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PRODUCTIVITY IN CONSTRUCTION, SOMETHING IS CHANGING: THE PATH THROUGH A DIGITAL CONSTRUCTION SECTOR

by Antonio Mura, CRESME Ricerche, Italy

In 2022, the hourly productivity within the construction sector in Italy was 26 euros (measured as the added value per hour worked and expressed in 2015 prices), indicating a noteworthy disparity compared to the general average of approximately 36.5 euros. The sector is facing an efficiency problem, an issue that does not solely concern construction companies; tracing back along the supply chain, the productivity gap indeed persists. The activities of architecture and engineering firms, for instance, demonstrate hourly productivity levels of around 25 euros, similar to those of construction companies. Nevertheless, there are emerging indications of a shifting landscape: during the post-pandemic era, the Italian construction sector has witnessed a substantial surge in hourly productivity, surpassing the pre-crisis averages (2017-2019 period). In 2022, the productivity in construction was +9.2% higher, exceeding the overall increase of “merely” +2.8% (with manufacturing productivity maintaining a relatively stable growth of +0.2%).

Figure 1: Hourly productivity, Italy 2022 (1/2)

Euros per hour worked, 2015 prices

S: Istat, Cresme calculations (2023).

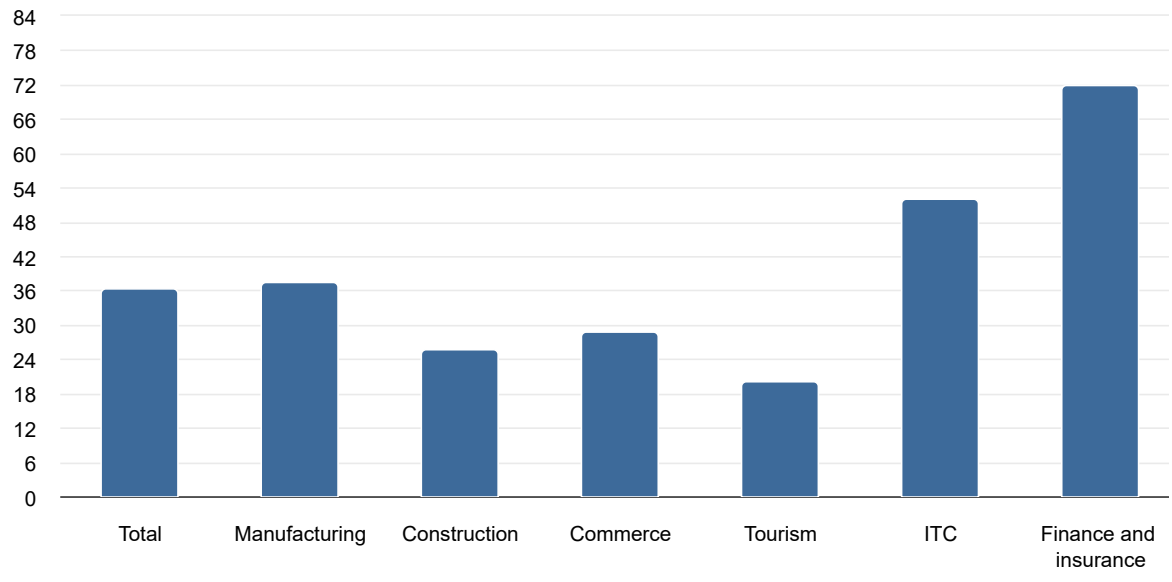
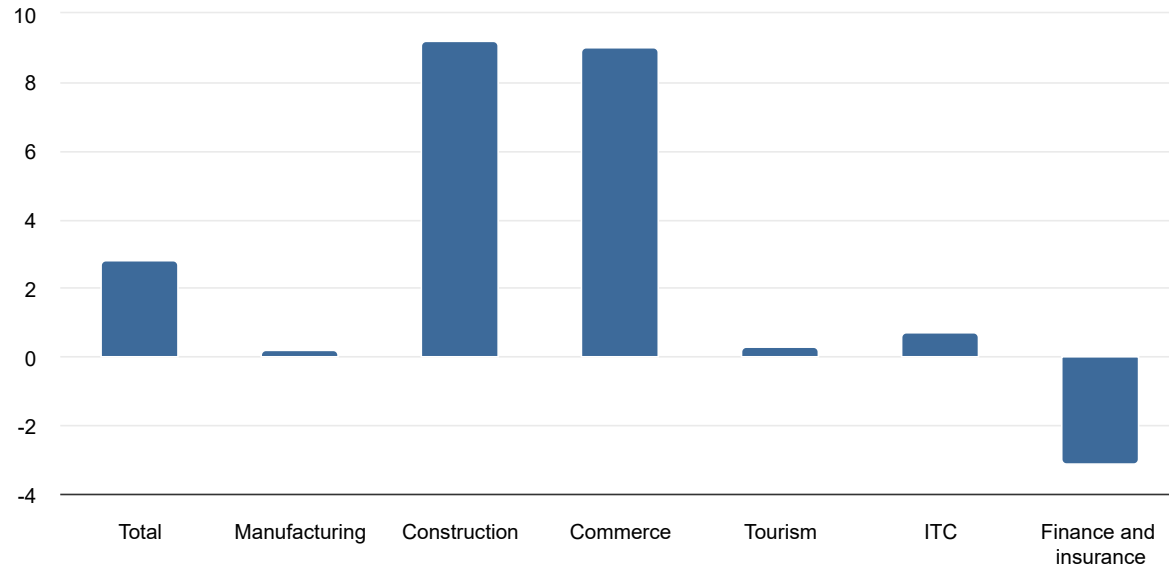


