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## **Engineers and Capitalism: Lessons from the early twentieth century**

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**Abstract:** This paper discusses the role assigned to engineering in the “Big business” capitalism. It develops an historical approach of the issue, building on the acknowledgement of significant commonalities between the early twentieth-century capitalism and the current era. The article first reviews the insights developed, a century ago, by the economist Thorstein Veblen about the rise of big business enterprises. Veblen notably highlights the growing ability of companies to capture the technological knowledge of the society to the benefit of the managers and of the shareholders they represent. In this stage of capitalism, Veblen argues, engineering is thus above all used to the benefit of a small social group, rather than to the material interest of the society as a whole. The paper then emphasizes the relevance of Veblen’s views to analyse the evolution of corporate governance and its consequences from the 1970s. The article ends on the acknowledgement of the weaknesses and dangers of the technocratic solution Veblen proposed to put the technology back to the benefit of the society. We argue that promoting a “humanistic engineering” requires engineers to contribute to a multi-sided movement for transforming the socioeconomic system, by fully assuming their social responsibilities, as experts of technology, without exceeding them.

This chapter intends to discuss the conditions under which a “humanistic engineering” may develop – or not – in the context of the firm. The approach of the issue derives from the view that the enterprise cannot be considered as a static organizational framework. It will be argued that the firm is a fundamental institution of capitalism that has evolved concomitantly with this socioeconomic system as a whole. As capitalism has changed over time, the organization and the governance of the firms, as well as the aims they pursued, have significantly evolved. As a consequence, the roles assigned to the engineers and the conditions under which they carry out their missions have been altered in a way that has been more or less favourable to the expression of humanistic propensities. Moreover, it must be acknowledged that this historical evolution has not consisted in the spreading of a well-defined trend. Over the last centuries, capitalism has experienced different stages, the succession of which has depended on the combination of various – technological, economic, political and cultural – factors. Now, as Branko

Milanovic – a former lead economist in the World Bank’s research department – recently argued:

*“There is, I think, little disagreement that the historical era most similar to ours – meaning the time after the global financial crisis of the past decade – is the period preceding World War I. Both eras are characterized by the spread of globalization and significant advances in technology (especially communications), but also in high income inequality and wealth inequality [...] We therefore have much to gain from reading the most important political and economic authors of the pre-WWI era”* (Milanovic 2018).

I agree with both Milanovic’s statement regarding the commonalities between the early twentieth-century capitalism and the current era, and his suggestion to look for relevant insights to address contemporary issues in the writings of past social scientists.

In the present paper, I will adopt Milanovic’s perspective to consider the place of engineers in contemporary capitalism and, to some extent, the role they could play to change it towards a more humanism-oriented organization of the economy. To this end, I will specifically revisit the work – actually a small part of the work – of the American economist and sociologist Thorstein Veblen (1857-1929). Although this scholar is not mentioned by Milanovic (2018), I argue that his writings, that include a book entitled *The Engineers and the Price System* (Veblen 1921), is most relevant to address the evolving relations between engineering, the business and capitalism.

The paper is organized as follows. In the first section, I present the main insights Veblen developed in analysing the evolution of capitalism from the eighteenth to the early twentieth centuries. I notably emphasize the rationale Veblen develops to explain the causes and consequences of the rise of “Big business.” Among these consequences Veblen points out the growing ability of companies to capture the technological knowledge of the society to the benefit of a small group of individuals. This conclusion leads Veblen to call for a radical transformation of the industrial organization, in order to put the technology back to the benefit of the society as a whole, namely to restore the social value of engineering. In the second section, I will discuss the contemporary relevance of Veblen’s insights. I will argue that Veblen’s work remains thought-provoking to understand our current situation, since a number of processes he analysed have been revived and expanded for the last decades. However, I will question the relevance of the economic and political project he defended to solve the problem of

misadjustment between the management of technology in the frame of business enterprise and the interest of society as a whole. The twentieth century history has revealed the major risks that underlie his appeal for a “*soviet of technicians*” (Veblen 1921). The many-sided dangers that have amassed over the last decades and that now seriously threaten the future of our societies and of our planet thus require us to invent new institutional frameworks to put technology in the service of the vital needs of humanity.

