# *Industrialization and Culture: The Case of Alsace*[*]

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Jean-François-Gravier concluded, in his comparison of the contrasting economic destinies of two regions of France, Limousin and Choletais, that sociological and cultural factors played a decisive role in determining the outcome of economic processes.[1] Peter Temin in his recent presidential address to the American Economic Association, similarly pointed to the urgency of studying the effect of cultural factors on long-run economic performance.[2] We examine the nature and causes of Alsace's successful industrialization in this context from the Napoleonic Wars to the Third Republic, including the expansion of markets for its manufactured products, its possible geographic advantages, and the role of human factors.

## I. High industrial growth rates from 1815 to 1870

The outstanding performance of the Alsatian industrial sector in the XIXth century is well documented by numerous quantitative studies. During the two decades following the end of the Napoleonic Wars, it

* I am grateful to John Komlos for helpful comments on earlier drafts. Any errors remain, of course, my own responsibility.

[1] Jean-François Gravier, *L'espace vital*, Paris 1984, p. 247.

[2] Peter Temin, « Is it Kosher to Talk about Culture? » *Journal of Economic History* 57, no. 2 (1997), pp. 267-87 ; David Landes in his monumental *Wealth and Poverty of Nations: Why Some are so Rich and Some so Poor*, (1998), also thinks that European culture was the fundamental reason why the region was able to succeed.

outperformed its British counterpart, as well as those of other regions of France, by quite a margin, and thereafter was less prone to suffer from economic downturns that regularly affected the British Isles. However, it is perhaps much less well known that its fate changed completely after its annexation by Germany in 1871: the emigration of many entrepreneurs to other parts of France caused a prolonged decline in its industrial output (Tables 1 and 2 and Figure 1 and 2).

## II. Industrial growth based on external markets

The rapid industrialization of Alsace up to the Franco-Prussian War was based to a considerable degree on the ability of its entrepreneurs to penetrate foreign markets and to gain market shares in other parts of France. The export of products with a high value added in the final stages of production was particularly successful. For example, the Rouen weaving workshops of Vermandois, Cambrésis and Pays de Caux closed down under the Restoration, as a result of competition from the Saint-Marie-aux-Mines valley producers in Alsace. Similarly, the production of calico ceased in the Beaujolais region, and instead, thicker fabrics, lining material, and heavy cotton textiles for trousers and jackets were produced there.[3] By the end of the Restoration, Alsace could boast of being able to compete with Tarare and Saint-Quentin in the production of fine yarns and muslin.[4] Under the July Monarchy, Alsace overtook Normandy in the printing trade, and subsequently the latter specialized in products of poorer quality.[5] An identical phenomenon occurred in the supply of fabrics for printing. Producers in Normandy were forced to abandon the manufacture of lighter fabrics, and specialized instead in heavier

[3] Maurice Levy-Leboyer, *Les banques européennes...*, pp. 83, 85; *Enquête relative à diverses prohibitions...*, (Paris 1834), vol. III.

[4] Achille Penot, *Statistique générale du Haut-Rhin*, p. 368.

[5] See deposition of Barbet in: Ministère du Commerce et des Manufactures: *Enquête relative à diverses prohibitions établies à l'entrée des produits étrangers*, (Paris 1835), vol. III, pp. 225, 229. Thirty years later Louis Reybaud remarked: "Alsace wisely left Normandy to manufacture the cheaper fabrics...Thus, one province specialised in ordinary products and the other in up-market items." Le coton, p. 275.

textiles, such as cretonnes for furnishings. Alsace followed a different evolutionary path,[6] and sent an increasing amount of lighter fabrics for printing to Normandy. Consequently, the raw cotton which arrived in the port of Le Havre, in Normandy,[7] was sent all the way to Alsace (by road) for weaving, only to be returned to Rouen (in Normandy) to be printed.[8] This regional specialization, with relatively high transportation costs, is an indirect indication of the regional differences in labour costs and know-how.

