it is central to consider a set of dimensions that will be determinants of the specific form of sectoral production in each case: specific aspects of the use-values (size, weight, chemical properties, etc.); changes in the social need for each use-value; productive attributes required for the performance of the different stages of production; natural conditions that face the different activities. At the same time, these aspects will depend on the specific conditions of the historical development of the different countries (productive subjectivity of the labour force, size of the internal market -scale-) and the sectors of production themselves (concentration and centralisation of capital, capital differentiation processes).

### **3. The configuration of production under the NIDL**

In the capitalist mode of production, this trend towards increasing productivity and competition for vending commodities, develops, in a mode of production that is carried on privately, with an inherently global scope. In other words, the capital accumulation process is global in essence but takes place concretely in the form of a group of countries under the government of national states (Hirsch, 1999; Iñigo Carrera, [2003]2013; Bonnet, 2007).

Within this framework, it is possible to recognise unity in the development path of the different countries, analysing them from the perspective of the general dynamics of the global capital accumulation process and the specific form (qualitative differences) of their participation in the international division of labour<sup>11</sup>. In this sense, the transformation in the material features of labour process that involves the valorisation of value through the production of relative surplus-value, will determine different historical forms of the international division of labour, giving rise to specific national paths, under the form of 'uneven development' (Charnock & Starosta, 2018). Therefore, the reference to the evolution of the world economy implies that certain technical transformations in the production process will modify the potentiality of the different countries to valorise capital within their borders, based on their historical development as a specific part of the global capital accumulation process (Charnock & Starosta, 2018).

Anyhow, this does not mean that the division of labour will not change in time resulting from further transformations in capital accumulation. So, with a focus on what happened under the NIDL, we will try to unfold (in a general manner) these phenomena for the consumer electronics sector in Argentina, considering the main changes related to those dimensions presented in the first section (expecting further development in future works)<sup>12</sup>.

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<sup>11</sup> This point of view seeks to understand what gives unity to the social relation of production. Then, the analysis is embodied in such unity and its historical forms of production. Thus, the global is not opposite, nor something external or separate, to the national. The global express the unity of the social relation.

<sup>12</sup> As can be seen so far, in this paper, we try to concentrate on the material (technical) aspects of production mediated by capitalist social relations. On this basis, we understand, it is possible to find the foundation of the international division of labour (here with a sectoral perspective). However, such a



### 3.1. *The New International Division of Labour*

Towards the 1970s the consolidation of a series of technological changes associated to the progress of the microelectronics, the automation of productive processes and the development of transport and communications, marked a break in the form of organizing production associated with the development of the 'classic' industrial countries of the first half of the 20th century. That changes lead to increasing fragmentation and relocation of production processes in different national spaces (Fröbel *et al.*, 1980; Whittaker *et al.*, 2010), as well as processes of differentiation of individual capitals within sectors of production (Starosta, 2010b).

As a form of the process of production of relative surplus-value, these changes laid the basis for the realisation of the need for capital to increase the production of surplus-value by changing the form of exploiting the labour force, via its differentiation according to different geographical regions<sup>13</sup>(Starosta, 2016). Schematically, the relatively more complex activities that require workers with scientific or professional training were concentrated in the countries that were at the forefront of the technical forms, carrying on the development of the productive subjectivity of the collective labourer portion who is able to advance in the control over natural forces and the work process organisation (Iñigo Carrera, [2003]2013). On the other hand, the latent labour force of the East Asian countries became part of the active working class, through the concentration in this region of tasks of less relative complexity, using cheap labour force but with the productive attributes necessary for its performance (Fröbel *et al.*, 1980; Grinberg & Starosta, 2009)<sup>14</sup>.

In turn, those countries that historically provided the world market with agrarian and mining origin commodities did not see their role in the international division of labour modified (with Mexico as an exception), although the irruption of the NIDL has had broad effects on this national capital accumulation processes. In these countries the appropriation of ground rent based on the exploitation of natural resources continues to specifically mark their form of participation in the international division of labour, albeit with more significant bounds in relation to the previous phase, expressed in the limits to industrialization processes in such countries (Grinberg & Starosta, 2009; Grinberg, 2011; Grinberg, 2016a & 2016c)<sup>15</sup>.

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process necessarily develops through political relationships, which are highly relevant to the global understanding of the phenomenon (political action of national states, unions, power relations between firms, etc.). Over those aspects, it is expected to advance in future works.

<sup>13</sup> Also, according to attributes such as citizenship or gender within each country (Keller, 1983; Iñigo Carrera, [2003]2013).

<sup>14</sup> “As a concrete expression of the inner nature of the process of capital accumulation, these transformations have been global in content and national only in form. More specifically, this growing differentiation of the productive attributes of the collective labourer of large-scale industry has been the basis of the emerging patterns of differentiation of national and regional spaces of accumulation in the past four decades. In effect, based on these recent transformations in the labour-process and the revolution in communication and transportation methods, capital has been increasingly able to disperse the different parts of the labour-process globally according to the most profitable combinations of relative costs and productive attributes of the different national fragments of the global labour-force, thus giving birth to the so-called ‘New International Division of Labour’ (NIDL)” (Grinberg & Starosta, 2009: 771-772).

<sup>15</sup> “(...) whereas in Latin America capital continued to find it more profitable to valorise on the basis of the appropriation of a portion of ground-rent; either because the specific kind of labour-power it needed was not there or was not cheap enough, or because the mass of ground-rent was large enough to offset the benefits of a

### 3.2. *Some particularities of the Argentine capital accumulation process*<sup>16</sup>

In the last cases, due to the higher labour productivity in the exploitation of natural resources, the conditions of valorisation of the total social capital are enhanced, since their participation in the international division of labour makes the value of raw materials cheaper (given a certain social demand for them) and with it, the value of the labour force. However, via the price formation of primary origin commodities, in their circulation flows to such countries a mass of surplus-value produced by the individual capitals that directly or indirectly buy those commodities, in the form of ground rent. In principle, this mass of value has as its destination the hands of the landlords, which constitutes a detraction from the capital accumulation process. Therefore, as Iñigo Carrera (1998) originally stated, in its more general determination the potentiality of the ground rent that enters to this countries is its reflow, at least in part, towards the fragments of capital for which it formerly constituted a detraction of surplus-value (Iñigo Carrera, 1998 & 2007; Grinberg, 2016a)<sup>17</sup>.

In the case of Argentina, the appropriation of ground rent through various mechanisms mediated by the action of the national State (such as the overvaluation of the national currency or taxes on exports) has been the central axis around which capital accumulation is reproduced (Iñigo Carrera, 1998). In general, since the 1930s that appropriation took place within the context of the so-called import-substitution industrialisation process (ISI), where the production of industrial products oriented to the domestic market complements the production of commodities of primary origin. Among the capitals that produce such products, it is possible to distinguish between those that operate in other countries with the scale necessary to sell in the world market and locate in the country fragments of themselves to produce with a restricted scale (plus industrial capitals of national origin and equivalent size) –‘fragmented normal capitals’- and those that constitute ‘small capitals’. However, in both cases the restricted scale and the consequent lower labour productivity, implies higher production costs, which requires extraordinary sources of surplus-value that act as compensation for the productive backwardness, a role that has historically been played by the ground rent, in the context of a ‘protected’ domestic market (Iñigo Carrera, 1998; Graña, 2013; Kennedy, 2018). Thereby, fragmented normal capitals obtain extraordinary profits that allow them to compensate for the productivity lag, while, in their commercial relationships, they find the possibility of appropriating surplus-value produced by small capital (Grinberg & Starosta, 2009; Graña,

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*‘structural transformation’ in the other direction by providing the source of extraordinary social wealth sustaining those profitable protected domestic markets” (Grinberg & Starosta, 2009: 773).*

<sup>16</sup> It is important to emphasise that these specific aspects are presented in a general manner, just for establishing some central lines when analysing the Argentine capital accumulation process. In the same sense, it is not intended to argue that the complexity of capital accumulation in Argentina (and in any country in general) is explained unilaterally from them. The approach is based on the developments of Iñigo Carrera (1998 & 2007).