### **1. Veblen on the engineers and the rise of “big business”**

Thorstein Veblen was an iconoclast scholar. Trained as a philosopher, he came to develop an original and ambitious project in economics. Veblen laid the foundations of an “*evolutionary economics*”, which he intended to be “*the theory of a process of cultural growth as determined by the economic interest, a theory of a cumulative sequence of economic institutions stated in terms of the process itself*” (Veblen 1919: 77). Veblen indeed emphasized the role of evolving institutions, defined as “*settled habits of thought common to the generality of men*” – or at least to a significant part of them –, in governing economic relations (Veblen 1919: 239). In his most famous book, *The Theory of the Leisure Class*, he theorized the historical evolution of the habits of “*invidious comparison*” and “*conspicuous consumption*” (Veblen 1899). In another book entitled *The Instinct of Workmanship and the State of the Industrial Arts*, Veblen (1914) developed a theory of the long term co-evolution of institutions and technology (Brette 2003).

Veblen stresses the key role of technological knowledge in the production process. He argues that “[i]ndustrial appliances and materials (*tangible assets*), as well as the *industrial man-power*, are productive agencies because and so far as the *accumulated industrial knowledge and practice make them so*” (Veblen 1923: 68). Moreover, Veblen emphasizes the collective nature of technological knowledge, in the sense that its growth, conservation and intergenerational transmission should be considered as the outcome of the society as a whole. This approach derives from the view that every invention or innovation is vitally dependent on the stock of technological knowledge that the society has previously accumulated over its long life:

*“Individual initiative has no chance except on the ground afforded by the common stock, and the achievements of such initiative are of no effect except as accretions to*

*the common stock. And the invention or discovery so achieved always embodies so much of what is already given that the creative contribution of the inventor or discoverer is trivial by comparison” (Veblen 1919: 328).*

Then Veblen comes to analyse the way the output of the common stock of technological knowledge is shared out among the different members of the society. He argues that these sharing rules have been historically determined by both the institutional and technological conditions in force in the society under consideration. In primitive societies, *“the rule is that the product of any member’s effort is consumed by the group to which he belongs; and it is consumed collectively or indiscriminately, without question of individual right or ownership” (Veblen 1898: 361).* Given the low development of the industrial arts at that time, the collective consumption of goods is a *sine qua non* to the survival of the community. The sharing rules of resources change significantly with the capacity of the group to produce a surplus beyond the bare necessities of life:

*“As this situation develops, it becomes worth while – this is to say, it becomes feasible – for the individual with the strong arm to engross, or ‘corner,’ the usufruct of the commonplace knowledge of ways and means by taking over such of the requisite material as may be relatively scarce and relatively indispensable for procuring a livelihood under the current state of the industrial arts” (Veblen 1919: 332).*

The access of individuals to the consumption of goods then comes to depend on the property rules enforced in society. The private control of manpower – through slavery then serfdom –, of land and, more recently, of material equipment becomes the condition *“for engrossing the current technological efficiency of the community” (Veblen 1919: 333).* The mechanization and the increasing scale of production it allows extend more and more the ability of the owners of the industrial equipment to capture the usufruct of the stock of technological knowledge of the whole society. Veblen argues that the perseverance in corporate capitalism of the legal principles that were born in an early stage of capitalism, when the economic system was characterized by the competition between small craftsmanship companies, has had harmful consequences. It has indeed led to confer to the owners of the assets of the corporation and to their representatives a discretionary power to control the production of goods, while they do not have any competences or interests in it. The increasing complexity of the production processes stemming from mechanization has generated a growing division of jobs and roles, between the *“industrial employments”* concerned by production activities on the

one hand, and the *“pecuniary employments”* focused on commercial and financial activities on the other hand (Veblen 1919: 279sq.). This is a major discrepancy from the *“earlier and less specialised organisation of economic life”*, where *“the undertaker frequently performs the work of a foreman or a technological expert, as well as the work of business management”* (Veblen 1919: 295).

