Research about Shipbuilding Sector

(Project n. 2024307)

Introduction

This research was conducted with the support of the Italian metalworkers' union Fiom-Cgil. It aims to highlight the main issues related to labour in the Fincantieri Group's shipyards. To investigate these topics, Fincantieri's main official documents (company financial statements, financial reports) and the main collective agreements with trade unions were analysed, and in-depth studies were carried out through targeted interviews with workers and trade unionists.

The Fincantieri Group dominates the shipbuilding industry in Italy. Fincantieri is one of the leading shipbuilding groups in the world, and it is active in all sectors of shipbuilding. It produces cruise ships, holding a 40% share of the global market, military ships, offshore vessels, oil and gas ships, fishing vessels, special ships, mechatronic and electronic naval systems, digital systems, engineering, and infrastructure. In Italy, Fincantieri employs over 11,000 people directly, operating on four continents with 18 facilities and over 21,000 direct employees. 71.32% of the company's share capital is publicly owned (Cassa Depositi e Prestiti), while other shareholders hold the remaining shares.

It is helpful to examine the financial data to understand what kind of company we are dealing with. The 2023 financial statements, as shown in Table 1, provide highly indicative data.

Table 1: Key Financial Data of Fincantieri S.p.A. (figures in thousands of euros)

Variable	2023
TOTAL VALUE OF PRODUCTION	5,333,572
Added Value	974,375
Total personnel costs	627,287
EBITDA	234,612
OPERATING MARGIN	92,438

The operating profit in 2023 amounted to over 92 million euros, highlighting how Fincantieri's figures lead to a completely different perspective than what has been stated about contracts: Fincantieri has substantial resources, with ample margins in terms of added value and net margin. A different approach should be adopted, especially considering the public nature of the company in question.

The same can be said when looking at the per capita data, as shown in Table 1-bis.

Table 1-bis: Per Capita Values (figures in euros)

Variable	2023
Turnover per employee	573,500
Added value per employee (a)	109,120
Staff Costs per employee (b)	70,250.00
Difference (a) - (b)	38,870

1. The Scale of the Contracting Phenomenon at Fincantieri

The organisational system of Fincantieri's production is characterised by extensive subcontracting related to the direct production of the ship.

Let us examine the presence of subcontracted workers in some months of a given year at a group shipyard. As shown in Table 2, the number of subcontracted workers and contracting companies at this shipyard is very high.

It should be noted that these data only include workers from subcontracting companies present at the yard, excluding so-called "turnkey" contracts, whose time is not counted as hours worked within the facility (this type of contract does not involve payment to the company based on hours worked, but rather based on the type of supply requested – e.g., bathrooms, cabins, etc.). If the data for "turnkey" contracts were included, the number of contracted hours (and the corresponding number of workers) would be even higher.

Table 2: Number of Subcontracted Workers and Companies at a Shipyard of the Group

Month	Number of Subcontracted Workers	Number of Subcontracting Companies
April	4,020	512
May	4,798	527
June	4,192	539
July	4,581	553
August	1,857	468

These data tell us two things.

The first: Based on the numbers from May, June, and July, we can estimate the average size of subcontracting companies: 9.1 employees, 7.7 employees, and 8.2 employees.

These average figures show that most subcontracting companies are tiny (we will revisit this point in a later section regarding Fincantieri's declared goal of pursuing a "qualification of the supply chain").

The second: According to the employment data for the yard, Fincantieri has an average of just over a thousand direct employees there. As noted, the ratio between subcontracted employees and Fincantieri employees is approximately 1:4.

However, this disproportion is even greater when we compare the hours worked by Fincantieri employees and those from subcontracting companies.

The hours subcontracting companies work account for over 80% of each ship's total hours.

In reality, the percentage of pure production is even higher, as nearly all of Fincantieri's direct employees' hours are limited to controlling, verifying, and reporting any shortcomings.

Fincantieri's decision to rely heavily on subcontracting for ship construction reflects the minimal presence of direct Fincantieri workers in almost all phases of the process.

Fincantieri workers are not strictly involved in production; they only perform tasks such as controlling subcontractors, overseeing subcontracted performance, and providing support services to them. In this way, Fincantieri has virtually given up on involving its staff in ship production.

2. Economic Aspects of Subcontracting: The Average Labor Cost

The expenditure on services, however, while high in absolute terms, appears very low when compared to the cost of Fincantieri's workforce, whose size is in a meagre ratio (1:4) to that of the subcontracting companies.

To understand this discrepancy between the scale of subcontracted labour and the relatively low cost incurred by Fincantieri for these services, we compared the average labour cost of some companies that have operated in the Group's shipyards with that of Fincantieri's direct employees. In some cases, the difference amounts to 20-30,000 euros.