Many more such examples could be provided. In general, this was a period of spatial restructuring of French industrial production. For instance, the Troyes cotton industry suffered a setback after the army ceased to purchase white trousers. It subsequently specialized in thicker materials (fustian for mattresses and twills), which, subsequently also fell into distress, and was eventually replaced with the hosiery trade.[9] The textile industry of Saint-Quentin and Amiens, consisted of cotton textile weaving but yarn spinning was not done there. After the First Empire, its growth proceeded at a moderate pace, but the 1837-1839 crisis marked the beginning of its decline.[10] Under the Second Empire, Normandy lost markets to Alsace once again for the production of low-numbered cotton yarn for the Aube hosiery trade.[11] Alsace itself, faced with competition from Switzerland for fine yarns, began to focus on thicker threads of lower count.

[6] Maurice Levy-Leboyer, *Les banques européennes...*, p. 82.

[7] In 1834, Keittinger-Turgis, a calico printer from Rouen, used equal amounts of calico manufactured in Alsace and in the Seine Inférieure. *Enquête relative à diverses prohibitions...*, vol. III, pp. 261-265.

[8] The roads connecting Alsace and Normandy to Paris were excellent since the XVIIIth century because of the efforts of the French monarchs to build a modern road network called «routes royales».

[9] Julien Ricommard, *La bonnéterie à Troyes et dans le département de l'Aube*, Paris 1934, pp. 42-53; André Colomes, *Les ouvriers du textile dans la Champagne troyenne de 1730 à 1832*, (Paris 1943), p. 42ff.

[10] Maurice Levy-Leboyer, *op. cit.*, p. 86; Albert Demangeon, *Géographie économique et humaine de la France*, (Paris 1948), vol. II, p. 469.

[11] In 1860 Alsace supplied only a negligible amount of the yarn requirement of the Aube hosiery trade, in contrast to the nearly 60 percent covered by Normandy. By 1870, however, proportions changed considerably: Alsace supplied 35 percent, and Normandy's share declined to 25 percent. See Douine's statement in: *Enquête industrielle*, (1870), vol. I, p. 699.

In the main, the Alsatian textile industry's rapid penetration into French provincial markets occurred during the two decades after Waterloo. During this period its share of the total cotton spindles in France increased from under 7 percent to over 20 percent.[12] Revenues from the Alsatian textile industry rose proportionally, to the detriment of other French industrial centres.

After the July Monarchy, the share of Alsatian cotton textiles in the total French output estimated on the basis of the number of cotton spindles in the province, remained quite stable.[13] It seemed as if this sector exhausted its exceptional growth potential, and would thereafter conform to the average French growth rates. However, the clothing industry of the town of Bischwiller was a marked exception. Its spectacular success after 1840 was based on low-priced, high-quality products which could compete with those of the Midi, Elbeuf and Louviers. Its sales increased five-fold between 1840 and 1860.[14]

The performance of the Alsatian metal-working industry, particularly that of the machine building and railroad-equipment producing branches, was as spectacular as that of the cotton sector, although more difficult to measure. Despite the almost complete absence of a machine-building industry under the Empire, Alsace became one of the few national centres to specialize in this sector during the Restoration. The success of machine-construction firms, of course, was based to some degree on the rising local demand of

[12] Alsace had 70,336 cotton spindles in 1812, out of a total of 1,028,642 for the whole of France, i.e. 6.8 %. Chaptal, *De l'industrie française*, Paris 1819, vol. II, pp. 15, 16. In contrast, according to the industrial survey of 1839-1845 and on information provided by the Mulhouse industrial gazette, Alsace had 823,616 spindles out of a total 3,457,532, i.e. 23.8 percent. (The survey did not include Paris, but as cotton spinning was no longer widespread in the capital, this estimate must have been close to the actual figure. *Stat. de la France*, 1st series, vol. VII, pp. 135, 149, and vol. X, p. 347.

