



Dominique Barjot et Patrick Fridenson (dir.)

France-Japon, regards croisés France and Japan, a cross-analysis

Mélanges en l'honneur de Terushi Hara
In memoriam Terushi Hara



Grand ami de la France, l'historien japonais Terushi Hara a ouvert d'importants chantiers scientifiques. Spécialiste de l'étude des ententes, des cartels et des politiques industrielles durant le xx^e siècle, une grande partie de son œuvre a été consacrée à l'histoire des chemins de fer, d'abord celle des chemins de fer algériens, mais aussi celles, comparées, du Shinkansen japonais et du TGV français. Partant des progrès de l'organisation scientifique du travail, intégrant les problématiques de l'américanisation, Terushi Hara s'est intéressé à la question des transferts de technologie et organisationnels. Son expertise de l'économie française, qu'il a fait connaître aux étudiants japonais, l'a imposé comme un grand historien des entreprises et des processus d'intégration internationaux, notamment de la stratégie des entreprises japonaises en France et en Europe.

Des historiens japonais et français, un historien suisse, un historien canadien et une économiste française offrent dans ce livre leurs contributions sur les thèmes qui ont été les siens, rendant possibles des regards croisés entre France et Japon à l'heure de la mondialisation.

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Terushi Hara (1943-2011) a fait ses études universitaires à Waseda, université privée la plus prestigieuse du Japon, puis en France avant de soutenir au Japon une thèse de doctorat remarquée. Proche de François Caron,

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TROISIÈME PARTIE

**Terushi Hara, historien
des entreprises et des processus
d'intégration internationaux**

FRENCH ECONOMIC PLANS AND THE MECHANICAL ENGINEERING INDUSTRY IN THE PARIS REGION, 1953-1974

Toshikatsu Nakajima

In a planned economy, the manufacturing of capital goods, in particular that of machinery, is supposed to enjoy disproportionately rapid growth. The case of France during the *Trente Glorieuses* (1944-1974) was an exception. Despite multiple efforts by the government to encourage domestic machine production, the French economy could not escape its dependence on German machines. Rather, the outdated and misguided machine export promotion policy of the planners prevented French mechanical engineers from realizing normal production growth within a natural division of labor in the European economy. The bureaucrats did not know how French machine production was organized on the shop floor level, though the network of seemingly obsolete small machine shops had played an important role in the early stages of post-war economic growth. This ignorance led to many mistakes in industrial policy making. This paper examines how the planners damaged traditional networks of the mechanical engineering industry in France, especially in the Paris region.

MECHANICAL ENGINEERING INDUSTRY DURING THE FIRST SIX ECONOMIC PLANS (1946-1974)

Until the 1870s, France, which was selling its products throughout the world, ranked just behind Great Britain in the machine-building industry. In the 1880s, mass production of machines flourished in the United States and the diffusion of Brown & Sharpe's universal milling machines ushered in a new era for the mechanical engineering industry. In Europe, captured by its artisanal tradition, France lagged far behind Germany with regard to introducing this new technology. The burden of military production during World War I, the financial disturbances in the 1920s, and the Great Depression after 1931 prevented French machine builders from executing the indispensable "scrap and build." France was strong in transport machines, steam engines, and turbine production, although weak in electrical machine and machine tool production. Automobile manufacturers were burdened by the recession, and while they did employ advanced and original technologies, they developed the

Ford production system step by step. From 1938 to 1940, French aircraft engine makers hurried to buy American grinders, only to make Daimler-Benz aircraft engines for the Nazis after France's defeat.¹

At the end of World War II, the means of production in the French mechanical engineering industry, which had always had an uneven structure, were still artisanal. However, modernization was crucial if the industry was to cope with the progress of mass production. Usually, an economic plan prioritizes machinery as capital goods. The French case was an exception to this rule, however, at least before the mid-1960s. The First Economic Plan (1946-1952), conceived by Jean Monnet, was named the "*Plan de modernisation et d'équipement*." Here, the word "*équipement*" referred not specifically to machinery but to industrial infrastructure in general. For example, the plan did not specifically include the production of machine tools, because Jean Monnet poured resources into fields such as coal, steel, and agricultural machines, whose needs were more urgent.² Most machine tools and general machinery needed to reconstruct the French economy had to be imported from the United States and Great Britain.³

After the Second Plan (1953-1957), economic planning attenuated its "directive" character to become increasingly "conductive." Industrialists became more autonomous, and the government lost the sources of its directive power, such as distribution of rare energy or raw materials, and foreign currency quota.⁴ As industrial infrastructure was gradually restored, the Planning Agency began promoting the mechanical engineering industry. Unlike the cases of coal, steel, and electricity, however, the French machine production system was too scattered to be censored by the government. Thus, in making economic plans, it was neither the Agency nor the Ministry of Industry that set production targets at the end of the planning period, but each individual professional association.

1 Toshikatsu Nakajima, "Crise et croissance de l'industrie mécanique de la région parisienne (1918-1939)," in Michèle Merger and Dominique Barjot (eds.), *Les Entreprises et leurs réseaux: hommes, capitaux, techniques et pouvoirs, XIX^e-XX^e siècles*, Paris, Presses de l'Université Paris-Sorbonne, 1998.

2 Richard F. Kuisel, *Capitalism and the State in Modern France*, Cambridge, Cambridge University Press, 1981, p. 219-247.

3 Philippe Mioche, "Les difficultés de la modernisation dans le cas de l'industrie française de la machine-outil, 1941-1953," *EUI Working Paper*, no. 85/168, 1985; *id.*, "La triple malédiction de l'industrie de la machine-outil en France," in Jean-François Belhoste *et al.* (eds.), *Autour de l'industrie, histoire et patrimoine. Mélanges offerts à Denis Woronoff*, Paris, Comité pour l'histoire économique et financière de la France, 2004.

4 Jean-Jacques Bonnard, "Les instruments d'exécution du Plan utilisés par l'État à l'égard des entreprises," *Revue économique*, vol. 21, no. 4, July 1970, p. 587-594; Pierre Bauchet, *Le Plan dans l'économie française*, Paris, Economica, 1986, p. 65-81; Henry Rousso (ed.), *La Planification en crises (1965-1981)*, Paris, Éditions du CNRS, 1987, p. 19-50.