This difference is not only due to the per capita cost (about 70,000 euros) for Fincantieri's employees but also includes managers and executives.

The same difference can be seen when we compare the per-capita personnel costs of some companies operating under contract at Fincantieri with those of other companies—also under contract—operating at other plants (e.g., petrochemicals), as shown in Table 3.

Table 3: Per Capita Labor Cost in Shipbuilding Subcontracting vs Other Sites

	Subcontracting (Shipbuilding)	Subcontracting (Other Plants)
Company 1	37,912.60	85.546,13
Company 2	33,414.81	55.650,23
Company 3	25,334.36	53.307,76
Company 4	22,468.57	47.400,05

This comparison also highlights the significant gap between the per capita labour cost practised by subcontracting companies operating at Fincantieri's shipyards and those working at other sites.

3. How the Subcontracting System Works at Fincantieri

3.1 The Work Breakdown and Cost Breakdown Structures

Fincantieri uses the Work Breakdown Structure (WBS) method, which allows the ship to be broken down into constituent parts. In this case, we are interested in the breakdown of the product into its parts (Product Breakdown Structure) and the breakdown of the total cost (Cost Breakdown Structure) for each component.

For example, a cruise ship primarily comprises a hull, propulsion system, everything related to cabins, service areas, restaurants, cinema-theater rooms, etc.

We can further subdivide these components depending on the level of detail in the WBS. In this way, the breakdown of the entire ship becomes increasingly detailed.

Once the ship is broken down, the Cost Breakdown Structure tool allows the cost to be assigned to each component. The cost of each component is determined by several factors, including materials, equipment, and labour needed to produce it.

The first and second-level WBS used by Fincantieri breaks the ship down into functional components: hull, coverings, marine systems, auxiliary systems for the engine and hull, ventilation/air conditioning systems, electrical systems, catering and service areas, furnishings and public rooms, propulsion systems, etc.

The WBS further breaks down these functional components into their parts.

To elaborate, the auxiliary systems for the hull and engine consist of, for example, steam and condensate discharge systems, technical water systems, washing and drinking water systems, fire and washing systems, fire extinguishing systems, compressed air systems, fuel service systems, oil service systems, etc.

Similarly, the marine system consists of equipment for anchoring and mooring, steering systems, manoeuvring propellers, navigation instruments, masts, etc.
Each of these parts/systems is further divided into individual components. The objective of a WBS is to arrive at the smallest constituent detail.
Let us take the hull as an example: the individual blocks are made up of sub-blocks, which in turn consist of sub-assemblies. Further broken down, these sub-assemblies consist of sheets, "beams," "flat steel with bulb shapes," etc.
The individual parts can either be purchased (in which case the cost of each part corresponds to its purchase price) or produced internally; this is the well-known "Make or Buy" decision.
Producing each of these essential parts requires a working process (manufacturing process), and if this process occurs internally at Fincantieri, it must be translated into cost terms. The same applies to the assembly operations of parts.
Let us look at two concrete examples:
First example: In the case of the hull, the individual parts or elements that make it up (sheets, bulbs, etc.) are worked on internally. Even if a sheet is produced externally, once it arrives at the yard, it is still worked on through carpentry operations: shaping, bending, welding, etc.
Thus, the production process for parts of the hull, such as a wall of a block, involves several manufacturing operations. These are "productive" operations, as the parts are produced internally through various processes.
Second example: In the "FAM" phase, various systems on the ship are assembled/set up: steam pipes, bathroom discharge systems, hot/cold water systems, etc. These pipes and systems are purchased externally, and some do not require internal processing; they are just assembled onto the ship. In this case, these are "assembly and installation" operations.
Of course, the two activities have no sharp distinction; this is simply a convenient classification.
In both cases, whether producing or assembling a part, each operation must be "costed."
At this point, another function of the WBS comes into play, related to the breakdown of a process/activity (Activity Breakdown Structure—ABS). In this case, the WBS, through ABS, defines how activities (production, assembly, installation) are organised; essentially, it defines the work processes for each micro-phase based on its characteristics.
These characteristics may involve the physical aspects of the product to be created (for example, the length of the sheet to be welded, the physical shape of the sheet – straight, curved, etc.) or the characteristics of the activity to be carried out (such as laying an electrical cable in specific spaces on the ship, etc.).
A time is assigned to determine the cost of each operation.
How is this done?