Figure 2: Hourly productivity, Italy 2022 (2/2)

Percent change from 2017-2019 average, 2015 real terms

S: Istat, Cresme calculations (2023).



"During the post-pandemic era, the Italian construction sector has witnessed a substantial surge in hourly productivity, surpassing the pre-crisis averages (2017-2019 period). In 2022, the productivity in construction was +9.2% higher, exceeding the overall increase of "merely" +2.8%"

This sectoral performance allows for different interpretations:

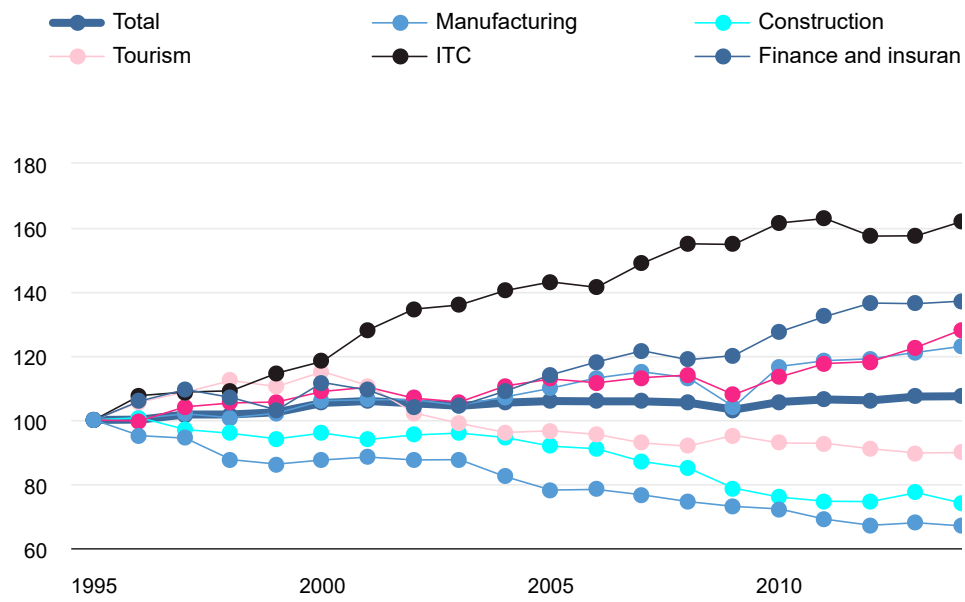
- Price change effect: the rapid increase in prices may have had an impact, considering the well-known difficulties in measuring inflation within the construction sector; underestimating the deflators, in fact, could explain part of the recent trend in hourly productivity (measured at constant values).
- Underestimation of hour worked: similarly, it's possible that an underestimation of the hours worked, due to the boost and burst expansion of the renovation market and the need for companies to rapidly increase their production capacity without making structural changes, could have had a positive impact on the measurement of productivity metrics.
- Renovation market boom: a direct effect related to the growth of the fiscally incentivized renovation market should not be excluded: the "financialization" of the sector, driven by the possibility of transferring the tax credits, the need to meet specific deadlines for the execution of works, heightened scrutiny and controls, the inclusion of administrative activities in company balance sheets and a greater focus on production process management, may have contributed to the growth of sectoral productivity.
- Expansion of civil engineering works: also the expansion of the infrastructure market (+11.5% increase in production value between 2022 and 2019) could also have played a role, with companies operating in the civil engineering sector, which are generally larger and more structured, showing higher levels of productivity compared to construction companies.
- Modernization and digital innovations: other possible factors are the increasing importance of the plant systems market (which now accounts for 35% of sectoral

production, the highest in Europe, compared to 27% registered ten years ago), which represents the most innovative and technological part of the construction industry, and, among all, a possible acceleration of the digitalization process.