Most targets were met as a result, although the aforementioned weaknesses of French mechanical engineering remained unaddressed.⁵

Table 1. Machinery Industry in the Second to the Sixth Economic Plans (Index numbers (100 +) and annual growth rates (%))

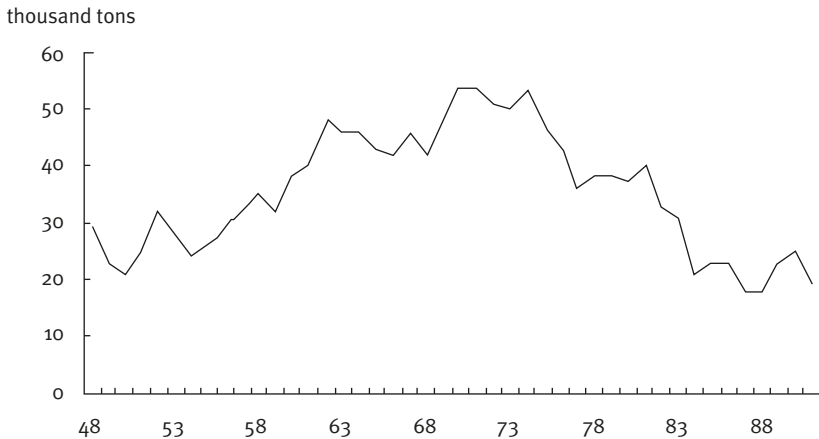
	Targets			Revised Targets			Results		
2nd (1954-1957)	Machinery and Electronic						Machinery and Electronic		
	52-57	130	5.4				54-57	156	16.0
							52-57	121	3.9*
3rd (1958-1961)	Machinery and Electronic						Machinery and Electronic r.		
	61-62	142	7.3				56-61	137	6.5
				Machinery			Machinery		
				56-61	139	6.8	131 5.5		
4th (1962-1965)	Machinery and Electronic			Machinery and Electronic			Machinery and Electronic		
	59-65	154	7.5	60-65	139	6.8	60-65	1365	6.4
				Machinery			Machinery		
				60-65	138	6.7	60-65	1352	6.2
5th (1966-1970)	Machinery and Electronic			Machinery			Machinery		
	62-70	160	6.1	62-70	153	5.5	62-70	169	6.8
6th (1971-1975)	Machinery						Machinery and Electronic**		
	70-75	156	9.3				70-75	122	4.1
							70-74	128	6.3

* Underestimated. ** Automobile and aircraft excluded. Sources: Publications of the French Planning Agency

Table 1 shows the targets and results of machinery production in the Second through Sixth Plans. French machinery production grew by more than 5% annually over these two decades, its performance surpassing that of the French economy in general. These growth rates differ according to product. For example, in the Fifth Plan, the index numbers of the target and result of machinery production from 1960 to 1970 were 1.60 and 1.69, respectively, whereas in the same period, machine tools scored only 1.38 and 1.46, respectively.⁶ The poor results for machine tools are depicted in fig. 1. After World War II, a massive demand for engines and transport machines supported the reconstruction of the machine tool industry in France. French colonial wars continued in Southeast

- 5 The planning of steel production had almost the same defect. See Suzanne Berger, "Lame Ducks and National Champions: Industrial Policy in the Fifth Republic," in William G. Andrews and Stanley Hoffmann (eds.), *The Fifth Republic at Twenty*, Albany, State University of New York Press, 1981.
- 6 Commissariat général du Plan, *5^e Plan 1966–1970. Rapport général de la Commission des industries de transformation*, Paris, La Documentation française, 1966, p. 94-96; *id.*, *Préparation du 6^e Plan. Rapport du comité construction mécanique*, Paris, La Documentation française, 1971, p. 71-77.

Asia and North Africa until 1962, and so the machine tool industry remained “strategic.” The outbreak of the Korean War in 1950 gave French machine and tool builders the opportunity to gain ground even in the United States. To continue their colonial wars, however, the French government imposed heavy taxes on machine tool manufacturers, depriving them of financial surplus to reinvest. Galloping inflation was followed by interest rates increasing to an almost unacceptable level. As a result, the structure of the French machine tool production remained rudimentary.



Sources : *Annuaire rétrospectif de la France. Séries longues 1945-1986*, Paris, INSEE, 1990

Fig. 1. Production of Machine-Tools in France

Until the mid-1960s, the essential role of machinery in a modern economy was not considered by the French bureaucrats. Even Pierre Massé, in his reminiscences, confessed his ignorance regarding machinery while preparing the Fourth Plan.⁷

FAILURE OF THE *PLAN MÉCANIQUE*

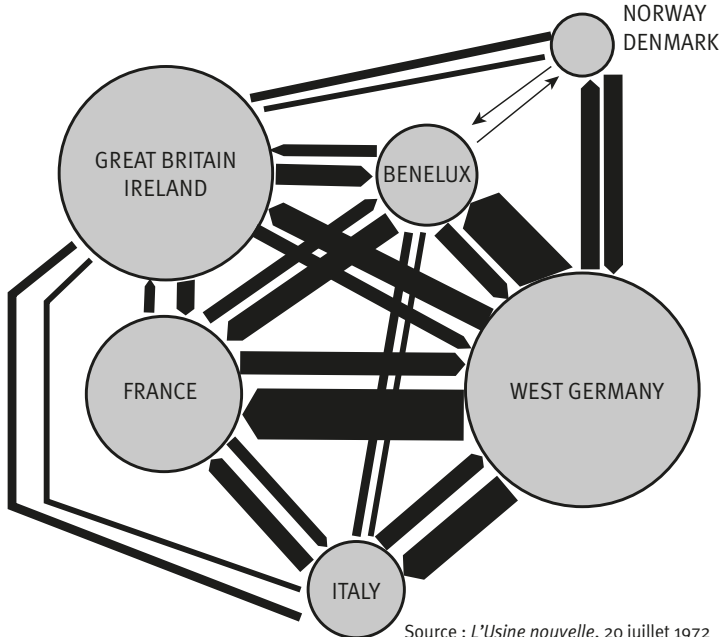
At the start of the Fifth Republic, the government attempted to modernize the French economy. Its first step was to moderate the regional disparity of income. In 1963 Olivier Guichard created the Délégation à l'aménagement du territoire et à l'action régionale (DATAR) for a radical relocation of French industry.⁸ Then, to cope with the international competition, the government tried to enlarge and strengthen French industrial firms. The law of July 12, 1965,

⁷ Henry Rousso (ed.), *De Monnet à Massé*, Paris, Éditions du CNRS, 1986, p. 203-204.