3.2 The Definition of Man-Hours

For each ship, Fincantieri defines an overall man-hour budget based on its design, establishing a total "service" of ship-hours. The Central Methods department at the company's headquarters determines the budget and overall service-hours.
Subsequently, a preliminary breakdown is carried out during the so-called "feasibility" review of the ship. The Central Methods department also manages this phase, which results in the development of the Center Connection Plan.
Based on this plan, the individual tasks are defined, and the feasibility of the ship's blocks in the three main yard areas - PRF, PRS, and assembly - is assessed.
"Feasibility" refers to the capability to carry out these tasks within the yard. This assessment considers available space, which can sometimes be a critical factor, and the PRF's so-called "historical data" of production capacity (developed tonnage).
This process identifies the ship's sections that cannot be completed in the yard, leading to decisions on subcontracting or external

assignments. Headquarters always oversees the approval of these assignments (upon proposal by individual yards).
There is a distinction between assignments and subcontracting:
• An "assignment" refers to ship sections being allocated to a different Fincantieri yard than initially planned (e.g., sending work to Castellammare di Stabia when its order backlog is low to utilise its capacity).
• "Subcontracting," on the other hand, involves outsourcing work to external companies that operate within the yard. The extent of subcontracting depends on the capacity to complete tasks internally.
The service-hours are then taken up by the COP (Coordination of Production), which is divided into PL1 (responsible for the hull), PL2 (responsible for outfitting), and PL3 (responsible for HVAC and electrical systems for FAM, APP, and ELE). The working method across these three divisions is essentially the same; for clarity, we will use PL1 as an example.
PL1 (hull operations) starts with the general project's service-hours, which have already been broken down and distributed among the blocks. Using this information, PL1 begins its analysis.
This analysis uses a table developed by Fincantieri, which specifies the time required for each operation (e.g., welding 1 meter of material). These tables have predefined time estimates and are based on historical data from previously built ships. Over time, a new method of time analysis has been developed.
This calculation method is critical: it defines the time allocated for each type of operation. As we will see later, any flaws in this method have cascading effects on the time assigned for individual tasks.
A significant issue is the ship's documentation (including blueprints), which is often incomplete. Ideally, these documents should include every part of the ship. When a part is explicitly listed and correctly attributed to its corresponding category, the software's macro can accurately calculate the hours needed for its production or assembly. However, if a part is missing from the blueprint or misplaced in another section, the system inevitably produces incorrect calculations, leading to inaccurate time estimates.
For each block derived from the ship's blueprint, the macro processes the phases and assigns hours. Ideally, the documentation should include a table listing all parts of the ship, ensuring accuracy. If parts are missing, the system underestimates the required hours.
An experienced technician familiar with the ship's blueprints may identify missing parts during the analysis and correct the error. However, this issue is compounded by Fincantieri's increasing reliance on outsourcing blueprints, which are often incomplete.
Previously, a "constructive sheet" system was used, in which technicians manually checked off each part and assigned it to the correct phase. While this manual process was time-consuming, it ensured comprehensive and accurate planning through human oversight.
This analysis is inherently subjective, and results vary depending on the analyst's expertise. Analysts with production experience are familiar with the ship's blocks, tasks, and associated challenges, allowing them to account for nuances and difficulties. Conversely, analysts without production experience may rely solely on the documents, conducting a rigid and standardised assessment without considering real-world complexities.
In assigning hours to each operation, analysts should consider extra time (called "margins") for potential challenges, constraints, peculiarities, and unforeseen issues. Accounting for these margins ensures realistic and inclusive time estimates.
Fincantieri's approach has been to minimise or eliminate these margins to reduce costs. Margins are vital, for example, when installing a component like a pipe. Analysts must account for real production difficulties, as specified in Fincantieri's table of margins.
While the table is accurate, company pressure often pushes analysts to reduce the assigned time. This pressure stems from economic considerations: the total cost of a ship, calculated based on man-hours, is a critical factor in negotiations with the shipowner. The offer of a competitive cost ("competitive" for the buyer and profitable for Fincantieri) results in underpricing subcontracted tasks, transferring this economic burden onto subcontracted workers.
The time assigned to each phase, including subcontracted ones, determines the contract's overall value. Time calculation errors, often due to overly simplified assessments, have significant repercussions.

For example, the table might allocate time for a single weld when welding two plate meters. However, the plate must be welded on both sides, doubling the required time. Analysts unfamiliar with production may underestimate the necessary time, leading to flawed assessments.
The PL1, PL2, and PL3 divisions manage their respective planning and scheduling, but their integration is critical. PL1 begins first, as outfitting depends on the hull's completion. However, the time gap between the start of PL1 and the other two divisions is brief, allowing PL2 and PL3 to initiate material orders and service planning. Weekly coordination meetings align all divisions to ensure progress synchronisation.
Fincantieri's material ordering is tightly managed to avoid maintaining stock. Each material delivery is timed to coincide with immediate installation. The company incentivises managers to ensure materials are processed and installed promptly, adhering to a "Zero Stock" lean model to streamline production.
This policy, however, creates issues: delays in material delivery can slow production, necessitating accelerated work rhythms to recover lost time.