[13] In 1867, Alsace accounted for 1.58 million spindles compared to 6.8 million for the rest of France, i.e. 23.2 percent. Carl Hack. *Die Gewerbe in Elsass-Lothringen nach der Zählung vom 1. Dez. 1875*, pp. 108-112. In 1918, Alsace accounted for a little more than 21 percent of the national cotton spinning capacity. Auguste Pawlowski, "La question du coton alsacien", *Revue d'Alsace et de Lorraine*, (April 1927), p. 52.

[14] Between 1840 and 1860, the value of textiles manufactured in Bischwiller rose from 2.6 to 13 million francs. Katharina Dehio. *die Bischweiler Tuchindustrie, von ihren Anfängen bis zum Jahr 1870*, p. 39.

textile mills.[15] By the July Monarchy, Alsatian firms had captured one-fifth of the national market, and for the production of mechanical spinning machines and weaving looms its share was almost half. During the second quarter of the XIXth century, Alsace ranked among the foremost producers in France of a large number of products related to the machinery industry, including locomotives, steel tyres, waggon wheels, as well as machines for the woollen industry.[16]

## III. The absence of geographic advantages in the XIXth century

In this section we explore Alsace's comparative advantage which might have contributed to its successful industrialization drive. It is noteworthy, that the region completely lacked both sources of energy, and the raw materials needed by its factories. Firewood was scarce by the beginning of the XIXth century, and coal was unavailable. Although there were some lignite deposits at Bouxwiller, that source barely sufficed for the chemical factory established there, so there was no surplus at all to be used in other industrial activities. In addition, the available hydraulic power was quickly overtaken by the use of steam engines (which at the end of the Second Empire provided four fifths of the energy required by the spinning mills and two thirds of the power for the weaving mills). As far as iron ore was concerned, the last mines were closed in 1858 in the department of Haut-Rhin, and in 1877 in the department of Bas-Rhin. To be sure, some oil was found after 1882, such as at Pechelbronn, but it was not of much significance. Finally, while potassium was discovered in 1904, and extracted in large quantities after 1919, it did not spawn a chemical industry.[17] Even this cursory consideration, thus makes it obvious that

[15] The existence of many firms in Alsace made it easier for machine-making firms to set up in the region, because the textile industry needed much equipment. But, initially, other factors (low wages, skilled craftsmen, entrepreneurs) played a more important role.
[16] Compte rendu des travaux du Comité de l'Union des Constructeurs de Machines et de Métiers, vol. III, (Paris 1843), p. 145; Michel Hau, *L'industrialisation de l'Alsace (1803-1939)*, (Strasbourg 1987), pp. 98-111.
[17] Hau, *op. cit.*, pp. 144-154.

Alsace lacked natural resources for industrialization, and energy sources were also scarce. Hence, its high growth rate supports those theories of industrialization which stress the ability of regions to succeed by substituting for such seeming pre-requisite raw materials for industrialization in the nineteenth century as coal and iron.

What, then, could account for its success? Could its geographic location have provided some hidden advantages? The answer is a resounding no. In fact, the region was rather at a substantial disadvantage: because of its frontier setting territorial claims and counterclaims made it risky to locate industries there and produce there. For example, commerce with Baden and with Switzerland came to a complete standstill after 1790, and similarly with Lorraine and Franche-Comté after 1870.[18] Moreover, wars brought about widespread destruction, and the changes in political allegiance of 1871 and 1918 made conversion to a new institutional and legal setting an extremely complex process.[19]

The benefits of the Rhine were also not available continuously throughout the XIXth century. For instance, the readjustment of its banks caused the current to accelerate, causing all navigation upstream of Mannheim to stop at the end of the 1860s. Only at the very end of the XIXth century, after the navigability of the river was improved considerably, did water traffic reach Strasbourg on the Rhine without any difficulty. This meant that during the XIXth century, raw cotton was transported by road and then by railroad to Alsatian factories. Moreover, trade using other international connections, such as the Rhône-Rhine canal, and the Strasbourg-Basel railway, was diverted until the end of the Second Empire, due to restrictions imposed by the French customs regulations.[20] Hence, Alsace's connections to the

[18] The return of peace after 1815 did not completely alleviate the fear of a new war. In 1840 (during the Egyptian crisis) and again in 1848 (during the proclamation of the Republic in France) or in 1859 (the war against Austria), there were fears of a European war. After 1870 (as between 1933 and 1939) the fear of a war were very great. In 1870, a large proportion of Alsatian industrialists emigrated to France, to avoid becoming German citizens. After 1933, all new investments ceased in Alsace.