To fully appreciate Veblen’s argument, one must have in mind the basic elements of his theory of human nature. Veblen argues that human behaviour derives from the combination of instincts and habits, which does not oppose the exercise of the individual free-will (Brette, Lazaric, Vieira da Silva 2017). In brief, instincts are to be viewed as basic propensities that are biologically inherited and that are primarily defined by the general motives for the action they support. Veblen (1914) emphasizes the role of four kinds of instincts in his approach of socioeconomic evolution of mankind: (i) the *“idle curiosity”* which is at the origin of world representation systems, including scientific paradigms; (ii) the *“parental bent”* which refers to a concern for humanity; (iii) the *“instinct of workmanship”* that supports the material adaptation of mankind as a whole to his environment; (iv) a set of *“rivalry”* or *“predatory”* instincts that prompt man to seek his own advantage at the cost of other individuals. The instinct of workmanship is the main proclivity to the growth of technological knowledge:

*“The instinct of workmanship [...] occupies the interest with practical expedients, ways and means, devices and contrivances of efficiency and economy, proficiency, creative work and technological mastery of facts. [...] It shows at its best, both in the individual workman’s technological efficiency and in the growth of technological proficiency and insight in the community at large”* (Veblen 1914: 33-34).

The rivalry instincts may express themselves in physical or military aggression, in *“invidious comparison”* and *“conspicuous consumption”* or in *“pecuniary competition.”* In the small craftsmanship companies, where the same people were in charge of productive (i.e. *“industrial”*) operations as well as commercial and financial (i.e. *“pecuniary”*) activities, the predatory instincts that underlie the latter were curbed by the instinct of workmanship that is behind the former. This situation prevented the material interest of the society as a whole from being fully subjected to the pecuniary vested interests. During this early stage of capitalism, *“an unsophisticated productive efficiency was the prime element of business success”* and *“business, whether handicraft or trade, was customarily managed with a view to earning a livelihood rather than with a*

*view to profits on investment*" (Veblen 1904: 23-24).

The evolution of capitalism, characterized by mechanization, large-scale production and the division between "*industrial*" and "*pecuniary*" employments, has broken the balance between the predatory and the workmanship instincts that had prevailed in the conduct of economic affairs. The business enterprise is now governed with a view to generating the biggest profit as possible to the advantage of its managers and of the shareholders they represent, that Veblen (1923) names "*absentee ownership*." Now, Veblen argues that the pursuit of this objective does not guarantee the material interest of the society as a whole:

*"[B]usiness activity may, and in a majority of cases it perhaps does, effect an enhancement of the aggregate material wealth of the community, or the aggregate serviceability of the means at hand; but such an industrial outcome is by no means bound to follow from the nature of the business man's work"* (Veblen 1919: 294-295).

Actually, Veblen develops a number of arguments to show that the governance of the large business enterprise is likely to disturb the proper functioning of the industrial system. He notably argues that the pursuit of the greatest financial profit calls for a strict control of the industrial production that is necessary to get high prices:

*"And the ways and means of this necessary control of the output of industry are always and necessarily something in the nature of sabotage – something in the way of retardation, restriction, withdrawal, unemployment of plant and workmen – whereby production is kept short of productive capacity"* (Veblen 1921: 8).

Moreover, the methods of "*sabotage*" that are used by business men benefit from the development of legal devices, such as patent rights, copyrights, franchises, and other monopoly rights, that confer to their owners preferential advantages to get profits. The value of the "*intangible assets*" of the enterprise, in which fall these legal artefacts, does not derive from their "*industrial serviceability*," rather the opposite. The "*intangible assets*" not only hinder the free use of the stock of technological knowledge of the whole society – as in the case of patent rights – but they also involve a wasteful employment of resources – as in the case of advertising in which firms invest to increase their reputation and "*good-will*" (Veblen 1904: 55sq.). Finally, as the modern industrial system tends to become a more and more unified organization, made up of numerous interlocking elements, the disturbances the business men provoke have global and cumulative destabilizing effects.