3.3 The Steps to Determine the Timing of Individual Operations

Once the Central Methods Office issues the PAC (Project Assignment Certificate), the site COP (Construction Operations Planning) takes over and manages it through all its various phases, with the respective timings for each phase, so that the work can start on the established date and be completed within the assigned time for the ship's construction.
Essentially, the COP is responsible for precisely scheduling the various shipbuilding phases within the overall program, defining and managing the exact time intervals for each stage.
For example, in the case of the hull, the COP must determine the time needed to arrange the sheets in the yard, the time required to assemble them and build the blocks, etc. If problems arise, the phases must be rescheduled, which may extend the overall timeline.
Therefore, the main difficulty lies in effectively synchronising and organising the various phases in sequence. For example, if a specific ship block needs to be constructed in the yard, the necessary sheets must be available and worked on within the allocated time. Hence, the scheduling must account for the time needed to ensure these materials are available within the set deadlines.
The time allocated to each phase (start and end times) is calculated once the overall analysis of the man-hours required on-site is available, considering how many hours a subcontractor is historically capable of working.
Therefore, the COP technician must take into account both the official schedule with the times allocated to each operation (theoretically including the related increases as previously mentioned) and the historical data and experience on how many hours a subcontractor can realistically work. This last data depends on the workforce (personnel) available to the subcontractor, the work organisation, professional skills, etc.
For block construction, reference must be made to the "fixed" timelines defined in the Gantt charts.
The Gantt chart is a graphical representation used for project planning and scheduling. It is a bar chart in which the vertical axis represents a process's various phases (activities), and the horizontal axis shows the time (e.g., divided into months: January, February, etc.).
Each activity is represented by horizontal bars of varying lengths, which indicate its timeline, duration, and start and end dates. For example, one phase may begin on January 15 and end on February 20.
As mentioned earlier, Fincantieri wants to use "fixed" Gantt bars to construct certain blocks, meaning predetermined and identical bars for every type of ship. In practice, applying a "fixed" Gantt bar for different types of ships is rarely possible; however, this is an apparent attempt by Fincantieri to standardise procedures that, by their nature, do not lend themselves to this kind of time predetermination, especially considering the variability that characterises both the ship product and the individual production/work processes.

For instance, depending on its complexity, building a flat block can take anywhere from 12 to 20 days, while constructing double bottoms may take 2 to 3 months, again depending on the complexity of the block.
However, the most significant pressure on the COP, more than determining the length of the Gantt bars (i.e., the maximum duration assigned to each activity), comes during the analysis evaluation. Specific times are set at the start of the project, but as the analysis progresses, these times must be adjusted to align with the actual production conditions.
For example, extending a phase from the initially planned 12 days to 17 days may be necessary. Fincantieri's pressure focuses on reducing these actual days as much as possible. This pressure is fully on the COP because the analysis, i.e., the timing and sequencing of phases, is under its responsibility.
This pressure during the planning phase is accompanied by procedures that, upstream in the process, partially condition the subsequent steps.
The Central Methods Office is responsible for determining the ship's feasibility using a software program that relies on tables indicating the various timings. On the one hand, compared to the initial tables issued by the Central Methods Office, which set very tight deadlines, the office has somewhat aligned with the actual times developed on-site. On the other hand, the software program used by the Central Methods Office works well on paper to define the ship's feasibility. However, it is not readily adaptable, as it operates in a fairly standardised manner. Essentially, the software used by the Central Methods Office checks whether a yard can build a ship within the set time.
Its rather rigid and standardised functioning seems to reflect an economical choice by Fincantieri, which agrees to certain timelines with the shipowner to secure a contract.
In summary, the Central Methods Office defines the number of months it takes a yard to build a ship, while the COP, through detailed analysis and scheduling, determines the number of days needed to complete each phase.
It is also the responsibility of the plant COP to verify whether the yard cannot complete everything internally and thus determine what must be outsourced (as previously noted, these outsourcing decisions are not about internal yard contracts but what activities should be outsourced to external contractors).
For several ships built in recent years, the hull was decided to be constructed by other yards (for example, in Tulcea, Romania) because the deadlines for completing the ship were so tight that it would have been impossible to build it entirely in-house.
Officially, the criteria guiding outsourcing decisions are related to the yard's space and the timelines agreed with the shipowner; however, in addition to space and time constraints, outsourcing also occurs due to cost considerations.
At other times, outsourcing decisions stem from planning errors. When time constraints and delays make completing the entire ship within the yard impossible, larger outsourcing volumes are decided upon than initially planned.
The same time pressure applies to subcontracted activities.
The cost of each ship section is determined through COP analysis. This cost estimate is then communicated to the purchasing office (ACU), which negotiates it with the subcontractor. The cost of the section is calculated through this analysis and depends on the number of man-hours required to complete that specific part of the ship.
Thus, the process consists of two steps.
The first involves calculating the time needed to complete the subcontracted ship section: the hours assigned to the construction of that specific part are derived from Fincantieri's "timing" tables, based on the general project defined by the Central Methods Office and later refined through detailed analysis carried out by the COP at each yard. The COP, therefore, defines only the man-hours required (which the central office tries to minimise to reduce costs) but not the economic value of the subcontract.
The second step is to calculate the economic cost. To determine the cost, the man-hours (if correctly calculated) should be multiplied by an hourly rate. However, the Purchasing Office negotiates the subcontract value with the contractor.
The economic value of the subcontract is only known when the RDA (Request for Quotation) becomes an actual subcontract order.