Figure 3: Long term development of hourly productivity in Italy

1995=100, 2015 prices

S: Istat, Cresme calculations (2023).



That something is moving in this direction is suggested by the fact that the positive trend in sectoral productivity is not limited to the most recent years. Considering the pre-pandemic period (2017-2019), construction is in fact the macro-sector that experienced the highest average productivity growth (+1.5% average annual growth, same as the commercial sector; +0.4% is the overall average). Moreover, in the past six years, among the four major European countries, only Italy has shown such significant productivity growth in the construction sector (+2% average annual growth in Italy, -0.8% in Germany, -4.5% in Spain, and -1.0% in France).

Figure 4: Hourly productivity in the construction sector in the largest Euro

Annual average change, in percent in real terms

S: OECD, Cresme calculations (2023).

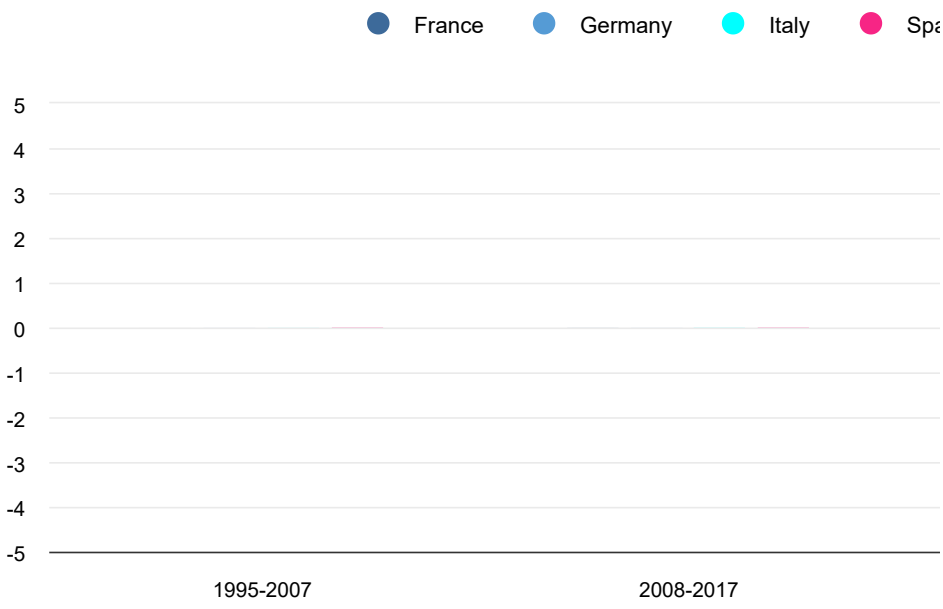
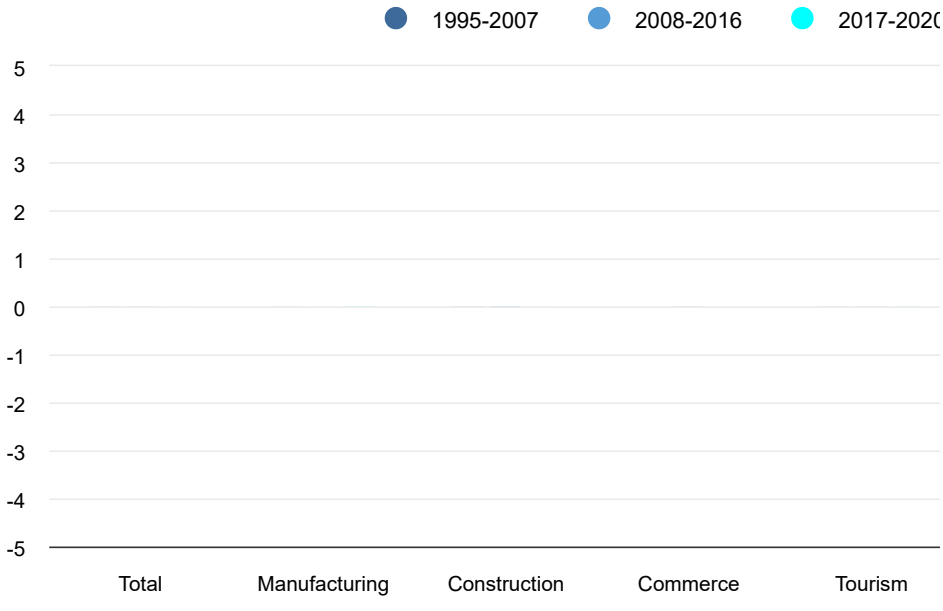


Figure 5: Total factor productivity

Annual average change, in percent in real terms

S: EU-KLEMS, Cresme calculations (2023).