<sup>17</sup> “(...) *Global capital became, then, driven to overcome this barrier to its accumulation capacity by establishing an antagonistic association with local landowners in order to recover a portion of that surplus value. Landowners, as social parasites, have had no option other than to accept, not without resistance, losing a portion of the ground rent to industrial capital. From being simply a source of cheap primary commodities, these spaces of accumulation (...) became also sources of ground rent for industrial (i.e., productive) capital and its junior partners” (Grinberg, 2016a: 71-72).*

2013). So, the release of surplus-value by small capital is an additional source of valorisation for the fragmented normal capitals, and the reflow of part of the ground rent<sup>18</sup>. Therefore, the limited production to the domestic market and the consequent productivity lag becomes a specific national form for the appropriation of ground rent by capital (Grinberg & Starosta, 2009).

In such a framework, the accumulation process in Argentina finds a limit to its expansion on the availability of ground rent as a source of compensation, either because of the magnitude of the mass of rent flowing into the country, or due to the evolution of the need for compensation, which lies in the magnitude of the production gap itself (Graña, 2013; Dileo *et al.*, 2017).

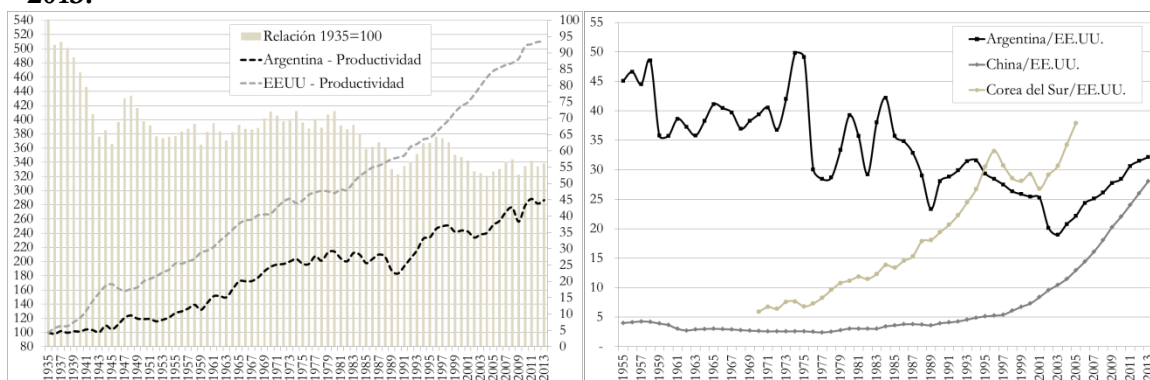
Thus, under the classical form of the international division of labour, the flow of ground rent allowed the expansion (under an unstable dynamic) of the economy through the advance of the ISI process. However, as the country does not have a central role in the development of the productive forces that shape the NDIT, a twofold movement occurs. In terms of productive dynamics, since the mid-1970s, there has been a deepening of the productivity gap, that is, a shift away from local productive conditions regarding general conditions, in the context of the reversal of the dynamics achieved under the ISI (Graña, 2013). As can be seen in Figure 1, after the widening of the productivity gap with the beginning of the ISI, until the mid-1970s the gap remains relatively stable (even slightly decreases), and then widens again to historical levels<sup>19</sup>. If we add to this the growing participation in the world market of commodities produced in countries with low wages (Figure 1), it turns out that the need for compensation appears redoubled (although in a specific manner in each sector and stage of the production processes).

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<sup>18</sup> "(...) This abundant extraordinary mass of social wealth has systematically complemented the surplus-value extracted from the domestic working class to the point of marking the very specificity of the accumulation process in those national spaces. In other words, ISI policies are understood here as the necessary political form taken by the accumulation of capital through the appropriation of the ground-rent and a portion or the whole of small capitals' profits" (Grinberg y Starosta, 2009: 769).

<sup>19</sup> The use of the US to compare productivity assumes that country as a general pattern, "which is based on several issues. On the one hand, that country has had a preeminent role in the trends of the world economy, based on a relatively homogeneous industrial development. On the other, its firms are world leaders, which allows a very clear comparison regarding the distance that separates the national industry from the technological forefront. Although in the last time firms from other countries (Germany, Japan or South Korea) have shown a remarkable technical capacity, on average, the US continues to serve as a comparison pattern. In any case, if indeed the latter was delaying, the conclusions of this comparison will become more negative" (Graña & Kennedy, 2017: 96). Regarding the productivity gap, here we mark the evolution since 1935, the reference year. Thus, do not consider the gap in terms of value. In this sense, according to Graña (2015), by 2012 the labour productivity in the Argentine manufacturing was equivalent to 12% of the US, while in 1935, 1950 and 1970 such a ratio was 49%, 20% and 31%, respectively.

**Figure 1. Left: labour productivity evolution (left axis) (1935=100) and productivity gap evolution (right axis) (1935=100). Argentina and USA. 1935-2013 | Right: wages (all the economy) Argentina/USA, urban wages China/USA and hourly wages (industry) South Korea/USA. In Parity Purchasing Power Dollars of 2005. 1955-2013.**



Source: own elaboration based on BCRA (1975), BEA, CEPAL (1988), Graña y Kennedy (2008), INDEC-DNCN, Grinberg (2011), Monteforte (2016), SAE (1955) y Sánchez, Pacífico y Kennedy (2016).

At the same time, the consolidation of those international trends took place in a context in which, in general, the ground rent shows, until the beginning of the first decade of the current century, a stable level (and on average less than that of the previous period), even with marked contractions in the late 1970s and early 1980s (Iñigo Carrera, 1998 & 2007). On this basis, the scale of the accumulation process tended to stagnate in the last quarter of the 20th century (Kennedy et al., 2018). Within this context, although ground rent historically fulfils the central role described, since the mid-1970s two other sources of compensation appear: the external debt and the payment of the labour force below its value (Kennedy & Graña, 2010).

As in the case of other Latin American countries, the ISI process has shown a sharp decline since then. While only a few sectors have been able to have relative 'success', such as the steel industry or terminals in the automotive sector, in general, the production linkages have tended to simplification, reproducing the ISI process in an increasingly limited way (with less diversification and linkages) (Grinberg, 2016a). Under these conditions, the process of retraction of the national economy that began in the mid-1970s and was brutally carried out in a bloody and devastating manner by the civic-military dictatorship meant a profound deterioration in the living conditions of workers. Then, both the demand of labour force and the number of industrial capitals fell sharply, not only in absolute terms but also for the degree of integration and technical complexity (Azpiazu & Kosacoff, 1989; Azpiazu & Schorr, 2010; Graña, 2015).