3.4 The Economic Value of the Contract: The Issue of DCMs, NCs, and the Qualification of Subcontracting Companies

In addition to the planned man-hours (which, as mentioned, present several challenges) and the hourly rate agreed between Fincantieri and the subcontracting company (which is also an extremely critical issue), there is another problem concerning modifications made to the original design (DCM) and "non-conformities" (NC).

DCMs refer to "extra" work compared to what was initially specified in the contract, which the technical office acknowledges. For example, if the design team realises there are errors in the drawing or the client requests that deviate from the original design, a DCM is defined as an official, analysed modification whose economic value is recognised for the subcontracting company.

The issue is different when it comes to NCs.

NCs consist of tasks that a subcontracting company must carry out, which are not included in the project or are not clearly specified in the project in terms of how to carry out specific operations (e.g., how to assemble pipes, systems, etc., during construction).

The NC is reported and only possibly recognised: for example, an NC may stem from a drawing from the hull office or be raised from one department to another, such as from PRS to PRF.

Thus, a DCM originates from a request from the client or Fincantieri's design team, realising that a modification is necessary to address a prior mistake. In contrast, an NC typically originates from the subcontracting company's request when they signal it.

If an NC results in extra work (for example, instead of 10 hours as per the contract, 15 hours are needed), this should be approved before proceeding. In practice, however, the subcontracting company often completes the work; only afterwards is extra work recognised.

This recognition is not automatic (i.e., not based on the subcontractor's simple declaration). However, it always involves analysing the times (using Fincantieri's time allocation tables) to verify the accuracy of the claims.

Verifying the accuracy of the additional hours declared by subcontractors is undoubtedly a necessary control mechanism by Fincantieri to prevent uncontrolled cost escalation.

However, there are challenges.

For example, if a subcontractor takes longer than expected, it could be due to their inefficiency or inability to perform. However, why would a subcontracting company be unable to operate properly or be inefficient in its work?

This leads back to the selection process for subcontracting companies and the verification of their skills, quality, and experience they can guarantee.

Some companies may present themselves as qualified and certified to carry out certain types of work, but they may not be. For example, for assembly work, some companies do not have the qualifications to carry out double bottoms (very few companies are capable of doing this).

To provide a concrete example, only three subcontracting companies were certified to build double bottoms on a ship built in a yard. However, assigning the entire ship to these three companies was impossible, especially since they were still busy completing the previous ship. Inevitably, other companies had to step in to carry out this work.

A second issue arises from the need to reassess the contract's cost in terms of the number of hours required. For example, over the years, the hull work has continuously been subject to time cuts to reduce the cost of the ship.

A more appropriate contract cost would also allow the possibility of paying more qualified professionals within the subcontracting companies. It should also be highlighted that Fincantieri's practice does not help develop the subcontractors' workforce and skill set. Sometimes, workers choose to move from one subcontractor to another because the latter is willing to recognise the acquired skills in terms of job classification—and, consequently, economically. Fincantieri's practice was to request that the transferring company sign a "release letter," which was a letter through which the company "released" the worker, allowing them to transfer to another company. This practice made it more difficult for skilled workers to switch companies. In this way, Fincantieri managed to keep subcontracting costs lower. Indeed, a company that recognises higher skill levels has higher labour costs and, therefore, higher contract costs.

