

**Localizing scientific management:
Alfa Romeo in Southern Italy (1938-1943).**

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Abstract.

This paper examines the application of scientific management in the Alfa Romeo aircraft engine plant in Pomigliano d'Arco, near Naples, which was built at the end of the 1930s. It will show how the company management tried to apply new methods of scientific management to an underdeveloped rural context in Southern Italy. This was an endeavor which ultimately failed.

Taylorism originated in the US, but was soon studied in Europe and applied there primarily after the First World War. The car industry showed a particular interest in these new methods of organisation. In France, for example, Ernest Mattern introduced scientific management in the plants of Citroën.¹ In Italy, Ugo Gobbato, the manager of Fiat's Lingotto plant during the 1920s, also applied the Taylorist methods which he had studied directly during his visits to large factories in the US. Gobbato was also a member of the Italian organization for the promotion of scientific management (Ente nazionale per l'organizzazione scientifica del lavoro or Enios), established in 1926.² In 1933, he left Fiat to

1 Y. Cohen, 1983; S. Van de Castlele-Schweitzer, 1986.

2 U. Gobbato, 1942.

become the head of Alfa Romeo, a part of the state-holding IRI (Istituto per la Ricostruzione Industriale), which the Fascist government had established the same year to rescue bankrupt companies and banks, to promote its industrial policies (geared towards autarky and regional development) and to facilitate its rearmament efforts. To meet these needs and facilitate its own recovery, Alfa Romeo diversified its production from automobiles to military vehicles; aircraft engines for the Air Force, trucks for the Army and buses for the Italian colonies. In 1938, the Ministry of the Air Force asked Alfa Romeo to build a large plant for the production of aircraft engines based on a Daimler-Benz design, with its output destined for both Italian military aircraft producers and the German Luftwaffe. Eventually, the plant was also meant to produce its own aircraft; though this never happened because the Alfa Romeo engineers and the Ministry could not agree on a design. Pomigliano d'Arco near Naples was chosen, because it was thought to be far from the range of the enemy bombers and was a rural area in need of industrial development.

The challenge for Gobbato and his managers was to adapt the Taylorist methods to such an underdeveloped area, where people made their living as farmers or craftsman and were now to become factory workers. Alfa Romeo adopted a number of measures to address these shortcomings, namely establishing a training center inside the plant and also creating houses for the workers next to the development. Also, they established a new farm further away for those who had given up their land for the construction of the factory.

But these efforts showed only very limited results and the company had to start additional engine production at its Portello plant in Milan to meet wartime needs. The few positive results there were obliterated when the factory was first bombed by the Allies and then completely destroyed by the retreating German army in 1943.

Technocracy and scientific management in Italy during the interwar period.

During the interwar period, the leaders of European society were learning from the new American scientific management theories and for the first time the human factor was considered to be the main problem of the theory. Taylorism was only the starting point in the discussions over organization, social impact and wages. In fact, all these aspects were gradually changing European society. Scientific management was becoming a tool used to plan not only factories but also countrywide developments. After the First World War, American firms were much too developed for national markets but, as the European context was considered to be underdeveloped, the ruling classes in both countries grasped opportunities to spread organizational models all over Europe. In 1926 an international committee, comprising American technicians and French, Italian, Belgian, Czechoslovak, Polish and German members, was

founded to circulate these theories, studying solutions to localize Taylorism, which was considered by them only as an ideal reference model.³

At this time Italian industries were very backward and not predisposed to improve. Hand-crafted production was still widespread and it clashed with the process of rationalization and use of advanced machinery. In 1925 the Ente nazionale per l'organizzazione scientifica del lavoro (Enios) was founded in order to spread Taylorism into Italian culture.⁴ The first step was to unify and normalize materials, tools and times to achieve the mass production. Unification was a good starting point both for small to medium and for larger factories. The Italian working class was very proud of its traditional craft skills and was initially opposed to the standardization of labour, however fascist trade unions attempted to damp down any industrial action or protests.⁵ At the same time the majority of the Italian ruling class was sure of its paternalistic methods and opposed to the Taylorist methods to work at full speed, but also distrustful of fascist intervention during negotiations with the workers. While it was recognized that, during the '20s, the influence of fascism improved the rate of production in the factories, corporatism had a difficult beginning: fascism is a corporatist political system which insists on the collective management of the economy by employers, workers and state officials at a national level. Under this system, individual interests are marginalized. Corporatism would instead