Thus, the changes in global capital accumulation process had specific effects on the different countries within the context of the NIDL. In particular, changes in productive conditions that derived in higher productivity and the cheapening of a portion of the labour force have had differentiated effects on the economic formation of the countries according to the level of development of its productive structure (level of diversification and complexity) and the labour force features resulting in each case.

To sum up, here we want to state that the recognition of national specificities in the development of global capital accumulation allows identifying the potentiality for the

development of productive activities in a country from a general point of view<sup>20</sup>. However, taking that into account, it is necessary to approach the analysis of the specific form in which sectoral activities are carried out (or their potentiality) in each case. That is, the analysis of the international division of labour from the perspective of the sectoral configuration of production (Kaplinisky, 1989; Alcorta, 1999; Starosta, 2009 & 2010b; Grinberg, 2016b)<sup>21</sup>.

#### 4. The NIDL in the consumer electronics industry

In particular, the consumer electronics industry is strongly associated with the dynamics of the NIDL due to the scope that the relocation and differentiation in the exploitation conditions of the labour force have reached. The rapid expansion and profound changes experienced in the sector have made it one of the most dispersed globally in terms of the stages of the production process (Oikawa, 2011). As a result, an increasing number of links between firms and broad diversification of products have been established (Sturgeon & Kawakami, 2010)<sup>22</sup>.

The key aspect of that process of fragmentation and delocalisation was the development of standardised rules and 'codify' systems, electronic elements and production processes towards the 1970s and 1980s, in the context of an intense process of development of new commercial applications and devices. The main processes that have been codified, standardised and computerised are design, inventories and control of logistics, as well as aspects of the production process such as testing, inspection and handling of materials and equipment. These conditions allow the establishment of relationships among individual capitals with relative flexibility and speed (Sturgeon & Kawakami, 2010). In turn, the standardisation of parts and subsystems (such as chips and microprocessors) allow a greater 'modularity', as well as the growth of suppliers through the expanding of the scale of production (Sturgeon *et al.*, 2009).

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<sup>20</sup> Again, with this, it is possible to express how general dynamics have effects on the general evolution of a national economy, but obviously, the complexity of such processes does not finish with that (just the opposite). In order to complete the study of a national accumulation process, further research on different issues related to social reproduction must take place (since the general political form of that processes to social actors subjectivity). Within these complex phenomena, here the focus is on the productive conditions that play a central role in the evolution of a sector in a specific national economy.

<sup>21</sup> On this basis, we consider it possible to analyse the 'uneven development' of productive activities in different countries, through the recognition of their specificities in the context of the global production process unity, unlike other approaches -such as GVC- that focus on technical changes of the labour process but understate the general dynamics of capital accumulation that explain the organisational, spatial and temporal dimensions of such process (Starosta, 2010a & 2010b). In other words, instead of conceiving the NIDL as the process of production fragmentation, geographic delocalisation and further integration of production between firms, here we try to depart from the unity of social production and develop its current form of realisation through the aforementioned fragmentation and relocation. The first perspective has as starting point the national conception of the capital accumulation process and its subsequent interaction in the world market -through the 'strategies' of leading firms and national states- (see for example Whittaker *et al.*, 2010).

<sup>22</sup> The electronics industry considered as a whole includes from the production of raw materials and inputs for the development of electronic components and equipment to the provision of services related to the use of electronic equipment and systems. Usually, these activities are grouped into different segments, such as industrial electronics, telecommunications or consumer electronics. This work tries to focus on the activity of consumer electronics, that includes a wide array of products such as semiconductors, computer hardware, software, storage systems, simpler electronic components, mobile telephone handsets, tv sets, audio and video equipment, etc.

Two additional aspects that are central in the organisation of production within this sector are, on the one hand, the transportation of components and final products -with high value/weight ratios and, therefore, lower relative costs of transportation-. On the other hand, the standardisation of the machinery. For example, the same automatic insertion line can be programmed to mount the components into different kinds of printed circuits boards for different products (Sturgeon & Kawakami, 2010). Similarly, the assembly lines of the products present a large component of modularity, while the same line can be easily adapted to assemble various devices (Paniagua & Sánchez, 2015).

On this basis, the individual capitals of the sector can participate in the production of different products, without the need to carry out jointly the production stages, and also the simpler stages can be replaced easily (Sturgeon & Kawakami, 2010). Thus, a trend towards the relocation of manufacturing activities was established (first equipment and components and then some aspects of design) as opposed to those of design and innovation.

Widely, it is possible to divide the productive process of the consumer electronics industry into three stages: design, research and development; manufacturing of components and printed circuits boards, which are assembled in subsets; and assembly of final products, which fundamentally involves assembly tasks of components and parts, quality control and packaging.

#### *4.1. The origins of the NIDL in the sector (the relations between US, Japan and South Korea firms)*

The development of the semiconductor industry played a key role in the configuration of production under the NIDL in general (in the context of the expansion of the microelectronics revolution and the automation of production processes) and for the consumer electronics industry in particular since the late 1950s and early 1960s. This was particularly relevant in terms of technological changes and their implications on the skills required from the labour force. On the one hand, the development of machinery (automation) simplified the direct intervention of the labour force (manual tasks) related to the transformation of materials, on the other, increased its complexity and the necessary knowledge for the development and organisation of production. In turn, in several cases, the tasks of assembly, testing and packaging were kept manual -for example, for electronic components, and also for applications and equipment- (Grinberg, 2011).

The semiconductor industry was developed in the years after the Second World War, closely linked to the US military sector (Keller, 1983)<sup>23</sup>. By the 1950s the transistor was already widely used in commercial applications (both consumer electronics, computing or capital goods) and, by the beginning of the 1960s, the transistor was replaced by the integrated circuit (the combination of several transistors in a single system) as a result of the development of materials and machinery (Grinberg, 2011).

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<sup>23</sup> As Keller (1983) points out, by the mid-1960s, sales to the Department of Defense and the National Aeronautics and Space Administration represented approximately 60% of sales in the US electronics industry.

The rapid expansion since the 1960s in the semiconductor industry allowed this activity (unlike other sectors such as textiles and apparel) to grow in both 'classical' and 'developing' countries (Keller, 1983; Snow, 1983). In this context, since the mid-1960s, there has been a process of internationalisation of industrial production in the electronics industry (both through FDI and subcontractors), in which low-wage countries concentrate labour-intensive operations. However, even within the US, the development of a new division of labour in the electronics industry began, with its focus in Silicon Valley (Keller, 1983; Snow, 1983). Snow (1983), while recognising the marked migration of the simplest stages of the production process, states that the number of jobs in the sector grew 64% between 1964 and 1978. However, the percentage of production workers and its absolute number decreased, while the increase was in those categories of higher qualifications (technicians and engineers)<sup>24</sup>.

This trend gained momentum towards the end of the 1960s and the beginning of the 1970s with the consolidation of the migration of labour-intensive processes abroad, and the accentuation of Japanese firms competition (as we will see below)<sup>25</sup>. In this context, wages in the US for the sector did not follow the pace that showed in other industrial branches. In turn, the percentage of workers who integrate ethnic minorities among the lowest-skilled workers increased considerably -usually women of Latin and Asian origin- (Katz & Kemnitzer, 1983).