⁸ Daniel Noin, *Le Nouvel espace français*, 3rd ed., Paris, Armand Colin, 2003, p. 178-180.

along with the August 1967 ordinances, introduced large fiscal exemptions for mergers and acquisitions.⁹ To this end, economic plans expanded to include many industrial projects, such as the construction of huge dams and highway networks. In those days, French bureaucrats exhibited an exceptionally interventionist attitude. In the realm of financial and fiscal policy, they pursued a Keynesian activism to maximize growth.

This expansionist policy was followed by fierce inflation and a huge trade deficit. Consequently, the French franc devalued by 19% against the Deutschmark in August 1969. Generally, if an economy reaches the limit of production allowed by a given level of fixed capital, an additional final demand multiplies machinery demand in the short term. As West Germany was the largest supplier of industrial machines in Western Europe, the investment stimuli in France, Great Britain, and Italy in the 1960s only benefitted German machine makers (see fig. 2). In France, as the trade deficit with West Germany accumulated, the mechanical engineering industry finally began to attract the government's attention.



N.B. Circles represent total machinery sales.
 Thickness of arrows is proportional to the amount of exchange.

Fig. 2. European Machinery Trade 1970

9 Maurice Parodi, *L'Économie et la société française de 1945 à 1970*, Paris, Armand Colin, 1971, p. 166.

In this context, the *Plan mécanique* – officially called the *Programme du développement à long terme des industries mécaniques* – was formulated in 1970 as part of the Sixth Economic Plan.¹⁰ Under Jérôme Monod’s supervision, the plan was developed by François-Xavier Ortoli, Minister of Industry; René Montjoie, commissioner of the Planning Agency; and François Peugeot, chairman of the Mechanical Engineering Federation (*Fédération des Industries Mécaniques*, FIM).¹¹

The *Plan mécanique* originated from a report entitled “Industrial development,” written in 1968 by Ortoli and Montjoie.¹² The following year, Lionel Stoleru’s book *L’Impératif industriel* attracted the public’s attention,¹³ and was thus generously accepted by politicians. To catch up with West Germany, the *Plan* stipulated that the government pour four billion francs over ten years into machine production, adding investments in this industrial sector by 11% annually to achieve annual growth rates of 8.6% in total output and 8.0% in added value. The investments focused on three points: production increase and innovation, technical education, and exports.

These targets could have been met if the French mechanical engineering industry had maintained its prosperity at the end of the 1960s (fig. 3). Unfortunately, the breakdown of the fixed exchange-rate system in 1971 and the oil crisis of 1973 destabilized the French economy. In the first year of the *Plan*, results already fell short of set targets (fig. 4), and in 1974, it was largely retrenched to become a small export promotion scheme, which continued until the end of the 1970s.

Indeed, even before implementation, some specialists had pointed out the *Plan*’s faults.¹⁴ As mentioned, similar to other schemes included in former economic plans, the production targets were set by professional associations. Public money was therefore dispersed evenly in almost all branches of the mechanical engineering industry according to their results in the 1960s. Power plants, transport, construction machinery, and other areas in which France had maintained a strong position enjoyed abundant public aid, whereas the “lame ducks” of the French mechanical engineering industry, such as machine tools,

10 Archives nationales (AN), 19910230, art. 1, “Programme du développement à long terme des industries mécaniques,” vol. 3, s.d.

11 François Peugeot, member of the Chamber of Deputies at the end of the Third Republic, directed Machines-Outils Peugeot after World War II. Jean-Pierre Peugeot, head of Automobiles Peugeot, was his cousin. On Ortoli, see Laurence Badel and Éric Bussière, *L’Europe, quel numéro ? François-Xavier Ortoli (1925-2007)*, Paris, Descartes & C^{ie}, 2011.

12 Commissariat général du Plan, *Le développement industriel. Rapport du groupe d’experts*, Paris, La Documentation française, 1968.

13 Lionel Stoleru, *L’Impératif industriel*, Paris, Le Seuil, 1969.

14 Jean Roumé, “Les hommes de la mécanique,” *L’Usine nouvelle*, vol. 26, n^{os} 32-33, 6th-13th June 1970.

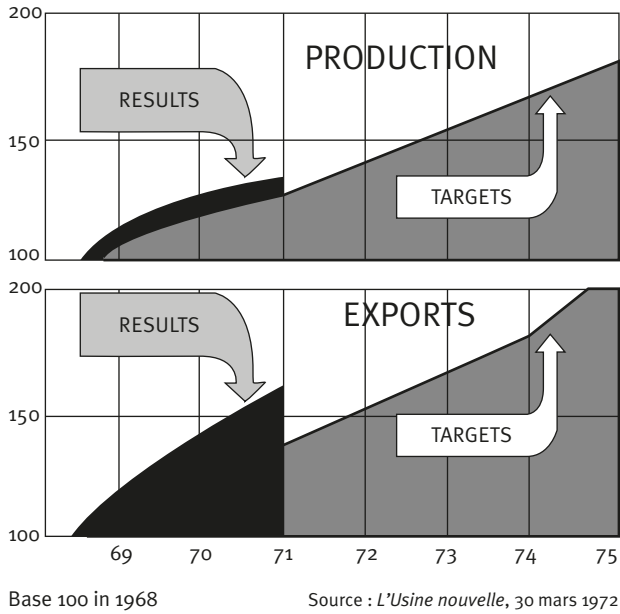
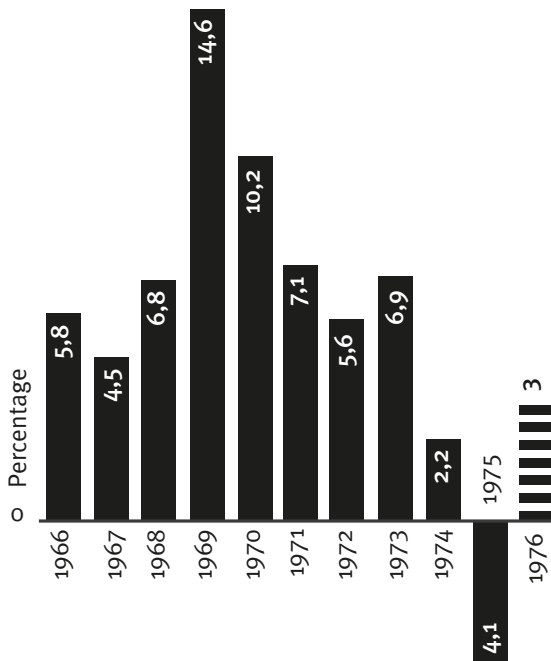