This diagnosis leads Veblen to suggest entrusting a “*soviet of technicians*” with “*the care of the community’s material welfare*” of the United States. This organization would be in charge of “*the due allocation of resources and a consequent full and reasonably proportioned employment of the available equipment and man power; [of] the avoidance of waste and duplication of work; and [of] an equitable and sufficient supply of goods and services to consumers*” (Veblen 1921: 141-142). Veblen thus recommends a genuine “*revolutionary overturn*” to overcome the major inefficiencies of the early twentieth-century “Big business” capitalism. In his view, the engineers should be the main protagonists of this overturn and of the founding of a new economic system that is expected to sharply improve the material welfare of the American society.

## **2. From a “Big business” capitalism to another ... and beyond**

Veblen died in August 1929, just a few weeks before the opening of the major financial crisis. The financial meltdown and the general economic slump it generated gave evidence to the relevance of certain analyses of Veblen on the erring ways of “Big business” capitalism. After WWII, a new international order was built on the widely shared view that unregulated capitalism may provoke a collapse of the economic system that may itself pave the way for extremist parties and armed conflicts. The Bretton Woods conference organized in 1944 established an international monetary system of stable exchange rates linked to the dollar (itself linked to gold), with the International Monetary Fund (IMF) as the keystone of the system. The IMF’s mandate was to promote the international monetary cooperation in order to prevent the currency wars that had destabilized the world economy during the 1930’s. The architects of the Bretton Woods system – notably the British John Maynard Keynes and the American Harry Dexter White – acknowledged the damages the free capital flows may cause to the real economy. De facto, tight capital controls were widespread during the Bretton Woods era (Ghosh and Qureshi 2016).

The Bretton Woods system collapsed between 1971 and 1973, following President Richard Nixon’s decision of severing the link between the dollar and gold. This led to exchange rates being mainly determined by market forces. This also led to the abandonment of capital controls, until their total disappearance in the advanced economies in the 2000’s (Ghosh and Qureshi 2016). This high international capital



mobility has significantly increased the frequency of banking (and financial) crises (Reinhart and Rogoff 2008). Moreover, financial liberalization and globalization have also substantially affected the corporate governance of companies, especially those that are listed on stock exchanges. These processes have indeed greatly altered the nature and objectives of the companies' shareholders. Institutional investors, such as banks, insurance companies, pension funds, hedge funds, etc., have acquired a growing weight as companies' shareholders, allowing them to impose their high and strict expectations in terms of return on equity. The managers of companies are now under a very high pressure to "maximizing the shareholder value," namely to increase the dividends per share and the share value. This pressure is exerted under a variety of forms, from the threat of selling shares in case of unexpected returns, to the financial reward when the objectives have been reached. The sharp increase in the incomes of the managers as well as their dependence upon the shareholders' earnings (e.g. through the granting of stock options) has proved effective in giving the primacy to financial objectives in the conduct of large business enterprise.

The increasing power of "*absentee ownership*," to use Veblen's words, has been theorized and legitimized from the early 1970's. In a famous paper entitled "The social responsibility of business is to increase its profits," that he published in *The New York Times Magazine*, Milton Friedman (1970), one of the most influent intellectual architects of the "neoliberal counter-revolution," argues that:

*"In a free-enterprise, private-property system, a corporate executive is an employee of the owners of the business [i.e. the shareholders, in Friedman's view]. He has direct responsibility to his employers. That responsibility is to conduct the business in accordance with their desires, which generally will be to make as much money as possible while conforming to the basic rules of the society, both those embodied in law and those embodied in ethical custom."*

There would be much to say on this approach, including on the basic postulate that the companies' shareholders should be viewed as the owners of the enterprise, namely of a group of people that are involved in a productive "collective entity" (Chassagnon and Hollandts 2014). However, let us focus here on some of its main consequences.