3 D. Hounshell, 1985; G. Sapelli, 1978; A. Salsano, 1987; S. Tolliday, 1986 S. Van de Castlelee-Schweitzer, 1986.

4 F. Mauro, 1926.

5 M. Montagnana, 1929, 1933; G. Di Vittorio, 1932.

recognize or 'incorporate' every divergent interest into the state organically. Technocracy found "rich soil" because private interests were mitigated by fascism, however at the same time it was a complicated system without guarantees about the balance between state intervention, owners and management. In any case, the fascist bureaucracy supported management against the interference of the ownership. After the crisis of 1929, the fascists tried to take financial control of the principal firms without nationalizing them but instead founding the state-holding IRI.⁶

Alfa Romeo: from artisanal to Taylorist firm.

Alfa Romeo made sports cars and, during the '20s, produced excellent results in this area. Due to an unsuccessful reconstruction process after World War I, Alfa Romeo found itself in deficit and the owner, Nicola Romeo, lost the control of his firm. Banca di Sconto became the main shareholder of Alfa Romeo and started a recovery program. Nevertheless, due to a financial crisis of the bank, Istituto di Liquidazioni (Settlings Institution) took the control of the firm from 1926 to 1932 but was not able to provide adequate financial resources and capabilities. Thus, paradoxically, while Alfa Romeo's products were producing excellent sports performances, the company was close to bankruptcy. Technicians and workers had very good skills and capabilities and the plant was able to produce a modest amount of sports cars and a few trucks, buses and

⁶ C. Spagnolo, 1992; Bigazzi, 1978.

aeronautical engines. In 1932 Mussolini showed great interest in the results achieved by Alfa Romeo in the international races which were judged to be of great importance for propaganda purposes. Following his intervention, IRI made a plan to bail out the firm. Only Fiat, Piaggio and Isotta Fraschini were important makers of aeronautical engines: Italian Air force didn't have a referential state controlled firm but was subject to the financial problems of Isotta Fraschini and the technical weakness of Piaggio. In particular Fiat was the most regressive and sought to monopolize the production of aeronautical engines in Italy, therefore reducing the Air Force's range of solutions.⁷ So the IRI decided to transform Alfa Romeo into a modern aeronautical engine maker. Ugo Gobbato, a public manager with entrepreneurial capabilities who had gained long experience in Fiat during the 1920's, was at the head of Alfa Romeo from 1933 to 1945; he attempted to diversify production and halted the production of sports cars due to the financial crisis.⁸

Ugo Gobbato was born in Volpago del Montello, not far from Venice, in 1888, and he studied as technician, first working in a local hydroelectric firm. In 1909 he graduated in engineering from Zwinkau University in the west of the German federal state Saxony. After World War I ended, he worked at the new Fiat Lingotto plant, quickly becoming the main manager of the plant. During the 20's he visited Ford Highland Park plant and other important American firms oriented to mass production. After these successful roles, Agnelli decided to

7 F. Minniti, 1981.

8 M. Comei, 1998.

charge Gobbato with organizing the new Riv plant near Moscow, controlled by Fiat and conceived to be a standardized producer of ball bearings. Gobbato was also member of Enios and was considered one of the most important Italian applicator of scientific management. Thus, when the head of IRI decided on a rescue plan for Alfa Romeo, Gobbato was judged fit to be placed in charge of the factory's reorganization. In 1932 Gobbato interrupted the Russian experience intolerable because of the oppressive social and political climate. In 1933 he accepted the new charge.⁹

The Alfa Romeo aeronautical productions.

In 1918, Alfa Romeo for the first time produced five aeronautical engines (from an order of three hundred) to support Isotta Fraschini productions. The craftsmen were slow and inaccurate and the organization of the plant mixed different productions (bombs, engines, punches etc.).¹⁰ After this experimental production, the firm started again in 1924 with the production of the 150 Jupiter. It was a radial 9 cylinders air-cooled design and was produced under Gnome et Rhône license. The French firm had bought rights from Bristol when the British firm was still testing the Jupiter.¹¹ During the '20s, Alfa Romeo technicians gained experience in the sector. However flaws persisted, and this

⁹ Archivio Storico Alfa Romeo (Asar), Finanziaria (Fina), c. 31, fasciolo «Gobbato». See also S. Agnoletto, 2001; P. Bassignana, 2000 e G. Ciocca, 1933.