Eventually, the "release letter" practice was abandoned, but it was replaced by another approach aimed at making these transitions more difficult or at least delayed. This approach involved the delay, or even the failure, to deliver the Unilav form to the worker, which would officially end the employment relationship. This method aimed to create difficulties in moving workers to subcontracting companies that were willing to pay them more, thus lowering subcontracting costs.
There is an official Suppliers' Register for evaluating subcontracting companies. But in practice, it happens that, for example, a company presents itself as having qualified welders (capable of welding underwater, with all types of certifications), but once they are assigned to weld Azipod motors, they end up risking damage. The same problem can arise in another delicate area, such as double bottoms.
In light of these aspects, one might ask what kind of checks Fincantieri performs with respect to what is outlined in the General Terms and Conditions of the Contract, which state that "the professionalism, organisational characteristics, and technical-professional suitability of the subcontracting companies must be evaluated positively," as well as that Fincantieri should assess "the competence, organisational characteristics, and technical-professional suitability of the Contractor."

3.5 How is the calculation of man-hours performed: standardisation or concrete evaluation?

As stated, a contract is based on the hours required for assembly. Therefore, a specific job is contracted by calculating the man-hours: this calculation determines how many people are needed to carry out a specific task under the contract.
On a formal level, the economic value of a contract is defined through the calculation of man-hours; however, in reality, the recognition of a specific number of man-hours, and thus the economic value of the contract, involves a comparison between the subcontracted companies and Fincantieri. These comparisons are often very heated.
The problem for the subcontractors is that, at Fincantieri, the figures responsible for calculating the man-hours are office-based figures with little or no real knowledge of the working conditions on the construction site or aboard the ship.
For example, a severe issue arises from the "linear" method of calculating man-hours. For example, cables can be installed on linear surfaces (in this case, the work is more straightforward) or irregular ones, with rising or lowering curves. In the latter case, the work to be done is more complex and demanding, requiring more hours, which are not recognised due to the "linear" calculation that treats all surfaces of intervention as if they were curve-free. However, more importantly, the calculation of the man-hours for a specific task is done based on standard conditions that do not consider the actual characteristics of the ship being produced, potential material imperfections, or issues related to the sequence of operations. For instance, it's one thing to calculate the man-hours needed for an assembly on a perfect wall; it's quite another to do so when there are no joints between the blocks.
These tables, therefore, being created "on paper," fail to account for the real conditions in which the work is being carried out. As a result, these discrepancies heavily influence the calculation of man-hours.

3.6 Land-based Work vs Dockside Work

Fincantieri is pushing for as much assembly work as possible to be carried out on land rather than aboard the ship in order to achieve significant cost reductions (for example, scaffolding can be lower on land, and extendable mechanical arms and 4-wheel movers can be used, all of which help reduce intervention times and thus lower the economic cost of subcontracted work).
However, this approach conflicts with another stance Fincantieri holds, creating an internal contradiction that gets passed on to subcontractors. This other stance refers to Fincantieri's intention to immediately get ship sections into the dry dock. This latter approach often takes precedence over the first one (working as much as possible on land), meaning that fewer large-scale tasks can be done on land. For instance, only 2 meters of guides can be installed out of a total of 300 meters, a very small percentage.
As discussed in the previous paragraph, the number of man-hours assigned to a job is calculated based on standard conditions

that do not consider the actual conditions of the ship. For example, the assembly process is calculated based on a perfectly flat wall versus a wall where there are no joints between blocks.

In this case, one might wonder why Fincantieri has shipped blocks that are not joined (not welded), making it harder for subcontractors to complete their work. The reason is that the more blocks are placed in the dry dock, the sooner Fincantieri can collect advance payments from the shipowner based on the project's progress.

Naturally, Fincantieri also tries to speed up the ship's launch date for financial reasons—the earlier the ship is launched, the sooner Fincantieri receives the expected advance payment. Additionally, an earlier launch allows them to begin working on the next ship to be produced, thus helping to manage Fincantieri's order backlog.

This is why Fincantieri ships as many blocks as possible, regardless of their condition: some are correctly welded, while temporary structures temporarily hold together others. In the latter case, specific tasks and assemblies cannot be carried out until the blocks are welded, which leads to longer processing times.

Of course, when the subcontract contracts are signed (which specify the assigned man-hours and the corresponding economic value), subcontractors are unaware of these situations.

This way, Fincantieri passes both the problems of organising the shipbuilding process and the pressure to collect advance payments as quickly as possible onto subcontractors.

Continuing the theme of Fincantieri's pressure to meet (or even advance) ship program deadlines, the Group has explicitly set up bonuses for managers based on their ability to meet or accelerate these dates. As a result, it becomes a priority for managers to ensure they receive this bonus without paying any attention to the conditions under which subcontractors will be forced to work.

Indeed, working on land would be preferable for cost-saving and safety reasons, as dockside work is dangerous. Large, heavy parts and tools are handled in dockside operations. These parts can be moved using forklifts on land. However, once the ship is in the dock, they must be moved by hand, significantly increasing time, making the work heavier, and exposing workers to more significant risks (such as injury or ergonomic issues).