In the case of San José, the core of the sector development in the US, the number of low-skilled workers almost doubled between 1966 and 1978, although its percentage in the total fell from 49% to 35%. Thus, the high-skilled workers (technicians and engineers) increased more than the rest and, therefore, their weight in the total. In San José, low-skilled workers accounted for 35% in 1978, while at the national level they represented 63%. Despite this, since the mid-1960s they grew in San José and decreased in the rest of the country. Therefore, as Snow (1983) concludes, in those areas of the US where routinary tasks (such as assembly) were historically concentrated is where the impact of the offshoring of production was also concentrated. In the opposite direction, the dynamic centres (research and development) were the US counterpart of the NIDL in the electronics industry. In turn, the wages for low-skilled workers fell in relative terms, widening the gap with professionals and technicians within the sector (Keller, 1983).

So, along with the delocalisation process, in the US also experienced a growing differentiation of the working class according to the different stages of the production process. Keller (1983), on the one hand, recognises high technical requirements for research, development and production control activities; and, on the other hand, aspects of the production process still linked with labour-intensive tasks, due to the limits to automate some

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<sup>24</sup> In the metropolitan areas of San Jose and Boston -the most dynamics-, due to their relative growth in the analysed period, the fall of the production workers number is not observed. In fact, in these cases (especially in San Jose), the total number of workers grew in general, even for the less-skilled workers. However, the percentage of those workers did decrease considerably. Thus, on the one hand, the fall in the number of less-skilled workers happened in other regions of the US (oriented towards routinary tasks) and, on the other, the most dynamics areas concentrate on the significant part of qualified workers (areas that are the core of research and development and business management of the sector) (Keller, 1983; Snow, 1983).

<sup>25</sup> For example, Snow (1983) highlights the growth of trade flows (imports of tubes, transistors and semiconductors).

manual activities. Hence, these tasks were carried out manually and did not require previous experience or formal training for their performance ('easily learned on the job').

Among the reasons for a considerable part of the production staying in the US despite the NIDL it is possible to identify the rapid change in products (which requires greater proximity between engineers and the production line) and the high percentage of production purchased by the military sector (research and development and manufacturing activities that could not be done outside the country -security sensitive production-) (Snow, 1983)<sup>26</sup>. Contrary, for commercial electronics products, it does apply the 'general case'. In fact, between 1950 and 1968 the portion of industrial production in the US sold for private consumption fell approximately from 56% to 21%. Even within the US, the location of production operations was in regions with lower wages, greater availability of labour force of Mexican origin and less presence of unions (California, Texas and Arizona) (Snow, 1983).

In Asia, employment also concentrated on young workers, particularly women, with low skills and on labour-intensive tasks<sup>27</sup>. According to Grinberg (2011), the existence of wide availability of cheap and highly disciplined labour force, allowed Japanese capitals emerged in the semiconductors sector towards the end of the 1950s, as producers of simple transistors, mainly used in the manufacture of radios for export. However, since the 1960s, Japanese capitals have increasingly been concentrated in more complex industrial branches and productions (Chibber, 1999). In particular, with the development of microelectronics, the manual assembly of printed boards and electronic components begins to take place in Japan, together with relatively more complex tasks (research and development for technological application), thus forming a collective labourer in the industry of applied microelectronics that begins to integrate portions of productive subjectivity of more significant development (Iñigo Carrera, [2003]2013).

In this context, US firms responded to the competitive pressure of Japanese firms and began to move (or subcontract) their stages of assembly (and testing) of (simple) semiconductors to East and Southeast Asia, where it was possible to find a labour force with similar features but cheaper than the Japanese. Then, a similar process of relocation took place in the production of integrated circuits (when these became the most widely used semiconductor device). The low transportation cost of these products also played a role in this process<sup>28</sup>.

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<sup>26</sup> Keller (1983) observes that a group of firms maintained production facilities in the United States (also in Europe). She argues that the five major US semiconductor firms maintained almost as many production plants in three states of the United States (California, Arizona and Texas) as in all of Asia.

<sup>27</sup> "To take one example, in Malaysia the electronics industry recruits young women directly from agricultural villages to work in large plants, with intense labor discipline and dormitory residence the factory writ large (Grossman, 1979)" (Katz y Kemnitzer, 1983: 343).

<sup>28</sup> The manufacture of integrated circuits already showed a clear trend towards the automation and robotisation of machinery by the 1970s. Increases in productivity in the 1960s and 1970s occurred in the form of greater miniaturisation of the components and an increase in the size of the silicon wafers (which allows obtaining a higher number of integrated circuits). Continuous improvements in the precision of the machinery were also developed with the introduction of greater automation. On the other hand, the tasks of assembly continued being work-intensive: the cut of the wafers to obtain the individual integrated circuits (chips); the assembly of integrated circuits; and the encapsulation. Then, the components were integrated into printed boards to form the electronic systems that control devices. These tasks still required human intervention to control and manipulate the materials (for example, cable joints). In fact, by 1976, practically all the machinery used in this stage of production were not



In particular, it is important to highlight that the rise of wages in Japan -product of the development of the productive attributes of the labour force and its relative scarcity- and the continuous development of the technical conditions of labour processes (automation of the machinery and robotization of the assembly line), enabled the accomplishment of successive tasks by workers who had the necessary productive attributes and were cheapened in relation to the Japanese worker (Chibber, 1999; Grinberg, 2016b). Thus, among other countries, South Korea appears as a new source of labour force able to carry out the simplest activities that begin to become more expensive in Japan (Grinberg, 2011 & 2016b). In this way, by the mid-1960s, a set of productive activities previously carried out in Japan to supply the world market began to be deployed in South Korea. This process took place in the form of a triangular relationship between the United States, Japan and South Korea, in which Korean capitals imported Japanese products while having access to the US market to sell their products (Chibber, 1999; Billoti, 2010; Whittaker et al., 2010).

In South Korea, the electronics sector began to develop under the ISI process with the assembly of vacuum valves for the production of radios, which began to be exported to the US by 1962. After some years of growth in the exports, in 1966, the first promotional law for the electronic industry was approved (which was one of the central sectors of the Second Five-Year Economic Plan of 1967-1971) (Grinberg, 2011)<sup>29</sup>. In 1965, Komi became the first plant of foreign origin to start producing in South Korea by manually assembling transistors and diodes, and in 1967, Fairchild also established an assembly plant (Grinberg, 2011).

In the following years, the Korean government reinforced support for the sector, for example, with an eight-year plan for its promotion (1969-1976). All of this aimed to develop semiconductor manufacturing for the emerging sector of consumer electronics in the country (which was still mainly imported from Japan). In this context, the production of parts and components rose rapidly, along with the electronic industry as a whole<sup>30</sup>. However, although production began to integrate beyond the final stage and the Korean government reinforced its policies for the development of the sector in the second half of the 1970s, by the mid-1980s the semiconductor industry continued to concentrate on the production of simple products for low value-added consumer electronics products (Grinberg, 2011).

After a new set of promotional plans, from 1984 to 1991 there was an intense process of investment in production plants by the leading local firms (annual growth of 45%), in which equipment (machinery), know-how and chip design were imported or purchased under licenses of the US or Japanese firms. Like Japanese companies in the past, Korean companies began to specialise in the production of standardised integrated circuits (DRAMs). Towards the mid-1990s the efforts were focused in the development of productive attributes of the labour force to carry out more complex tasks, at the same time that the Korean firms established

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fully automated. Similarly, in the manufacturing stage of electronic equipment, human intervention was still relevant in the assembly (and welding) of integrated circuits and other semiconductors and components in printed boards (Snow, 1983; Grinberg, 2011).