The fact that something is indeed happening, in terms of process optimization and digitization, is confirmed by analysing the total factor productivity (TFP). Hourly productivity growth is typically split into three components: the increase in fixed capital per worker (capital deepening), the shift of working hours towards higher value-added activities and an increase in total factor productivity. The latter represents everything that contributes to the output growth that is not related to changes in the production factors, and includes, technological developments, process innovation and improvement in human capital quality. Looking at the period 2017-2020, the growth of sectoral TFP closely mirrored the dynamics of

hourly productivity; it has increased in construction (+0.6% average annual growth) and decreased in other sectors (-0.5% overall average, -1.4% in manufacturing).

On the other hand, over the past decade, there has been a growing recognition of the necessity to enhance the sustainability of the construction sector on a broader scale. As a result, the adoption of digital process management has emerged as a potential solution to address the longstanding issues of stagnant growth and low productivity.

Manufacturing companies, especially in highly internationalized sectors, started to realize the benefits of digital management, from procurement, through the use of EDI platforms for e-procurement, to sales. The distribution sector started to figure out that a comprehensive digital management system that interacts with manufacturers' platforms, exchanging product data and technical information efficiently, is the key to compete in an increasingly demanding and internationalized market. Automated warehouse and logistics management, the standardization of technical information and the use of cutting-edge information systems for real-time inventory management started to spread among more structured companies, driving innovation at all levels. Construction companies and installers begin to understand that, in order to reduce operational risk (dispute, safety, administrative, environmental, etc.), an optimized information management of construction sites is mandatory. The themes of digitization and traceability, then, become strategic, not only for improving productivity and efficiency, but also for risk mitigation. In the field of systems and installations, the increasing integration of buildings with home automation and IoT is making standardization of data flow crucial, in a broader perspective of component interoperability.

In this context, there is an increasing awareness that the quality of the building product depends on the quality of the decision-making process, the choice of materials and the integration between the design phase and the construction moment. In this sense, the adoption of Building Information Modelling (BIM), BIM as an integrated tool for managing the entire process, from design to execution, to facility management, assumes a deeper strategic role. The digitization process implemented at the early stages, thus, enables the integration of various digital solutions throughout all the construction phases, including the management phase. But the first step towards a truly digital construction industry is to ensure that products during design, construction, delivery, management and maintenance can be uniquely identified and traced.

A recent survey conducted by Cresme among leading entities in the industry provides insights into various aspects of digital innovation. In terms of e-procurement, the use of EDI platforms is still limited among manufacturing companies of construction products, mostly for foreign suppliers. When it comes to sales, companies rarely possess dedicated order management platforms and rely on email or direct contact. In specialized distribution, the use of EDI platforms is almost non-existent, except for the centralized purchasing context. Regarding product coding, barcodes are commonly used by manufacturers for marketing, along with internal coding for warehouse and logistics. In distribution, larger specialized groups emphasize the importance of product information coding for efficient warehouse management, however, across the sector, including smaller companies, the situation is problematic; many distributors do not even include GTIN codes in their systems, leading to suboptimal purchasing and internal warehouse management. In the construction industry, information coding and on-site communication are limited to more structured entities, with no real-time system for tracking materials, machinery, and personnel in the majority of cases. In general, construction companies represent the true bottleneck of the digitalization process of the supply chain; in 2022, according to the DII (Digital Intensity) index developed by Eurostat, 84.5% of construction companies (considering only the larger ones with more than 10 employees, which account for just 5% of the total) have indeed a low or very low level of digitalization.

In conclusion, delays are widespread, especially due to the entrepreneurial landscape of Italian construction companies, which largely consist of small and micro-sized entities with limited capitalization and a lesser inclination towards innovation. However, recent trends demonstrate that, although taking its time, the path is set: even in Italy, digitalization stands as the future of the construction sector.

ABOUT THE AUTHOR

Antonio Mura

CRESME Ricerche, Italy

https://cresme.it

antonio.mura@cresme.it