Additionally, the difficulties of working in the dry dock are compounded by the continuous reduction in scaffolding around the ship. While the scaffolding system allowed easy access to both the hull and the interior in the past, it has now been drastically reduced for cost-saving reasons.

Fincantieri's decision to cut back on scaffolding means that workers essentially "automatically" work without it, as scaffolding is only used in welding areas since, from Fincantieri's perspective, these structures are seen as a cost that should be eliminated. However, without scaffolding, specific assembly tasks become much more challenging to perform, and it becomes impossible to meet the man-hour quotas specified in the subcontract.

Previously, Fincantieri's ASS (Assistance) Division handled the preparation and installation of scaffolding in the areas of the ship where it was needed. Fincantieri no longer does this, and subcontractors are left to make do with whatever makeshift solutions they can find, such as using step ladders. In some cases, subcontractors aren't even allowed to arrange scaffolding themselves: some of them would like to manage the installation of scaffolding independently to facilitate the work (and thus meet the man-hour quota), but Fincantieri often denies these requests.

Returning to the subject of land-based work, which, as seen, offers much better working conditions than dry-dock work, the goal of increasing land-based operations risks being undermined by Fincantieri's pressure to spend as little time as possible on land. Blocks that should stay on land for a month are often moved to the dry dock after just a week.

Land-based work would also be made more accessible if all the necessary professional figures were present and able to coordinate various tasks effectively.

The pressure to move parts from land to dry dock also has clear economic consequences.

In the past, the regulatory framework between Fincantieri and subcontractors specified that there would be a higher economic compensation for work that had to be transferred from land to the shipboard through what was known as the "phase change."

However, under Fincantieri's current specifications, any activities not explicitly mentioned in the subcontract are not consistently recognised in terms of compensation, even if those activities must be carried out, regardless of the subcontractor's intentions.

3.7 DCM and NC: Critical Issues for Subcontracting Companies

Another issue arises from the difficulties subcontracting companies face in getting additional work, which became necessary due to modifications from the initial design, which are recognised financially.

These are "extra" activities, which can be classified under the acronym DCM for justified (and therefore recognised) modifications or with the term "non-conformities" (NC), referring to interventions required to correct defects that emerge during the work process.

Suppose Fincantieri's technical office modifies the parts to be built and issues a corresponding DCM. In that case, these changes are paid quite easily, as the cost is borne by the client, i.e., the shipowner.

Modifications are generally requested by the shipowner, translated into drawings by Fincantieri's offices, and then communicated to the subcontracting companies so they can execute the changes according to the revised project.

On the other hand, "non-conformities" are design errors made by Fincantieri and reported by subcontracting companies once they begin working aboard the ship. In this case, obtaining recognition and payment from Fincantieri is much more difficult.

These design errors seem to stem from internal organisational issues within Fincantieri; for example, when a ship is transferred from one yard to another, the drawings are not always correctly and simultaneously transmitted (even due to internal conflicts between different yards within the Group). Alternatively, NCs may stem from mistakes made during earlier stages of the work process. For instance, a pipe fitter may find the pipe path blocked by a wall incorrectly installed or lacking the necessary openings. Obviously, this issue must be resolved before the pipe installation can continue, leading to additional work hours not initially accounted for in the contract.

The impact of "non-conformities" can be significant, and their non-recognition can have heavy economic consequences.

While payment orders for works executed as per the contract are issued promptly and invoiced (meaning the agreed amounts are collected), with "non-conformities" and DCMs, subcontractors cannot invoice for these works until they become official orders — that is, once Fincantieri recognises them.

This situation exposes many subcontracting companies to significant financial risk.

The financial exposure from these interventions can reach up to 10% of the total contract value. When recognised, reimbursement of these amounts is often delayed, and sometimes, they are not even recognised and thus remain unpaid.

To try to obtain recognition, subcontractors negotiate with Fincantieri without any certainty regarding the outcome of these discussions. Subcontractors have little bargaining power in this matter, as failure to perform these works could lead to further consequences.

To get paid for the work carried out, subcontractors must "deliver" to Fincantieri what they have completed; upon delivery (e.g., a block or a fitting), the shipowner also checks that the work has been done. However, the shipowner is not concerned with the specifics of what happened between Fincantieri and the subcontractor: their only concern is that the work has been completed, and that part of the ship can be "delivered." Only at this point will the shipowner make the payment to Fincantieri for the work done, and only then can the subcontractor invoice Fincantieri for the work completed, which may also include work performed under "non-conformity" that has not yet been recognised.