¹⁰ D. Bigazzi, 1988 G. Rochat, 1979.

¹¹ Asar, Direzione generale (Digen), Segr, Pv, c. 9, f. 17, «Promemoria dei diversi servizi al Direttore Generale anche circa le speciali situazione del contratto Gnome et Rhône/Bristol/Alfa».

caused frequent delays in the delivery of work. Air Force tolerance limits were drastically reduced with IRI intervention. From 1933 to 1938 Gobbato worked to introduce Taylorist methods into the production of a series of aeronautical engines.. One of the most important of Gobbato's interventions was based on the consideration of human capabilities. He reorganized the whole Alfa Romeo production plant, giving motivation and responsibility to the middle management. Gobbato's aim was to combine an autonomous managerial decision process with the accomplishment of the ability to solve unexpected problems. He was also able to organize the human capital at all levels, exploiting older craftsman as well as new technicians and engineers. New workers, both unskilled workers and young engineers, had to attend the firm's school, and the employees became teachers themselves after they had gained sufficient experience. There was also knowledge transfer between those producing different product lines: for example, many technicians who had experience in the sports sector were moved to aeronautical engines productions. Milan was also a fit place for such a scheme, with already existing social infrastructures and a job market created by the many factories which had arisen in the suburbs.¹²

Italian Air Force at the beginnings of World War II.

In 1939 Italian Regia Aeronautica was a significant force only in theory: by June 1940 the Italian Air Force had 783 bombers, 594 fighters, and 419

¹² R. C. Garberi, 2008.

reconnaissance aircraft and also 84,000 total personnel. But the obsolescence of equipment and the influence of hierarchies and senior officers who advised the Air Force about the development of airplanes, who stressed the need for good acrobatic qualities for air to air combat to the detriment of high speed. Also, American engineers were developing new heavy bombers with four engines, though the Italian Air Force carried on during the 1930s to increase the number of medium-sized bombers with three engines which it held. Italian fighters were very good biplanes but seemed outdated and inferior in comparison to the new European monoplanes. Also the Air Force had a great number of different models and the aircrafts were wooden and built by hand. In the Italian aviation industry bombers made of metal were still at the testing stage but the weakness of skills and a lack of both working capital and of capacity caused a considerable delay in comparison to other countries, for example, Britain and France.¹³

Researching the reliability of the aeronautical engine was very expensive for the Italian motor industry and so production under foreign license was considered the best solution to bridge the technological gap. Alfa Romeo was the only state engine industry in Italy but their license only covered the production of the Bristol aircraft. Thus, the new Alfa Romeo organization was based on the American scientific management theories to minimize costs and mistakes.¹⁴ The plant in Milan was not considered enough to support the

¹³ J. S. Corum, 2004.

¹⁴ D. Bigazzi, 1986, 2000b.

increasing demand placed on the company by the imminent war and there was also significant government pressure for the establishment of a new plant able to assemble full aircraft. High-ranking officials were convinced that a new plant had to be built far from the enemy bombers range, so they excluded the possibility of situating the new plant in the north. They proposed that Alfa Romeo and Cantieri riuniti dell'Adriatico might cooperate to the new plant, combining the expertise of Gobbato's firm in engines and mechanical components and the other firm's knowledge of fuselages.¹⁵ They located the agricultural area of San Martino in Pomigliano d'Arco, near Naples. This area was considered fit because of the backwardness and the chronic joblessness. The political plan of development was also connected to the fascist idea of coexistence between factories and farms; this was supported by the propaganda of autarchy and the might of the rustic Italy. In retrospect, however, these choices reveal themselves to be absolutely wrong: the lack of infrastructures, of human skills and, in particular, the distance from the most important firms in the north of the country highlighted the difficulty of creating a southern industrial base *ex novo*.¹⁶

15 Asar, Digen, Pv. S. Martino c. 296, f. 57s, «"Cant" Cantieri riuniti dell'Adriatico Monfalcone. Collaborazione per l'avviamento cellule», 1941-1942 and Asar, Digen, Pv. S. Martino c. 297, f. 64s, «Avviamento cellule a Pomigliano. Sottopratica rapporti cellule norme», 1939-1943.
16 A. Dell'Orefice, 1994.

The new plant.