<sup>29</sup> For more detail on the institutional framework created in South Korea related to this industry, see Grinberg (2011).

<sup>30</sup> The concentration of production was in Massan EPZ, where union activity was prohibited (Grinberg, 2011).

themselves as the main producers of this product at a global scale, displacing Japanese firms (Grinberg, 2011). The crucial aspect for that upgrading, as analysed by Brown and Campbell (2001) and pointed out by Grinberg (2011), was the development of automation in the handling of materials and information in the 1990s, that allowed to reduce the qualifications requirements for technicians and operators in semiconductor manufacturing, by increasing routinary aspects and decrease the intervention in decision making.

One of the aspects highlighted by Grinberg (2011) is that, along with the technical change in the sector, the specific aspects of the Korean capital accumulation process, in particular, a cheapened and disciplined labour force, presented material conditions that allowed their insertion in the beginnings of the NIDL. Then, on that basis, also participate in the deepening of that process with a specialisation in specific sectors and products. Thus, Korean firms (like the process experienced in Japan decades ago), began to integrate and move towards more complex products or more complex stages of production (knowledge-intensive) (Whittaker *et al.*, 2010)<sup>31</sup>.

#### 4.2. *The general dynamics of the NIDL and the 'current' configuration of production in the sector*

The configuration of production resulting from those processes contributed to the rise in labour productivity in the most developed countries in the electronics industry and the concentration therein of employment of the high-skilled labour force in charge of research and development and design of products, as well as the increasing incorporation of a relatively cheaper labour force for the realisation of processes of lower relative complexity (Snow, 1983; Nochteff, 1984).

The individual capitals that shape the sectoral production are usually identified in three groups (Sturgeon and Kawakami, 2010): leading firms, contract manufacturers and platform leaders. The leading firms are located in the countries with the longest tradition in the sector such as the US and Japan (or more recently such as South Korea and China) and perform tasks related to the design and development of products. At the same time, they are the owners of brands and in most cases are responsible for the trade of the products. These capitals determine the products to be elaborated and specify processes through production agreements in order to control the dispersed production process (Starosta, 2010a & 2010b). Contract manufacturers usually focus on manufacturing (production services): purchase and insertion of components, assembly, testing and packaging. They are identified as EMS (electronics manufacturing services) or OEM (original equipment manufacturing); while those that also carry out design activities are known as ODM (original design manufacturing). These firms take in charge the purchase of components (generally to suppliers indicated by the leading firms), and the subsequent assembly of the devices. The platform leaders are firms that develop key products (such as software or components) and, depending on the role they acquire, can dispute 'power'

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<sup>31</sup> Along with the development of leading firms in the classic countries, Japan and South Korea, the other case usually referenced is Taiwan, where subcontractors manufacturers of components and assemblers were established. Although not presented here, these capitals increasingly incorporated a wide array of tasks, from the purchase of components to design. As in the cases mentioned in the text, the concentration of the production of these subcontractors gave rise to the term giant global contractors (ECM) (Starosta, 2010b, Sturgeon & Kawakami, 2010).

with the leading firms, especially when their products are cross-cutting and key in the industry (as in the case of Intel)<sup>32</sup>.

As has been noted in the cases of Japan and South Korea, with the successive changing in the technical conditions of labour processes, a *gradient* of productive subjectivities (increasingly complex) begin to participate in the NIDL outside of the classical countries (where the more complex productive subjectivity continues to be developed). In other words, the complex work begins to move towards the East Asian countries that first developed within the framework of the NIDL, and the same does the simple work towards the countries that are incorporated later.

Thus, the ISI processes reach 'completion' in Japan and South Korea (although to a lesser extent, since it continued to depend on Japanese imports of machinery and components), countries that manage to locate themselves as exporters of machinery, transportation equipment, electronic equipment, etc. Furthermore, the countries that joined in later (Thailand, Vietnam, Malaysia, Indonesia, Bangladesh, among others) are immersed in a deeper competition (to a greater or lesser extent) by the sale on the world market of less complex products. The only country that seems to break with this dynamic since the 1990s, but mainly in the 2000s, because of its scale of production, is China.

As part of this process, but contradictory to the general trend, the form in which the consumer electronics sector developed in Argentina presents barriers for the use of forefront technologies and, therefore, for its international competitiveness. In this general context, the production particularities of this sectoral activity derived in a specific form of reproduction within the Argentine economic structure.

## **5. The consumer electronics industry reconfiguration within the limits of the ISI process in Argentina**

The current configuration of this sectoral activity in Argentina is the result of a process that, in its origins, responded to the migration of firms operating in the metropolitan area of Buenos Aires to the southern Province of Tierra del Fuego, Antártida e Islas del Atlántico Sur (in those years Territorio Nacional and onwards, TDF). Such migration took place in the years following the creation of the Fiscal and Customs Promotional Regime of Law 19.640 in 1972 (Nochteff

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<sup>32</sup> For the unfolding of the determinations of the differentiation of capital within the sector from the perspective of the global capital accumulation process, see Starosta (2009 & 2010b). Starosta (2010b) highlights the trend (transition) towards the concentration of manufacturing in the sector with the emergence of global contractors (ECM) (which replace the small capitals concentrated in work-intensive assembly), that became large firms at the international level (with their own strategies of fragmentation and delocalisation of productive processes). This concentration allowed to reverse, at least partially, the subordination relationship of the contractors with leading firms. However, the leading capitals maintain the capacity to coordinate the activities of the sector (systems integrators) necessary to carry out production. For example, the conditions imposed by leading firms about suppliers and prices, as well as for commercialisation of final products. These phenomena have been highlighted as a form of appropriation of surplus-value by such leader capitals (Starosta, 2010b). The mentioned transition finds its basis in the new technologies for the assembly of printed circuits that limited the reproduction of small capitals in the sector. That is, "*the upgrading of externalised segments is a later phenomenon reflecting subsequent technological changes and opportunities for scale economies. At the very moment of outsourcing, those functions were indeed 'low-profit'. This should come as no surprise given the original inner purpose of outsourcing by 'lead firms' commented just above*" (Starosta, 2010b: 551).

1984; Roitter, 1987; Azpiazu, 1988)<sup>33</sup>. Towards the mid-1980s, with such process fully deployed, almost all the production of the sector was located in TDF (Roitter, 1987; Azpiazu, 1988; Filadoro, 2007). Along with this migration process, there was a change in the productive process of local firms, which became concentrated in the final stage of the productive process (assembly), characterized by a high weight of imported inputs and a supply that is essentially addressed to the domestic market (Nochteff, 1984 & 1992; Azpiazu, 1988; Cimillo & Roitter, 1989; Filadoro, 2007; Moya et al., 2012; Paniagua & Sánchez, 2015; Sánchez, 2018)<sup>34</sup>.