[19] Hau, pp. 207-284.

[20] Hau, pp. 177-203.

outside world were relatively limited, and could not have served as the engine of growth of its indudstrial sector.

## IV. The quality of the rural labour force

As in several other parts of Europe, population growth accelerated in most rural districts of Alsace during the last quarter of the XVIIIth century, leading to the proliferation of small holdings, and to an increasingly precarious degree of overpopulation.[21] The reaction to this Malthusian threat in some parts of France, including the South-West, Normandy, and Champagne was the spread of contraceptive practices. However, the adoption of fertility control remained slow in Alsace, perhaps because of devout religious convictions. To the extent that it did take place at all, it was offset, for an extended period of time, by a decline in the age at first marriage. Hence, population growth in Alsace continued unabated. Given the decline in per capita availability of arable land, the only possibility to continue to eke out a living for those not emigrating, was the traditional solution of working longer hours and intensifying work effort. In other words, Alsatian industrialization was preceded, and accompanied by an upsurge both in labour-intensive agriculture and in proto-industrialization. The cultivation of cash-crops by increasing work input, and the manufacture of handicrafts within the household economy using underemployed or low-wage labour in off-seasons was the typical solution chosen by Alsatian farmers to the increasing land shortage.[22] They learned to adapt

[21] For a similar pattern in Bohemia see John Komlos, *Nutrition and Economic Development in the Eighteenth-Century Habsburg Monarchy: An Anthropometric History* (Princeton: Princeton University Press, 1989), Chapter 3.

[22] Initially, wages were lower in Alsace than in the other French industrial regions (Hau, Table 37, p. 289). But, as rural poverty diminished, wages increased quickly and, after the annexation by Germany, they were higher than in most of the other parts of Germany (Hau, p. 307). In 1918, as Alsace was returned to France, Alsatian wages were higher than in many other parts of France (Hau, table 46 p. 310). But low or high wages do not automatically imply low or high labour costs, because the productivity of the Alsatian labour force and its high quality plays an equally important role. The quality of the Alsatian labour force was (and is today) high, because of its tradition of meticulous agricultural work.

to the increasingly binding constraints by doing away with idle time, and by scrupulously complying with quality standards imposed by merchants. Aware of their own insecurity, and exposed to the whims of both climate and the changes in fashion, they learned to live with constant uncertainty. This undoubtedly explains both the innovative attitude of the agricultural population toward assimilating new farming and craft techniques, and their willingness to cater to the demands of distant clients. Moreover, in contrast to other societies, they did not find it particularly difficult to abide by the strict factory regulations, having been already accustomed to a certain amount of discipline on their own plots and family workshops. For an extended period of time they had learned to follow meticulously the quality specifications of putters-out, who were always threatening to reject their products. In short, during the proto-industrial developmental phase, the Alsatian labour force developed important skills pertaining to quality control, and the maintenance of machinery, that served them well once industrialization proceeded in earnest.[23] These attributes were valued greatly by the new factory owners of the early XIXth century. For example, Armand Audiganne, a contemporary observer, was struck by both the "grim determination" and "dexterity" of the Alsatian workers.[24]

In contrast, the mentality of rural populations in other regions of France, not threatened to the same extent by Malthusian pressures, whose standard of living was improving without recourse to new industrial strategies, was quite different, insofar as the force of circumstances did not necessitate their adopting such labour-intensive techniques as in Alsace. For instance, the population of Basse-Normandy

[23] See also Franklin Mendels, « Proto-Industrialization : The First Phase of the Industrialization Process, » *Journal of Economic History* 32 (1972), pp. 241-61. Protoindustrialization in Alsace prepared the transition to modern capitalism and was mixed with modern capitalism (the industrialists gave orders to hand-weavers for their printing fabrics). The system continued until the end of the nineteenth century in northern Alsace, where rural overpopulation persisted longest.