Fig. 3. Targets and Results, 1971



Source : *L'Usine nouvelle*, 21 octobre 1976

Fig. 4. Volume and Machinery Production Growth, 1971

obtained a comparatively meager share. To reduce trade deficits, the government privileged export promotion, postponing measures that required severe structural changes.¹⁵ As the world market for the finest machines was occupied by American and German firms, the best way in which French machine makers could profit in the short term was by exporting cheap, outdated machines to Asian, African, and Latin American markets. Here, an excessive export promotion policy could have inversely delayed modernization of the French mechanical engineering industry. This hypothesis will be tested when examining the case of H. Ernault-SOMUA.

RELOCATION OF THE MECHANICAL ENGINEERING INDUSTRY IN THE PARIS REGION

240 The geographical distribution of plants also reflects the aforementioned structural problems of the French machinery industry. A comparison of the industrial censuses of 1962 and 1977 indicates machine production concentration in the Paris region (figs. 5 and 6).¹⁶ Even in 1977, of the 4,775,448 employees in the mechanical engineering industry in France, more than one-fifth (1,098,909) still worked in the Ile-de-France region, significantly more than those working in Rhône-Alpes (560,609) and Nord-Pas-de-Calais (454,519).

Still, in Ile-de-France, the importance of the city of Paris and its near suburbs appeared to have gradually diminished. Figures by commune can be found in publications of the population census of 1975, although this census pertained to places of residence, and not places of work. Furthermore, the census' definition of "mechanical engineering" is narrower than that of the industrial census of 1977.¹⁷ According to this census, in 1975, 135,985 workers in the mechanical engineering industry lived in Ile-de-France. Most (121,400) lived in the so-called Paris region: 24,485 in the city of Paris, 70,885 in the near suburbs (*petite banlieue*), and 26,030 in the distant suburbs (*grande banlieue*).

Of those residing in the city of Paris, only 9,895 lived in the East End (10th, 11th, 18th, and 19th districts). Among inhabitants of the near suburbs, only 13,940 lived in the eastern near suburbs (communes of Saint-Denis, Pantin, and Le Pré-Saint-Gervais). The decline of the traditional center of metalworkers in the East End seems indisputable. However, as metro and bus networks became

15 In 1970, in the Ministry of Industry, a group of engineers prepared a promotional program for the machine tool industry, but it was never executed, AN 19910230, art. 2: "Programme de promotion de l'industrie de la machine-outil," s.d. [1970].

16 INSEE, *Recensement de l'industrie 1963. Résultats pour 1962. Série structurelle*, vol. 4, *Tous établissements. Résultats par régions*, Paris, Imprimerie nationale, 1967; Ministère de l'Industrie, *Traits fondamentaux du système industriel français: enquête annuelle d'entreprise 1977*, Paris, La Documentation française, s.d. [1978].

17 INSEE, *Recensement général de la population de 1975. Résultats du sondage au 1/5. Région Île-de-France*, Paris, Imprimerie nationale, s.d.

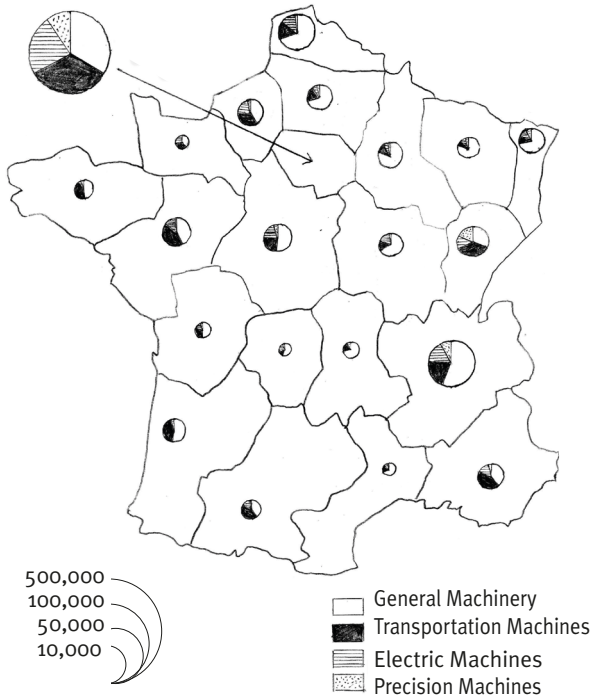


Fig. 5. Diffusion of workers in mechanical engineering, 1962

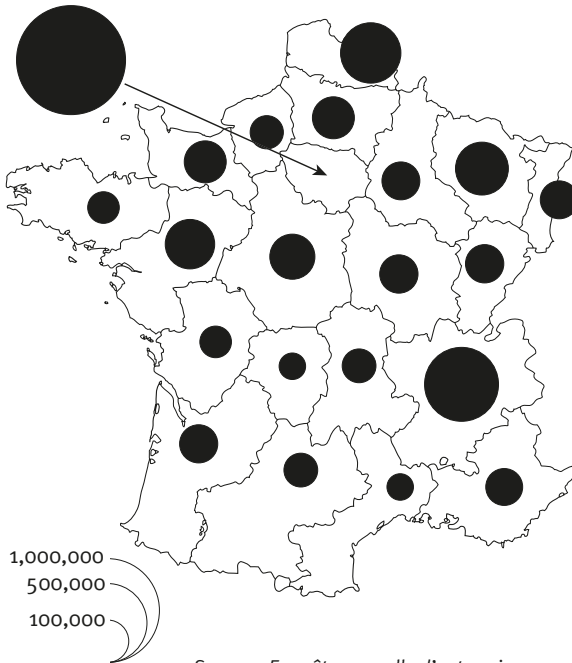


Fig. 6. Diffusion of workers in mechanical engineering, 1967

denser, faster, and cheaper, an increasing number of workers began living in the near suburbs, far from their workplaces.¹⁸

Initially, the DATAR attempted to distribute industrial plants from Paris to every corner of the Hexagon. However, fearing unemployment, the city of Paris and neighboring *départements* protested against excessive decentralization. Consequently, the DATAR decided to create four large satellite cities (Cergy-Pontoise, Saint-Quentin-en-Yvelines, Melun, and Marne-la-Vallée) with industrial zones in Ile-de-France and link each with highway networks (fig. 7). It also planned to establish a new business agglomeration in the western outskirts of Paris (La Défense), which would become the nationwide center of administration. As Paris was thought to specialize in the tertiary sector, industrial production in general was doomed to quit the metropolis.