More specifically, the productive process carried out by the firms located in TDF is the final stage of the production of electronic devices. According to the tasks developed, it is possible to identify two production organisation systems in this stage: Completely knocked down (CKD) and Semi-knocked down (SKD). The CKD system involves the reception of all the components and parts necessary to produce a product separately for later assembly. This process begins with the automatic insertion of the components in the printed circuit boards (surface-mount devices or SMD process). Once the boards leave the automated insertion line, they are finished by a manual insertion phase of components, due to the impossibility of inserting them automatically (at least with the technology used for these firms). Then, the boards with the mounted components pass through the assembly line of the product, where the final assembly of the equipment takes place, in addition to software load and testing, quality controls and packaging activities. Otherwise, the SKD system implies that components and printed circuit boards enter the production process as already integrated subassemblies, which are directly assembled to obtain the final products. In general terms, in the assembly lines are performed tasks of cutting and preparation of materials, assembly, software load and testing, quality controls, packaging and some complementary processes<sup>35</sup>.

### 5.1. *The transition towards the current local conditions of production*

In the years before 1975, the productivity of consumer electronics terminals in Argentina had grown steadily. However, the prices of domestic electronic devices were still much higher than the prices of the same products in the international market (Nochteff, 1984). In turn, in

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<sup>33</sup> The Fiscal and Customs Economic Promotion Regime created in 1972 by Law 19.640 (from now on, the promotion regime) comprises practically all the firms of the consumer electronics sector in the country. This regime focusses on a set of exemptions and regulations in fiscal and customs issues that include all the economic activities carried out in TDF. The main promotional benefits of a general type for the industrial capitals operating in the Special Customs Area created by law are the exemption of national taxes and taxes on imports of inputs and capital goods. For a detailed overview of the promotion regime, see Garófalo (2004), Government of TDF (2011) and CFI (2013). In turn, it should be clarified that, as is usual, here we refer as 'Regime of economic promotion of Law 19.640' to a broader set of regulations, complementary and amending.

<sup>34</sup> In its beginnings, and until the crisis that marked the end of the currency board regime in Argentina, the production in TDF focused on TV sets, audio and video equipment and radios. However, in the later period, the production experienced an important growth and diversification, the most relevant being telephone handsets, TV sets and PCs. This new dynamism implied, among other issues, a significant growth of imports of inputs used by firms in their production processes (Paniagua & Sánchez, 2015).

<sup>35</sup> In some cases, the layout of the assembly lines used in the successive stages of these systems is part of the production agreements maintained by local firms and leading firms. At the same time, these agreements usually include a set of requirements for quality standards, arrangements for the use of components and additional processes.

those years, two phenomena associated with the sector took place. On the one hand, the process of developing applications and electronic products in the consumer segment led to the introduction and consolidation of the colour TV sets, an aspect that increased the productivity gap that existed up to that time between national firms and those that produced to the world market (Roitter, 1987; Cimillo & Roitter, 1989; Filadoro, 2007), given that this product was not produced locally. On the other hand, the general changes in the organisation of sectoral production meant a growing wage differential, especially with the relocation of manufacturing.<sup>36</sup> On that basis, the context of trade openness and overvaluation of the national currency towards the end of the 1970s and early 1980s abruptly tightened the possibilities of reproduction for national firms in the form it had taken until then.

Before 1976, the firms produced mostly black and white TV sets in terminals that were supplied by local firms. It was precisely the consumer sector the centre of the activity within the local electronic equipment industry production (73% in 1976), while the production covered 96% of the domestic market of electronic consumer goods (Nochteff, 1984). In addition to the assembly tasks, the processes carried out by the terminal firms focused on product design and technical developments, by adjusting technological innovations in the branch to local consumption, with high use of national inputs (Nochteff, 1984; Roitter, 1987). This dynamic found its basis on the protected domestic market under the ISI, in the form of tariffs and import prohibitions. Indeed, in June 1976 the rates for TV sets and radios were 200% and for the other consumer electronic products 140%. At the same time, since 1971, a series of import prohibitions covered a broad spectrum of consumer goods, including electronic ones (Nochteff, 1984).

The policy that began the opening of the market for consumer goods was Resolution 292/76 established by the civic-military dictatorship, which repealed all existing import prohibitions, while a series of general tariff reductions began, together with reductions or elimination of specific fees. According to Nochteff (1984), after the trade opening, the cost of importing electronic products compared to December 1976 was: for consumer products, 54% lower in June 1978, 78% lower in June 1980 and 67% lower in June 1982; for inputs and printed circuits, 63% lower in June 1978 and 82% in 1980; for the rest of the electronic components, 72% lower in June 1980. Although the prices of inputs of national origin also decreased in real terms in that period, they did so in a much smaller proportion than the imported ones. Thus, in June 1980, the cost of an imported subset for a consumer device had been reduced by 75% compared to a national subset concerning the situation of December 1976.

It that context, the production in TDF, subject to the conditions of the promotional regime, became a real possibility for survival for the firms of the sector, by adapting to the productive scheme of the branch on a global scale. So, previously, it was necessary to transform the local production process. However, this process of productive transformation was possible only for a part of the firms of the sector. The cheapening of imports of final and intermediate products had direct effects on small capitals, which were not specialised in the production of black and white TV sets. These firms were the first to be affected and, due to the fall in the protection of

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<sup>36</sup> For example, in 1975 the production of TV sets in Argentina was approximately 420 thousand units (550 thousand in 1974) compared to 178 thousand produced in China. While in 1985 the production in China, with more than 4 million units, already exceeded several times the registered in Argentina.

consumer products, they abandoned their production relatively quickly in order to (in some cases) import products. On the other hand, the most relevant firms (mainly black and white TV sets terminals) would also abandon their production as they had carried out until that moment, but in a 'gradual' form and as a transition to the general productive conditions of the branch mentioned above.

Initially, with the reduction in the price of imported products resulting from the trade opening and the overvaluation, the terminal firms replaced domestic inputs with imported ones. However, when those were no longer adaptable to the products designed in the country (in a context in which it was not possible to change the design of the products), a limit was presented to the valorisation on that base. In this way, some of these firms began to abandon their production lines and, in some cases, also began to import finished products. The result of this process on the terminal firms was that of the 14 leading firms in 1976, by 1982, practically all had abandoned the manufacture of their previous products. In turn, of the 12 firms that were active in 1982 between 8 and 10 in that year imported the products that they manufactured years ago, as well as other electronic consumer products that were not produced in the country (Nochteff, 1984).

At the same time, in the years after 1976 (more precisely in 1980) the colour TV broadcasting service was incorporated in Argentina, a product that was not commercialised in the country. As we will see, it was in the context of the insertion of these new products that the change in the organisation of production and the migration to TDF occurred. So, although the terminal firms were leaving aside the production of black and white TV sets or radios, under certain conditions, it was viable the production of colour TV sets considering the effective level of protection towards the end 1970s<sup>37,38</sup>. So, the terminal firms began to produce colour TV sets (then incorporating other products such as audio and video equipment), focusing on the assembly of products, with a high ratio of imported inputs for third-party brands and under the current relationship scheme in the branch (Nochteff, 1984; Azpiazu, 1988; Cimillo & Roitter, 1989).

The lack of local suppliers for new products was a crucial aspect in adapting the production process to the conditions of valorisation of the TDF promotion regime, which determined the beginning of migration and production under licenses (Roitter, 1987). Thus, the change in the production process occurred in parallel to the relocation of production. Only in this context did the promotion regime provide a real possibility for those capitals that could continue producing (terminal firms), given the impossibility of reproducing itself under the previous conditions and the possibility of obtaining an advantage for its valorisation when relocating to TDF under the conditions of the new productive scheme. That is, the SKD or CKD system to produce colour

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<sup>37</sup> According to Nochteff (1984), there existed at that time a series of conditions that differentiated the markets of colour and black and white TV sets and would have played in favour of the production of the former. In particular, he mentions the fall in the prices of black and white TV sets on the international markets and the still concentrated production of colour TV sets in the 'traditional' countries of the sector.