[24] ("âpreté dans le travail") Armand Audiganne, "Du mouvement intellectuel parmi les populations ouvrières : les ouvriers de l'Alsace," *Revue des Deux Mondes*, vol. I (1852), p. 670.

peaked in 1821, and then began a prolonged period of decline. As the population decreased, plough-lands were transformed into pastures, with a concomitant reduction in total labour input. This process led to an increase in agricultural yield per worker: by 1850 it was twice as high as in Alsace. However, the land was used much less intensively, so that revenues per hectare were only half as high as in Alsace.[25] Under these conditions, entrepreneurs found it much more difficult to recruit qualified workers in Basse-Normandy and were therefore unable to compete with manufacturers from the North of France and from Alsace.

The lead taken by Alsace in the area of primary education was also of considerable advantage. The majority of townships had already possessed a school before the passage of Francois Guizot's legislation pertaining to universal education.[26] That Alsace enjoyed a profound advantage in human capital formation is shown by the fact that in 1830, 82 percent of conscripts in the department of Bas-Rhin and 77 percent in the department of Haut-Rhin knew how to read, compared to only 47 percent in France as a whole.[27] Consequently, it was much easier to find qualified workers, and easier to train them to meet the demands of the new technologies. Furthermore, the schooling already socialized them to understand the importance of punctuality, to observe disciplinary regulations, and to become aware of quality standards that were more abstract and more complex than those in the traditional crafts. These attributes raised labour productivity, and substantially reduced unit labour costs, indispensable for success in the extremely competitive environment of the early-industrial age.

Finally, the role of family structure should be considered. The "stem-family" was widespread in Alsace. These were characterized by parental authority over children, even after marriage, and often resulted in three generations living in the same household. In view

[25] Michel Hau, p. 49 ; Gabriel Desert, *Les paysans du Calvados, 1815-1895*, (Lille 1975), vol. III appended tables 37 and 39.

[26] The law, which came into effect in 1833, obliged each township to finance its own elementary school.

[27] Ministry of State Education, *Statistique de l'instruction primaire pour l'année 1863*, (Paris 1865), p. 332.

of the fact that they were part of such a complex family structure throughout their life, maintained extended kinship ties, and were under strict parental authority, rural Alsatian workers had less difficulty in complying with the demands and objectives of their factory foremen.[28] Armand Audiganne's contemporary account is significant again: every Alsatian factory, and in particular those in the Vosges valleys, reminded him of an "industrial clan controlled by a patriarch".[29] This feeling of identification with the business enterprise went so far that in 1848 the workers at De Dietrich firm even agreed to receive their pay late, in order to build up the firm's working capital.[30]

## V. Entrepreneurs who reconciled religious convictions with a faith in human progress

The mentality of the regional industrial bourgeoisie was yet another factor conducive to rapid industrialization in Alsace. These characteristics were a legacy of the past, and it was fortuitous that in Alsace they were perfectly suited to the requirements of industrialization. The Alsatian bourgeoisie was overwhelmingly Calvinist and, as Max Weber asserted already in 1912, the Protestant ethic fostered an industrial capitalism based on performance. Alsatian entrepreneurs were particularly frugal.[31] Imbued with a tradition of

[28] On the advantages of religious networks in lowering the transaction costs of doing business, see: Avner Greif, « Reputation and Coalitions in Medieval Trade : Evidence on the Magribi Traders, » *Journal of Economic History* 49, no. 4 (1989), pp. 857-882.

[29] Audiganne, p. 671.