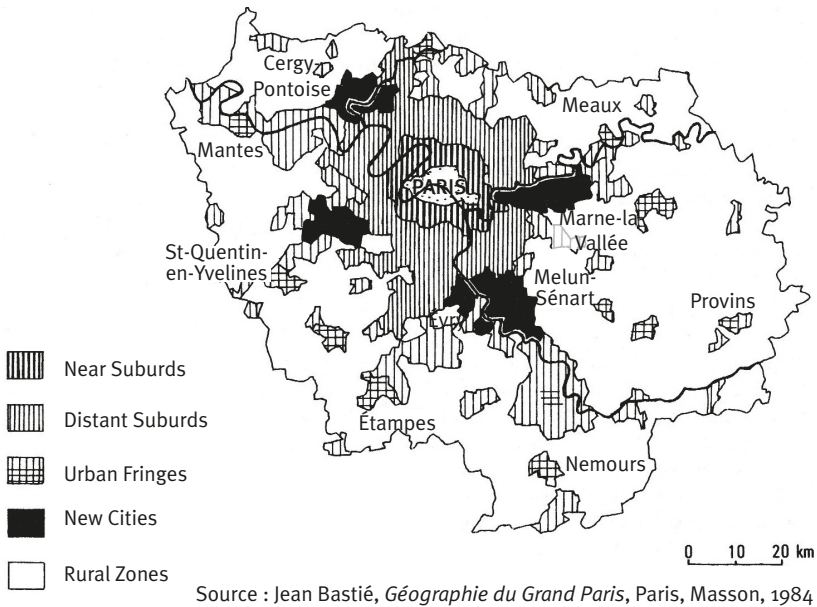


Fig. 7. Four satellite cities, 1962

In accordance with this industrial relocation policy, large mechanical engineering firms, especially manufacturers of transport machines, created huge machine part rough processing or final product assembly plants in the countryside. However, fine processing and adjustment of machine parts were not possible without the highly skilled workers agglomerated in and near Paris. Consequently, large firms not only retained their smaller factories in the City of Paris' near suburbs but also continued to rely on small metalworking shop networks that had survived the pressure of relocation in the East End (figs. 8 and 9).

¹⁸ Dominique Larroque, Michel Margairaz, Pierre Zembri, *Paris et ses transports XIX^e et XX^e siècles*, Paris, Recherches, 2002.

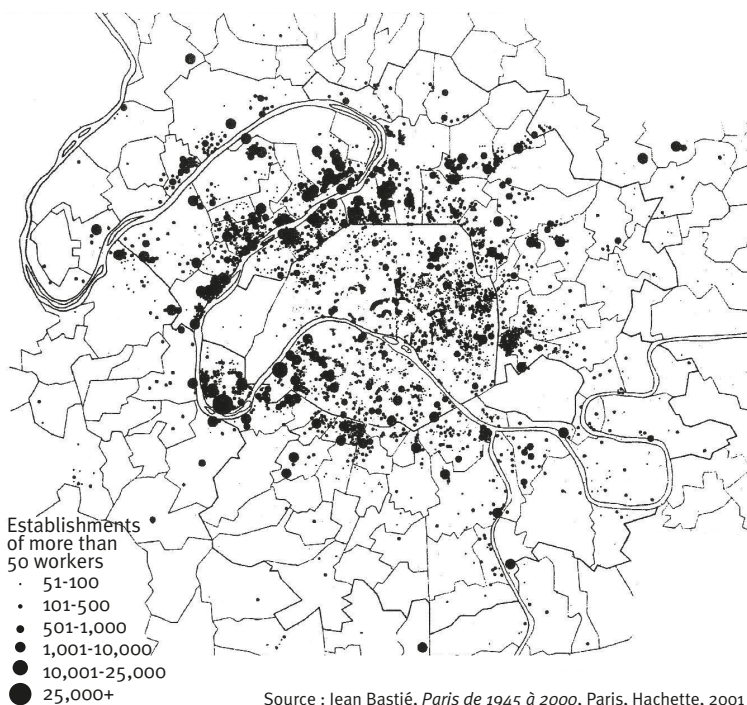


Fig. 8. Diffusion of industrial workers, 1954

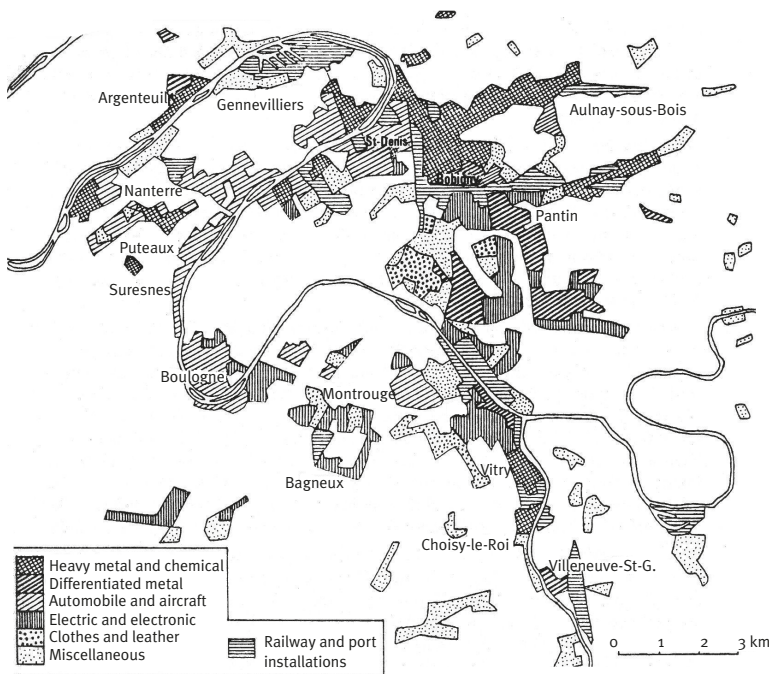


Fig. 9. Industrial activities, end of 1960s

To more precisely trace the limping modernization of French mechanical engineering, the next sections of this paper examine three large firms. Finally, the evening glow of the small machine shops in Paris' East End in the 1960s is described.