<sup>38</sup> The tariff structure (Res. ME 751/79) presented much lower levels than those in force before 1976. In turn, in the previous situation, the tariffs for parts and components were similar to those for consumer goods, but now markedly inferior. On the other hand, the new tariff structure implied greater protection for the colour TV sets, concerning that of black and white TV sets.

TV sets, given that, as Nochteff (1984) notes, these were the only two possible alternatives for the organisation of production in the face of the productive trends of the branch<sup>39</sup>. Once the migration process was completed, the sectoral activity in the metropolitan area of Buenos Aires practically disappeared. Besides, other firms linked to the trading of the products also established production plants in TDF (Cimillo and Roitter, 1989).

Based on the results of the Economic Census of 1973 and 1984, Roitter (1987) highlights the lower complexity and integration of the productive processes carried out in TDF with respect to those previously carried out in Buenos Aires (mainly in terms of industrial and design capabilities developed under the ISI), in addition to the considerable loss of job positions (from 13,000 to 4,400 between 1974 and 1980, Nochteff -1984-) and productive establishments, which was particularly intense at the level of small firms (72% of the total between the two census).

Concerning this set of small capitals that previously supplied the terminal firms, as we have noted, they experienced a notable setback and, in many cases -particularly those that produced electronic components-, did not manage to keep themselves in production (Azpiazu *et al.*, 1990)<sup>40</sup>. In this case, the greater exposure to the conditions of competition of the world market did not leave room for productive adaptation (because these firms were specialised in the production of inputs for the no longer manufactures designs of the terminal firms) nor to the compensation of the higher costs through promotional benefits<sup>41</sup>. On the one hand, because one

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<sup>39</sup> Beyond the higher transport costs derived from producing in TDF and (nominal) wage levels of TDF relatively higher than those prevailing in the metropolitan area of Buenos Aires, the productions that will best adapt to the conditions necessary to produce in TDF will be those that present lower relative costs of transport, higher organic compositions of capital (less weight of the labour force in the advanced capital) and that, at the same time, have high levels of sales (possibility of appropriating more significant benefits as taxes) and high tariffs on imports together with a high percentage of imported inputs and fixed capital goods. Accordingly, it is possible to affirm that the particularities of the local productive process of consumer electronics present relatively favourable conditions for adaptation to such conditions (Filadoro, 2007). On the one hand, the wage differential for producing on TDF has a relatively small effect on the costs of the firms, since the processes carried out there are in many cases automated and the inputs of the products have a high value per unit. The weight of the total wages in the Gross Output for the most representative firms of the sector was 9.2% in 2012 (Paniagua & Sánchez, 2015), -9.9% in the cost price-. In the same sense, beyond the long distance and the problems associated with transport (Paniagua & Sánchez, 2015), the high value/weight ratio of the electronic components and products make the transportation cost relatively low in the cost price of the products (Sturgeon & Kawakami, 2010). On the other hand, the relevance of the import tariff exemption will be higher when the imported inputs and the tariff of such products are higher. While the level of tariffs has lost relevance over time, the high level of imported inputs continues to the present. According to Paniagua & Sánchez (2015), the imported inputs of the firms located in TDF represented an average of 77% of the Gross Output for the period 2000-2014. In turn, although national taxes can be thought of as transversal to any sector, those sectors with high levels of sales (mass consumption) will benefit most (in absolute terms). In summary, it is possible to affirm that the conditions of the stage of the production process taking place in TDF, show that the firms of the sector have a higher relative capacity to valorise their capital under the conditions imposed by the promotional regime.

<sup>40</sup> According to Nochteff (1984), of the eleven main electronic components firms that operated in 1976, five had disappeared in 1982, among which were the three largest. Of the remaining six, three had reduced their productive capacity to less than a third and a fourth (the firm with the best technological capacity) operated with more than 50% idle capacity.

<sup>41</sup> The fact that the productions that were addressed to supply the terminals have disappeared after the migration, does not necessarily imply that all of these firms have disappeared, while some may have been converted at that time to other linked productions, for example, to supply fixed capital goods terminals in the industrial electronics sector (Nochteff, 1992). As Nochteff (1992) points out, towards the end of the 1980s, there were 39 companies in the electronics sector that made components (although with minority participation in sales). In any case, the impact was particularly relevant for these capitals.

of these benefits is the exemption of import tariffs; on the other hand, given that the production process with the productive features adopted in TDF is subject to the requirements of the leading firms, in a context of greater technological complexity with standardised products and processes. These aspects implied a growing distance from the prevailing general productive conditions in the sector (Roitter, 1987; Filadoro, 2007). The form of adaptation to the current relationships of the sector was only possible in the final stage of the production process, with a simplification of tasks and in the context of high protection for final products<sup>42</sup>.

In order to sum up, before the transformation of the production process towards the end of the 1970s (which is expressed in the beginning of the production of colour TV sets) the benefits of the promotional regime did not necessarily constitute a sufficient compensation to attract settlements in TDF: besides that until 1976 the import tariffs of inputs and capital goods were upper 90% (and therefore the tariff exemption in TDF was not total), until that year the production of consumer electronics was integrated locally, so the need for skilled labour force (and the consequent higher weight in production costs) and geographical proximity with suppliers, forced to operate in a relatively high industrial developed area. The tax advantages could not compensate for the higher costs resulting from operating in TDF under such conditions since tariff reduction was not an essential factor as the firms did not import their main inputs (Nochteff, 1984). After the change in the production process, the high ratio of imported inputs and capital goods, together with the simplification of tasks and the lesser need to coordinate with local suppliers, allowed these firms to consolidate as the central sector under the TDF promotional regime.

Over time, the productive dynamics of the firms show a markedly irregular evolution (Figure 2), and a trend of less dynamism concerning that observed in the countries that concentrate the sectoral activity: both, in those in which the activity developed more 'recently', such as South Korea and China, where labour productivity in the consumer electronics sector shows a growing trend in recent decades, with increases of 55% between 1999 and 2013 in the first case and 239% between 1995 and 2011 in the second; as well as in 'traditional' countries in the industry, such as the US, where labour productivity in the manufacture of electronic products increased by around 100% between 1998 and 2013<sup>43</sup>.