Mussolini started the work on 1st April 1939 . Firstly there were the burn buildings assigned to engine production, and then those assigned for aircraft productions. At the same time new accommodation was built around the plant to provide homes for the workers who, at the start of production, were coming from Milan. Then the foundry to make the aluminium alloys, essentials for aeronautical components, was completed. Buildings were connected by tunnels to allow quick and safe movements of the workforce; they also utilized servo systems and air conditioned ducts which ensured the tunnels were very easy to keep in good conditions Near the plant a cement runway was built to test the airplanes. The new structures were connected to railway system and the local line of *Circumvesuviana*. Another important aspect was the impact of the new Pomigliano d'Arco village with a rational disposition of about 600 homes, shops and services and an important welfare area. The workers homes all also incorporated a vegetable garden. Around the plant there was a farm that employed a great number of farmers who IRI had dispossessed from their land in the building of the Alfa Romeo plant. This farm complex also gave autonomy to the plant in complete consistency with the Agricultural land improvement policy of Fascism.¹⁷

¹⁷ Fondazione Feltrinelli, Fondo Duccio Bigazzi, «Fabbrica di aeroplani S. Martino in Pomigliano d'Arco (Napoli), Visita allo stabilimento di S. Martino», Milano, 23 settembre 1940. See also S. Stenti, 2003.

The Italian Air force was uncertain with regard to its needs: during the '30s in fact, the government supported the development of a disproportionate number of airplanes. The absence of a clear line of development caused delays, inconsistencies and an equipment not well suited for different purposes. After the intervention in the Spanish civil war there was, for example, an overabundance of medium bombers, but the research to produce new solutions was fragmented over many different projects without any central co-ordination. At the end of 30's, the SM 79 was, for example, a very good aircraft, the most widely produced Italian bomber, but its design was founded on old technical knowledge (the fuselage was made of a welded tubular steel frame and covered with duralumin, plywood and fabric, with wooden wings). At the beginning of the conflict no heavy bomber was ready and so the Italian Air Force were powerless against foreign technology. The use of foreign licenses helped technicians to bridge the technological gap to enable them to make safe engines, but the reliability obtained meant that models became outdated, without any new insights being gained about how to produce new engines with higher power. These problems were becoming significant for the development of the new plant, because was not clear what kind of solution the government considered appropriate.¹⁸ Alfa Romeo was specializing in radial engines production, but the relationship with their German allies persuaded the government to use the Daimler Benz license to produce the DB 601, a 12

18 L. Ceva, 2004.

inverted V cylinders, with height performances, but completely different in comparison to radial engines. At the same time the uncertainty about what kind of airplane had to be produced in Pomigliano caused embarrassment and tension between Ugo Gobbato and the government. Gobbato was conscious that in Milan he had good technicians and engineers, so he started a program of rounds at the Daimler Benz plant near Berlino. So he tried to train the workforce for the new type of engine production but there were still two problems. The first was the absence of knowledge about metal fuselages and the second the absence of a clear idea of airplane production. The plant took into account many variables and so the dimensions of the sheds and hangars were calculated to satisfy manifold productive exigencies. This was done in the same way as the new Fiat plant of Mirafiori, Pomigliano which had to be flexible in order to resolve the rigidity of buildings such as existed at Fiat Lingotto, for example.¹⁹ Gobbato started the production of engines with the Alfa 110 and Alfa 115, a four and a six cylinder, air-cooled, inline engine respectively, used in a variety of light aircraft; both of these types were based on the de Havilland Gipsy engine. This activity was important to begin the training of the local workforce.²⁰

19 D. Bigazzi, 1981, 2000a.

20 As 3, f. 54, «Relazione sulla visita allo Stabilimento di Pomigliano eseguita nei giorni 4-7 luglio 1945 dagli ingegneri Tomaselli e Gatti», Milano, 18 luglio 1945; Asar, As, c. 3, f. 58, «Relazione sull'avviamento e lo sviluppo della produzione dello stabilimento aeronautico S. Martino di Pomigliano d'Arco», Pomigliano, 6 luglio 1943. See also S. Ritchie, 1997.

The Alfa Romeo Corporate Schools.