THE PURSUIT OF COMPETITIVENESS

In the 1960s, the bureaucrats realized that the Achilles' heel of the French economy was the production of industrial machines. They wished for some of the good fortune experienced by transport machines and power plants to rub off onto the *mécanique générale*. For this purpose, mergers and acquisitions between smaller domestic firms were facilitated. To explain the unimpressive results of this competitive strategy, we examine three large companies, once representatives of the aircraft engine, turbine, and machine tool industries in the Paris region.

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SNECMA¹⁹

Before World War II, two large aircraft engine manufacturing firms, each employing thousands of workers, were based in Paris: Gnome et Rhône and Hispano-Suiza. After the war, Gnome et Rhône was nationalized to become the Société nationale d'étude et de construction de moteurs d'aviation (SNECMA). Meanwhile, the privately controlled Hispano-Suiza relocated its factory from Boulevard Brune to Bois-Colombes. These firms had always attracted the most qualified mechanical engineering workers in the Paris region. As jet engines expanded, Hispano-Suiza introduced new technologies from Rolls-Royce in Great Britain, while SNECMA did the same from Pratt & Whitney (P&W) in the United States. As aircraft engines became too large to build in the City of Paris, SNECMA relocated its factory from Boulevard Kellermann to Corbeil in 1962.

In the 1960s, SNECMA's increasing dependence on P&W's technologies was evident in the hundreds of dispatched American engineers it received. Hispano-Suiza, with Rolls-Royce, tried to develop a new engine, the Olympus 593, for the Concorde project. However, Hispano-Suiza accumulated deficits and was absorbed by SNECMA in 1968.²⁰ The Concorde project was interrupted the following year, and in 1977, SNECMA finally closed its Bois-Colombes factory, which had fired more than half its workers. SNECMA's final opportunity was

¹⁹ There are annual reports and other documents on SNECMA and Hispano-Suiza preserved in the Archives historiques du Crédit Lyonnais (AHCL, now Archives historiques du groupe Crédit Agricole), DEEF 52380, 57379, 61051, 61122, 64677, 64807, 65677-1, 73793, 73907, 75408, 75718, 76522, 78926, 79160.

²⁰ Hispano-Suiza nearly merged with Société alsacienne de constructions mécaniques (SACM) just before its absorption by SNECMA. See François Bernard, *L'Alsacienne de constructions mécaniques des origines à 1965*, Strasbourg, Presses universitaires de Strasbourg, 2000.

tendering for the Airbus project engines. The tender was, however, awarded to two American firms, General Electric and P&W. SNECMA barely survived this defeat, relying on scarce orders from the French Air Force.

Certainly, worldwide competition in the aircraft engine industry proved too intense for SNECMA, who battled to sustain its position as a first-rate manufacturer. In a way, however, the company was a victim of the errant Concorde project. However, it later found a second life (a joint-venture with General Electric for CFM engines, space engines, etc.) and, a member of Safran group since 2005, became a key player in what is now called enginology.

Rateau²¹

Auguste Rateau, a pioneer of the steam turbine, created a modern factory in La Courneuve in 1917. Later, in addition to large turbines, the factory produced turbochargers for aircraft engines, compressors, and so on. Staff had already begun studying jet engines in the 1930s. After World War II, Rateau extended its turbine production to meet the domestic reconstruction demand.

In 1960, the production of steam turbines for electric power stations was distributed among four companies: Alsthom, Schneider, Rateau, and Compagnie Électro-Mécanique (CEM). CEM had accumulated deficits through excessive product diversification (small motors, locomotives, washing machines, etc.). In its main factory in Le Bourget, CEM barely managed to continue building Brown-Boveri's steam turbines. Fierce competition also decreased profits for Rateau in the large steam turbine industry. Instead, the company tried to increase profits by manufacturing compressors, air conditioning, and water supply appliances.

In 1961, at the government's request, Schneider, Rateau, and CEM concluded an agreement for technical cooperation in the steam turbine for electric power stations industry. Furthermore, a joint sales company, Rateau-Schneider, was created. However, Rateau's La Courneuve factory was too small to produce steam turbines for the big energy plants of the 1960s; thus, further integration was inevitable. In 1969, Alsthom suddenly absorbed Rateau by acquiring more than half its stocks. Rateau-Schneider was dissolved to clarify the rivalry between Alsthom and Schneider. In 1974, workers at the La Courneuve factory protested against Alsthom's rationalization scheme through a three-month strike. Ultimately, Alsthom concentrated on steam turbine production in its huge Belfort factory, reducing La Courneuve to a subsidiary plant. Thus, the long tradition of large engine manufacturing in the northern suburbs of Paris was silently terminated.

²¹ Annual reports and other documents on Rateau are preserved: AHCL, DEEF 52295-1, 62590, 64829, 74194, 79056. For CEM, see AHCL, DEEF 52407, 59832, 64666.

Once the largest machine tool manufacturer in France, H. Ernault-SOMUA must be included among the victims of the government's modernization policy. In 1962, two machine tool builders from the Schneider group, H. Ernault and SOMUA, merged to create a new company, H. Ernault-SOMUA. To satisfy the demand of the small- and medium-sized factories mostly agglomerated in the Paris region, French firms invented new, smaller machine tools for universal use. These products, invented in the 1950s, enabled high-speed, precise processing of hard steel. H. Ernault's "Jupiter" lathes and SOMUA's "Z" milling machines embodied many characteristics of French machine tools. They were compact, speedy, polyvalent, and easy to use. These machines soon gained worldwide success. In Japan, Toyoda Machinery obtained a 10-year production license for the "Z" milling machines and their selling rights in Asia. After the merger, H. Ernault-SOMUA rationalized its production system and reinforced its sales organization. In 1967, H. Ernault's former finishing factory, along with H. Ernault-SOMUA's headquarters, relocated from Rue d'Alésia to Vélizy, where a new laboratory was created. The former SOMUA factory in Saint-Denis was transformed into a large repair shop and filled with 40,000 types of machine parts, 300 repairmen, and 20 automobiles. The company pledged that a repairman would arrive anywhere in the Paris region within 20 minutes of receiving a phone call.²³ Thus, H. Ernault-SOMUA's growth in the 1960s was bolstered by the prosperity of the small metalworking shop agglomeration in the northeast quarter of Paris.