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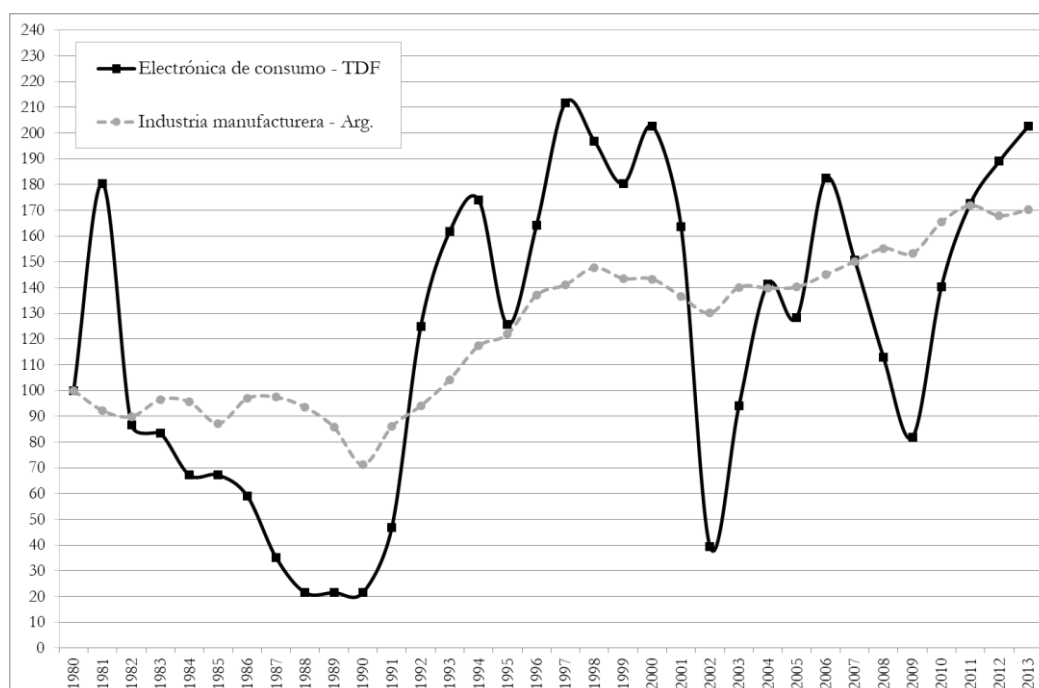
According to Azpiazu, Basualdo & Nochteff (1990), this process caused the virtual disappearance of the producers of inputs within the sector, in such a degree that between 1974 and 1983 the production of components was reduced by 91%. Nochteff (1984) makes an extensive analysis of the relationships between terminals and the local industry of components and parts. In this sense, it is important to note that, depending on the designs of the terminals in a protected market, the firms producing components were, to some extent, captives of those terminals.

<sup>42</sup> In this sense, in the face of the impossibility for the terminals to continue linking up in the circulation with the small capitals that previously supplied them, it is possible to recognise another specific aspect of the national economy according to which the capitals of the sector find an additional factor for the migration of the activity. Not only because in the new conditions the need to be close to suppliers is unnecessary (and as a counterpart, the higher proportion of imported inputs expresses an advantage for the recovery in TDF). Also, the terminal capitals lose the possibility of appropriating extraordinary profits that arise from the relationship in the circulation process with small capitals provided them (Starosta, 2009 & 2010b).

<sup>43</sup> The sources for the estimation of the series are NBSC, KOSIS, BEA and BLS. In the text, we mention the periods in which it was possible to reconstruct the data. In the cases of South Korea and China, the series include the production of components and parts.



**Figure 2. Evolution of labour productivity for the consumer electronics industry in TDF and manufacturing, Argentina. 1980=100. 1980-2013.**



Source: own elaboration based on Aduana, Anuarios Estadísticos de TDF, Graña (2015), INDEC, Nochteff (1992) and MTEySS-OEDE.

Beyond the relative level of labour productivity and the complexity of the products and stages of the production process, the smaller scale and the irregular dynamics observed at the local level can be located, on the one hand, in the limited scale of the market that local firms supply compared with the capitals that produce for the world market (an aspect that is intensified when products have rapid change) and, on the other hand, in the strong dependence of production on the cycles of the national capital accumulation process, the flow of promotional benefits and policy regarding foreign trade.

In this sense, Nochteff (1984) already pointed out that the location of the activity in TDF was only sustainable if three conditions were ensured: tariffs on imports for consumer electronic goods; exemption from import duties for inputs; and a high ratio of imported inputs in the production process. Since then, far from reversing such conditions, a series of additional benefits and protections have been incorporated, which only reflects the growing need for compensation of the firms.<sup>44</sup>

<sup>44</sup> Even so, that aspect does not deny that, being a 'closed' regime with access to the domestic market, the existence in different periods of tariff or para-tariff measures for consumer goods, allows capitals to access extraordinary profits (phenomenon already evidenced towards the end of the 1980s and early 1990s: Azpiazu & Nochteff, 1987; Azpiazu, 1988; Nochteff, 1992). At the same time, although the capitals established in TDF are mostly of national origin, the 'leading firms' of the sector, by replicating the configuration of production at a global scale, but adapted to the specific conditions of the promotional regime, could find a way to participate in the promotional benefits and the extraordinary profits without the need to settle themselves in the country, rather than for the trade, administration

## 6. Conclusion

In the first place, this paper tries to establish (on a preliminary basis) the analytical framework considered necessary in order to account for the analysis of sectoral production organisation, starting from the perspective of the general determinants of the international division of labour in the capitalist mode of production. This phenomenon was addressed, analytically, from those aspects related to the organisation of production within productive sectors (technical change and specific dimensions of analysis, as well as the capital differentiation process) and those related to the spatial organisation of production, where the form of participation of countries in the international division of labour plays a central role.

Thus, through the development of the inner laws regulating the indirect social relations in the capitalist mode of production, the paper aimed to contribute to the explanation of the novel configuration of production in the consumer electronics industry over different countries, since the beginning of the so-called NIDL. In a context of successive technical change, different production stages started to be carried out in some countries (i.e. South Korea), stop to taking place in others (i.e. the United States) and were limited in others, such as the ISI process in the Argentine case. On the other hand, the jump to more complex stages in Japan and South Korea found its basis on the potentiality that the simplest stages of the production process had acquired, being the firms in those countries able to supply the world market. Then, on that basis and the progressive technical changes, local capitals were enhanced towards upgrading processes. Unlike that, considering the structural conditions in which the activity had developed within the Argentina ISI process and the specific evolution of the capital accumulation process, sectoral activity in Argentina experienced a deep retraction in the degree of integration and complexity.

This temporality has been a critical aspect in the form that the NIDL process takes in different countries. Depending on the historical conditions of development in the reproduction of the labour force and the economic structure in each country -and considering the subsequent transformation of the material features of the labour processes-, different regions/countries have been able to participate in that process with a greater or lesser extent, according to that temporality. The international fragmentation of the productive subjectivity of the labour force (the NIDL) corresponds to the different specific potentiality for the accumulation of capital (as well as the productive activities that can take place in such countries in each moment and place), as aliquots parts of the global capital accumulation process. It is in this fragmentation on a global scale that the process of development of each region/country finds its 'potency' or 'limit'.

As a result of the limited nature of this growing fragmentation and the resulting competition in the world market, national development processes begin to narrow and intensify

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and management of the products. From another perspective, this aspect has been identified by Azpiazu & Nochteff (1987) and Nochteff (1992), who identify the possible existence of transfer prices in the purchase of imported inputs (among other issues associated with the transfer of technology). This dimension, which has not yet been developed for the sector at the local level, will be analysed in a future study.

over time and to be limited to a smaller set of activities. Such is the phenomenon evidenced by Whittaker et al. (2010) as 'compressed development', although instead of posing the focus on the general dynamics of the global capital accumulation process and its particular expressions within each country, they see it as the 'intelligent insertion strategy' within the context of the GVCs.

In order to grasp these phenomena, we consider that the former approach permits advance in the comprehension of the potentiality that, within different national economies, have the development of different branches of production, as a necessity of the capital accumulation process. Thus, also from the perspective of the configuration of production, raising the question about the needed political action of the working class to overcome the limitations that capital implies for the reproduction of life at a global scale.

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