[30] Gaby Aron-Castaing : "Une grande entreprise en milieu rural : de Dietrich au XIXe siècle", *Saisons d'Alsace* n° 91, (1986), p. 109. The event was independent of the revolutionary turmoil of the time. This example is typical for a region which was far from Paris and from other revolutionary regions. It is located in a rural overpopulated country, where the industrial workers had better revenues than the peasants. The revolution of 1848 did not enjoy much popularity there.

[31] Until the reannexation to the French Republic in 1798, sumptuary laws prohibited the wearing of jewels and luxury suits in the free town of Mulhouse. Moreover, long after they attained high status, industrialists continued to have few servants. In addition, industrial dynasties tended to exist for an extended period of time, and the cohesion of the entrepreneurial families was extraordinary. These features permitted the building of solid firms, with a high rate of self-financing and frictionless transfer of authority between the generations.

study and intellectual curiosity, first directed toward religious issues, and then increasingly towards scientific ones, the Alsatian entrepreneurs became very active in implementing the new technologies of the Industrial Revolution. This was a great asset at a time when firms were managed by a small number of directors with multiple functions. The strict endogamy practised by the old Mulhouse patriarchy, the parental authority over children into adulthood, as well as the large number of heirs facilitated the recruitment of motivated managers and the training of successors.[32] The fact that employers in the Haut-Rhin were often related, and shared a common religion served to strengthen ties between them, both in their work and social undertakings. This solidarity was undermined only by minor differences in opinion, pertaining to tariff policy, between upholders of protectionism and of free trade. The prolonged existence of Alsatian industrial dynasties, and the long-term control of founding families over their firms, even after they were turned into public limited companies, revealed the strength of this family-based capitalism.[33]

The success of many outstanding Alsatian entrepreneurs should not prevent us from acknowledging the ones that failed, and subsequently sank into oblivion. Notwithstanding the talents of their founders, chance obviously also had a role to play in the success or failure of enterprises. Part of the successful economic performance of Alsace can be explained by the continual reinvestment of the fortunes accumulated in industrial ventures, and by the hard-working nature of many of the leading families, in spite of their inherited fortunes.

The religious convictions and philosophical world-view of Alsatian entrepreneurs should also be taken into consideration. In France, the revolutionary crisis hastened the abandonment of Christian values by a large segment of the bourgeoisie, but Alsatian entrepreneurs were among the few who did not participate in this process, and were able

[32] In the Koechlin family, for example, there was an average of 6.4 children per household for the generation which married around 1800 and 5.2 for that which married around 1830.

[33] Michel Hau, *op. cit.*, pp. 350, 395-399.

to reconcile their religious convictions with their faith in secular technological progress. The bourgeois who left the Catholic Church seemed to view profit, above all, as an individual birthright. Those, however, who remained faithful to their religion - mostly Protestants and Jews - perceived economic gain, as both a duty and as a resource to be used in the public interest. Even if these convictions gradually weakened, and no longer motivated the daily economic decisions of entrepreneurs, they nonetheless maintained a worldview conducive to continued risk taking.

## Conclusion

The case study of Alsace enriches our view of the processes of industrialization in XIXth century Europe, insofar as it illuminates the complex relationships of factors leading to success in a particular region. It provides us with the dual paradox of successful economic growth, without many geographic advantages, in a society in which traditional lifestyles persisted in many ways, but did not prevent the assimilation of new technologies. Though investigations must continue, it is now abundantly clear that the threatening Malthusian crisis in Alsace, as in many other parts of Europe, was averted through a process of industrialization. Alsace's comparative advantage was provided by its industrious, literate, skilled, and quality-conscious workforce, which enabled entrepreneurs to succeed even in a resource-poor environment. This case study also underlines the finding that resource-poor regions were, under certain circumstances, quite able to substitute for the supposed pre-requisites of industrialization.[34] The ability of Alsatian entrepreneurs to compete in distant markets was enhanced by the fact that they subscribed to a Weberian ethic of frugality and diligence, demonstrating the importance of many cultural and sociological factors in its unusual success in face of pronounced disadvantages.

[34] Komlos, *Nutrition and Economic Development*, Chapter 5.