As the domestic market stagnated at the end of the 1960s, H. Ernault-SOMUA expanded its exports. Even before the merger, both H. Ernault and SOMUA exported 10–30% of their products. As the world market became increasingly competitive, export destinations shifted from Europe and North America to Latin America, Africa, and Asia. The devaluation of the French franc and the *Plan mécanique* accelerated this geographical expansion. The number of workers in the company increased to 3,671 in 1974 (fig. 10), and the following year, exports accounted for 44.1% of total sales. Thus, while H. Ernault-SOMUA gained fleeting success in the emerging markets, their products, simple universal lathes and milling machines, soon became outdated in advanced countries. In 1975, Michel d'Ornano, Minister of Industry, began promoting the production of numerically controlled machine tools.

²² Annual reports and other documents on H. Ernault-SOMUA are preserved in AHCL, DEEF 50715, 59817, 62583, 64673-2, 73769, 75782, 78148; Archives départementales des Yvelines, 75 AJ 9.

²³ "Visite d'usines: Le service après-vente de la Société H. Ernault-SOMUA," *La Machine-Outil française*, no. 267, August 1970.

As H. Ernault-SOMUA did not possess its own knowledge in this field, it entered into a French joint venture with Toyoda Machinery in 1980. By 1981, H. Ernault-SOMUA's financial situation had deteriorated to an extent that led to it being absorbed by Toyoda. Its office in Vélizy is now Toyoda Machinery Europe's headquarters, and its Cholet factory near Nantes, once reputed to be the largest machine tool plant in Continental Europe, has totally disappeared.

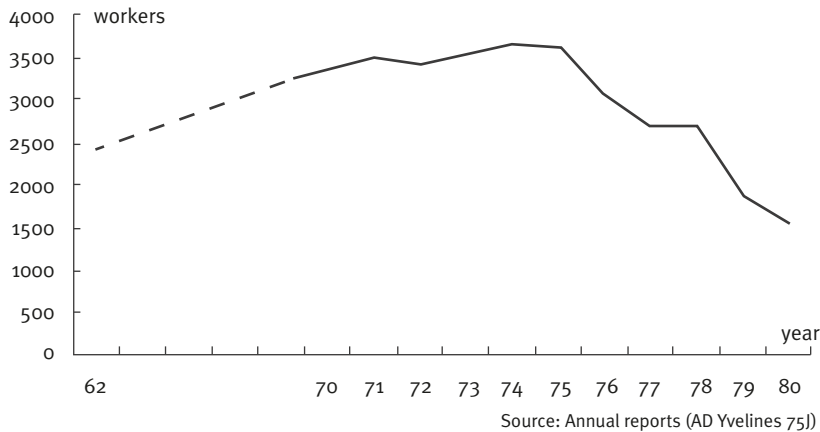


Fig. 10. Workers of H. Ernault-SOMUA

THE WORLD OF SMALL MACHINE SHOPS

The old center of metalworking in the northeast quarter of Paris represents the artisanal character of French machine building. Here dozens of relatively large factories (employing 500 workers or more) existed until the late 1960s. The majority of this conglomeration, however, was comprised of small machinery and metalworking shops (employing 10 workers or less). Not only the workers but also most shop owners were autodidacts trained on the job. While polyvalent, the shops were organized according to a subtle and flexible division of labor. Each shop owner was a potential organizer of small production schemes. Interestingly, most orders were oral and not underpinned by written contracts. While primitive, this custom reflects the strength of the mutual trust between shop owners in this quarter.²⁴ This organization, suited to shrewd batch production, corresponded to the dispersed and stratified structure of the French industrial machine market.

²⁴ Serge Goldberg, "La sous-traitance dans l'industrie des métaux," *Cahiers de l'Institut de l'aménagement et d'urbanisme de la région parisienne*, n° 2, 1965.

As mentioned, the government's floating industrial policy resulted in the immaturity of mass production in French mechanical engineering. Furthermore, this industrial sector was also handicapped by macroeconomic elements. Creeping inflation was a constant hindrance to industrial investments. In addition, in the early years of the Fifth Republic, the French government tried to minimize wages to accelerate investments.²⁵ Insufficient income prevented workers from buying automobiles and home electrical appliances; therefore, in the mass production of consumer durables, France fell far behind West Germany and Great Britain. Consequently, most industrial equipment was produced on a made-to-order basis. As such, the artisanal character of the French mechanical engineering industry was maintained until the end of the 1960s.

It is for these reasons that the small machine and metalworking shops dispersed in and around Paris were indispensable suppliers of machines and machine parts for large French manufacturers of transport machines and power plants in the 1960s. Far from obsolete, these small shops, spread as they were in and around Paris, proved to be positive actors in French industry. Josef Steindl analyzed this type of interdependence – between small and large firms in an industry – in 1945.²⁶ His argument was introduced in France in 1957 by the economist Jacques Houssiaux; consequently, bureaucrats began to acknowledge the importance of small firms in industry.²⁷ Accordingly, in the *Plan mécanique*, some space was devoted to the promotion of “small firms specialized in highly specific fields.” Even so, almost no measures were implemented for this purpose. As French politicians were mostly preoccupied with “the American challenge” (*le défi américain*), creating “national champions” remained the mainstream industrial policy. Thus, the promotion of small firms had to be realized by trade associations themselves. For example, the FIM began organizing the European fair of machine parts in 1971 (*Marché International pour la Diffusion Européenne de la Sous-Traitance*, MIDEST).²⁸

25 Maurice Larkin, *France since the Popular Front*, 2nd ed., Oxford, Oxford University Press, 1997, p. 303-305.

26 Joseph Steindl, *Small and Big business: Economic Problems of the Size of Firms*, Oxford, Blackwell, 1945.

27 Jacques Houssiaux, “Le concept de quasi-intégration et le rôle des sous-traitants dans l'industrie,” *Revue économique*, 8, March 1957. Academic efforts in this domain resulted in two brilliant monographs on small metalworking shops in the Paris region in the 1970s: Françoise Lanoizelée-Quairel, *La Stratégie des moyennes entreprises de mécanique*, PhD dissertation, Université Paris I, 1975; Alain Champaux, *Le Développement des entreprises de sous-traitance du secteur découpage-emboutissage. L'évolution du marché de la sous-traitance métallurgique*, Université Paris I, 1976. For further theoretical details, see Jean-Claude Tarondeau, *Stratégie industrielle*, Paris, Vuibert, 1996.