There are many ways and means to increase the "shareholder value" that may have deleterious consequences from a social or environmental viewpoint. First, increasing the share of the value-added distributed to shareholders implies reducing other shares,

namely investments and/or wages and/or taxes. Now, cutting investments may compromise the future of the firm and the providing of essential services that require costly infrastructures. Lowering the wages of people with few qualifications makes them more vulnerable and undermines the foundations of society, not to mention the problems of demand it may cause to many enterprises. Moreover, the so-called “tax optimization” strategies implemented by most big companies weaken the ability of the governments to offset the problems just mentioned. Second, engineering is directly concerned by some means used to increase the “shareholder value”, to the extent that they aim at capturing the technological knowledge of the society to the shareholders’ benefits, at the expense of other social groups. It is the case when the threat of automating activities – in addition to the threat of relocating activities to countries with lower labour costs – enables employers to lower wages. It is also the case when superprofits and extravagant dividends are generated thanks to the patenting of key inventions, as it may notably occur in the pharmaceutical industry – see e.g. the controversial strategy of Gilead Sciences based on its patents on the hepatitis C treatment. Finally, one should acknowledge that in case of dilemma between increasing profits and lessening environmental injuries, technological choices are often made in favour of the former – see e.g. the Volkswagen’s “Dieselgate.”

It is striking how shrewd Veblen’s insights remain a century later. The current increase in manifold socioeconomic inequalities and ecological damages offers new evidence of the market’s inability to guarantee the pursuit of the common good. Indeed, “[t]he ground of survival in the selective process [of business competition] is fitness for pecuniary gain, not fitness for serviceability at large” (Veblen 1919: 299). However it is fair to recognize that the economic and political project Veblen worked out to fix the problem is questionable, to say the least. As the German philosopher Theodor Adorno (1941: 10) already emphasized:

*“Veblen, however, is ready to regard the engineers and technicians as a kind of élite to whom the rational organization of society might be entrusted. [...] To be sure, their functions are upset by today’s irrational economy but this in no way qualifies them to select themselves as dictators. Like all subservience, their subservience to technology contains potential domination, and prepares them to take things into their own hands.”*

Through his criticism of Veblen's (1921) appeal for a "*soviet of technicians*," Adorno (1941) warns us against the temptation of the technocratic and bureaucratic elitism that we may have, to overcome the failures of market and capitalism. This cautionary statement remains most salutary today. Defining the conditions of the common good, or, to use Veblen's (1899: 98) words, "*the test of impersonal usefulness – usefulness as seen from the point of view of the generically human*," is a political question (in the fullest sense of the word) that must be treated through a democratic procedure. If the engineers, as a social group, have a crucial role to play in specifying and implementing these conditions, they cannot do it alone. It is thus their responsibility to take part in socioeconomic and *de facto* political movements, such as "the social and solidarity economy" (Laville 2016), in order to improve the ability of the technological knowledge to deal with major social and environmental issues. A crucial challenge in this regard is to alter the finalities and governance structures of firms towards a more favourable environment to the development of a "humanistic engineering."

## **Conclusion**

This paper aimed at discussing the place of engineering in contemporary capitalism by putting it into historical perspective. Building on the commonalities between the current situation and the early twentieth-century era, it has been suggested that the insights developed by Thorstein Veblen a century ago may help taking a fresh look at our world. Veblen's work may help understanding why and how technological knowledge may be captured to pecuniary interests, that are likely to be (partly at least) conflicting with the interest of the whole society. Over the last century, the technocratic and bureaucratic elitism has developed as a way to deal with the problem. Analysing and discussing Veblen's (1921) project for a "*soviet of technicians*" remains useful, not necessarily to endorse the elitist view but to understand its principles, weaknesses and dangers.

We are now in the critical, uncertain but exciting situation where we have to open new ways for restoring the social value of technology. The ability of engineers to promote a "humanistic engineering" will lie in their capacity to contribute to a multi-sided movement for transforming the socioeconomic system, by fully assuming their social responsibilities, as experts of technology, without exceeding them. This ability is likely to depend on the understanding they may develop of the socioeconomic system in which

they act. In this respect, the place of humanities in technological universities and engineering schools is of crucial importance.

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