The Milan Training Center was founded in 1936 by Gobbato and it was subdivided into a school for engineers and technicians and one for workers. This institution was important to train the workforce and ensure it was able to keep to the pace dictated by a Taylorist firm: traditional artisanal methods had to be abandoned and every worker needed to be trained with the same working practice and so reduce individual discretion. About 12 hours were dedicated to theoretical notions and 30 hours to practice. After two years workers were divided in two groups, one specializing in foundry materials or and the other in mechanics. At the same time clerks completed their training into the offices. One of the most important factors was the relationship with families of the scholars, indeed in many cases the trainees were the sons of employees and so their good performances and results caused immediate consequences for the reputation of their parents inside the factory. So the school was also a tool of social control, in addition to the recreational club and the other fascist welfare organizations. However, whilst in Milan the workforce come from professional schools or other factories and had experience of the demands of factory life, discipline and the terms of remuneration, in Pomigliano d'Arco the situation was completely different. Workers were closely tied to the countryside and to local traditional jobs. Alfa Romeo started its selection of employees from 6,373 candidates, but only 50% were judged suitable for work in the factory. In 1939 Gobbato activated the Pomigliano Corporate School but results were very

different in comparison with the Milan academy. Scholars were traditional craftsman (15%), farmers (3.5%) and 35% of them didn't have a definable job before coming to the Alfa Romeo plant. Until 30 June 1943, 4,075 apprentices had attended the school; 509 were trainees inside the factory, 903 failed and were fired and 2,582 started to work. A part of workforce came from the Milan plant, but 62% of mechanics, 33% of operators at assemblage of aircraft and 60% came from the Pomigliano d'Arco Corporate School. However 8% of the workforce was fired because it was deemed untrustworthy and in many cases workers' presence was irregular with lots of unexcused absences. Consequently these situations prevented management from organizing into regular teams and shift patterns. The cultural and social context of Southern Italy was very different from Milan industrial area. Families were connected within very strong social networks and through informal personal bonds: managers who first began planning for the hiring of personnel received a lot of nepotistic pressure to employ relatives, friends of local politicians and local people without basic entrance requirements. Instead of this, Gobbato wanted to start a modern enterprise with productive workers and attempted to introduce a rigid hierarchy and clear factory norms, defining each workers responsibilities and reducing the informality. The engines assembly line was conceived to employ workers with good skills, able to work with precision to reduce mistakes and avoid the waste of materials which was subject to autarchy policy. So he tried to solve this problem by asking for direct intervention on the part of corporatist labour

institutions in order to initiate regular employment by using the official checked lists of rights holders. But the absence of a professional ethic allowed for the creation of a flexible, indefinite and informal system that involved not only the workers but also the engineers at the head of the plant.²¹

Conclusions.

The distance of the factory from Milan become an important problem when the Italian railroad system was damaged by the Allied bombs and others means of transportation also became extremely dangerous. Gobbato worked from the Milan plant and the direction of the southern division was carried out by a young engineer who had studied in Daimler Benz plants but didn't have the necessary authority to command the workers. So the workforce management degenerated progressively into anarchy. The plant was damaged by Allied bombs and completely destroyed by German soldiers with mines in september 1943. After the armistice the plant was became a sort of "gold mine" of ruins from which people scavenged every kind of material, cattle and food. After the conflict Alfa Romeo technicians found parts of the plant scattered over a range of 100 km and goods looted from the plant used by people in many disparate ways.²²

21 *Archivio storico Alfa Romeo*, a cura di E. Ruocco, and «Scuola aziendale», s.l., s.d., Fondazione Feltrinelli, Fondo Duccio Bigazzi.

22 Asar, As, c. 3, f. 58, «Stabilimento aeronautico S. Martino di Pomigliano d'Arco», relazione del 31 gennaio 1945.

When the plant was destroyed it had made just 900 small power engines and more than 1000 of high power and the assembly lines were working incessantly. Nevertheless the support of workers and in particular technicians and engineers from Milan was still predominant, even if a part of local workforce was progressively acquiring skills. But the fickleness of the majority of workers was still an unresolved problem; the idea of the establishment of the new town and the farm linked to the plant had only a partial cushioning effect and equally nor did the Corporate school prove to be enough to adequately train workers or give them a sense of cohesion and allegiance to the firm.

Partially based on the experience at Pomigliano d'Arco, Gobbato developed a series of ideas to help develop Italy after the war, based on medium-sized companies with no more than 5,000 employees and an overall system planned but not directly controlled by the state which embraced all productive sectors and integrated well with the countryside. But once again, its possible realization was cut short when Gobbato was murdered in 1945.

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