28 “La sous-traitance: MIDEST 1972,” *Les Industries mécaniques*, no. 915, 30th December 1971. This trade fair, first organized in Nancy, then in Nantes and Lausanne, soon found its permanent site near Paris, in the Parc des Expositions Paris-Nord-Villepinte. The fair still continues to be held annually.

As discussed earlier, in the Paris region, the DATAR created large satellite cities with industrial zones in distant suburbs and tried to encourage decentralization at any cost. The government, through fiscal exemptions and public financial aid, prompted mergers between machine builders and small metalworking shops in and near the City of Paris as well as the relocation of their plants to the new industrial zones. Renault extended its plant to Flins and Citroën created a new factory in Aulnay. Poissy, with the successive arrivals of Ford, Simca, Chrysler, and Peugeot, also became a new automobile assembly center.²⁹ These new large plants attracted many small machine part manufacturers.

The small firms in the East End wanted to confine their mutual relationships to a small area, but the government, to create jobs for the inhabitants of satellite cities, directed their dispersal throughout the new industrial zones.³⁰ We can trace the process of these transfers by examining the archives of the Fonds de développement économique et social (FDES) and other sources on the public aid and fiscal exemptions afforded to smaller industrialists.³¹

Innumerable small metalworking shops, which demanded public aid, were prompted to leave Paris, and most finally accepted the proposal. Few chose to remain in Paris and expand their activities by absorbing the abandoned factories of their former neighbors. For example, Fabrications Automatiques de Précision, a screw cutting firm at 11 rue Saint-Ambroise (11th *arrondissement*), employing 117 workers and 150 machine tools, demanded public aid of 960,000 francs in 1965 to purchase new, advanced machines (nine lathes, two grinding machines, etc.).³² Similarly, Lagardelle, a lock maker at 12 passage Thiéré (11th *arrondissement*), with 28 workers, demanded a tax exemption in 1968 for transferring its factory to a larger site at the nearby 62 rue Amelot.³³

Those who accepted the transfer tended to select the closer suburbs of Paris. Dehail and Grenier, a stamping firm at 71 avenue Philippe Auguste (11th *arrondissement*), employing 24 workers, first planned to relocate its factory to the eastern outskirts of Paris.³⁴ However, in exchange for a tax exemption,

29 Jean-Louis Loubet and Nicolas Hatzfeld, *Les 7 vies de Poissy*, Boulogne-Billancourt, E.T.A.I., 2001.

30 Jean Bastié, *Géographie du Grand Paris*, Paris, Masson, 1984, p. 181-187; Jacqueline Beaujeu-Garnier, *Atlas et géographie de Paris et de la Région d'Île-de-France*, Paris, Flammarion, 1977, t. 2, p. 128-139.

31 On the FDES (born in 1955) and other aid to enterprises, see Richard F. Kuisel, *Capitalism and the state*, *op. cit.*, p. 254; Daniel Dague, "Les moyens de la politique industrielle," in Pierre Massé (ed.), *Politique industrielle et stratégies d'entreprise*, Paris, Masson, 1977; Laure Quennouëlle-Corre, *La Direction du Trésor, 1947-1967. L'État-banquier et la croissance*, Paris, Comité pour l'histoire économique et financière de la France, 2000.

32 AN, Centre des archives contemporaines (CAC), 19970402, article 10.

33 AN, CAC, 19910402, article 12.

34 AN, CAC, 19910402, article 9.

the firm agreed to relocate to the west (Gennevilliers). This type of exemption was usually only possible in the case of a long-distance transfer. If, as in the case of Lagardelle and Dehail and Grenier, the applicant could prove through a list of clients that most of its orders originated in the Paris region, the exemption could be applied to a transfer within Paris or to the *petite banlieue*. Dehail and Grenier listed many transport machine assemblers as its clients, including Bendix, Lockheed, and SNCF. The list demonstrates the key role of these shops in the French mechanical engineering industry in the 1960s.

After the late 1970s, the French automobile and consumer durables industry finally reached its zenith, retrenching the markets for polyvalent small manufacturers of machines and machine parts. Soaring rents and heavy land taxes eliminated factories from the northeast quarter of Paris.

250 Small machine shops were thus eradicated from their old center at Ménilmontant. Some, although not many, were absorbed into the “Artisan City” created by Léon Gingembre and Michel Poniatowski in Saint-Ouen-l’Aumône, near Cergy-Pontoise.³⁵ Most were distributed separately in the new industrial zones around Paris and became increasingly dependent on orders from large nearby assembly plants. The flexible division of labor, which had characterized the small metalworking shops in the northeast quarter of Paris for more than a century, finally disappeared. It can be said that these shops ceased to play a historical role, but, with them, France lost the opportunity to create the networks of small metalworking firms – such as those that would later prosper in Italy, Japan, and China – in the Paris region.³⁶

During the *Trente Glorieuses*, the French economy was still at the dawn of the mass consumption era. A large portion of industrial production remained made-to-order and was supported by the flexible division of labor developed within the traditional networks of small machine and metalworking shops dispersed in the Paris region. French bureaucrats first neglected mechanical engineering, and then encouraged it, to reduce trade deficits. They continuously overlooked, however, the importance of small firm conglomerations, and thus unwittingly tore up their precious *tissu industriel*.

35 “Le parc moderne d’industrie PME à Cergy-Pontoise,” *Les Industries mécaniques*, no. 1151, 2 October 1977.

36 Sebastiano Brusco, “The Emilian Model: Productive Decentralisation and Social Integration,” *Cambridge Journal of Economics*, no. 6, 1982; Toshihiro Nishiguchi, “Suppliers’ Process Innovation: Understated Aspects of Japanese Industrial Sourcing,” in Toshihiro Nishiguchi (ed.), *Managing Product Development*, New York, Oxford University Press, 1996; Tomoo Marukawa, “The Supplier Network in China’s Automobile Industry From a Geographic Perspective,” *Modern Asian Studies Review*, vol. 1, no. 1, mars 2006.

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