However, if the subcontractor had not carried out the "non-conformity" work in anticipation of Fincantieri's formal and official authorisation, they would not have been able to complete the overall intervention. As a result, that part of the ship could not have been delivered, the shipowner would not have made the payment, and the subcontractor would not have received any compensation.

The procedure for obtaining recognition for the hours worked (and thus payment from Fincantieri) should be formal and based on a relationship of mutual trust. Subcontractors are told to carry out the necessary hours to complete the work and will be paid later.

For example, the "shipboard" staff tells them what additional tasks to perform beyond the contract, such as filling holes or making adjustments, with the assurance that Fincantieri will pay for these works. Only afterwards will the subcontractor issue the NC (non-conformity). So, first, the subcontractor performs the work as instructed by Fincantieri's staff, and then requests economic recognition for it. Performing these works before formal recognition by Fincantieri is crucial in the relationship between Fincantieri and the shipowner and, by extension, for the subcontractors. The shipowner views the work as completed: they are not concerned with what Fincantieri decides to do with the subcontractors as long as the work is finished. This is a crucial factor influencing the subcontractor's ability to invoice Fincantieri for the order. The shipowner only cares that the work is completed; whether NCs were involved is not their concern. However, if the subcontractor tried to get the NCs recognised by Fincantieri while they were occurring (i.e., during the actual work) and waited for Fincantieri's approval, they would not be able to complete the work on time for delivery to the shipowner, and as a result, they would not be able to invoice the order, risking non-payment, even though the work done was beyond the scope of the original contract.

Again, we see a profound contradiction with the General Conditions of Contract. These procedures seem to be aimed solely at protecting Fincantieri from the economic claims related to "extra" works that arise in practice. As we've seen, in the case of unforeseen circumstances, mistakes, unplanned situations, or specific working conditions, the need for additional work becomes necessary to meet the deadlines.

This procedure exposes subcontractors to the risk of missing the deadline for ship delivery, which would prevent Fincantieri from receiving the payment for the work completed. Thus, subcontractors are put at significant financial risk. If the timeline slips, Fincantieri could face penalties from the client. Therefore, this risk is entirely (and doubly) passed on to the subcontractors.

4. Financial and Economic Situation of Contracting Companies

It is impossible to comprehensively evaluate all companies operating under contract with Fincantieri, as a complete list of these companies, including their subcontractors, is unavailable. However, specific assessments can still be made. For this purpose, we will draw on the provisions in union agreements signed between Fincantieri and trade unions regarding the contracting system.

This analysis will exclude norms concerning the verification of contractor companies' compliance with obligations regarding employee wages, social security contributions, and safety measures. Instead, it will focus on the corporate requirements that contractors must meet to obtain Fincantieri contracts and operate in its shipyards.

A union agreement dated January 25, 1999, outlined the foundations of Fincantieri's outsourcing policies, emphasising:

- Rationalisation and qualification of the supply chain.
- Reduction of fragmentation among contracting companies for recurring activities.
- Adequate resources and equipment to perform assigned tasks.

Fincantieri also committed to subcontracting activities integral to its production cycle (derogation contracts) up to a limit of 25%. These contracts were mainly for turnkey components, systems, and services. Furthermore, Fincantieri pledged to assign contracts to companies, consortia, or temporary joint ventures with sufficient resources and infrastructure to handle the workload. Fincantieri also declared that future contracts would eliminate subcontracting, which would remain only in exceptional cases like unforeseen work, additional tasks, or modifications that exceeded the contractor's flexibility. In such cases, Fincantieri would notify union representatives of the necessity for subcontracting.

For cleaning, painting, and other ongoing services, work would be assigned to companies with adequate resources in terms of workforce size and quality.

A union agreement on October 28, 2000, reaffirmed the goal of ensuring a more qualified supply chain at Fincantieri's shipyards. It introduced norms like requiring contractors to deposit a security guarantee equal to 20% of the contract's value to ensure com-

pliance with wage and social security obligations. This condition highlighted the importance of financial and organisational solidity among contractors.

The June 15, 2004 agreement established requirements for inclusion in the Supplier Register, such as a minimum capital of €50,000 and a workforce of at least 20 employees. These criteria ensured contractors met basic financial and operational thresholds to qualify for contracts.

The April 1, 2009 agreement justified the use of outsourcing in recent years as necessary to meet production deadlines and workload schedules dictated by project development. It stated, however, that internal efficiency improvements would allow the company to reduce reliance on outsourcing, enabling a more reliable and qualified supply chain.

The June 24, 2016, agreement sought to reorganise the contracting system by reducing subcontracting. Expressly, it declared the company's intention to:

• Eliminate subcontracting for "derogation" activities.

• Reduce subcontracting for high-value turnkey contracts (e.g., cabins, public area installations, HVAC systems, and integrated electrical/electronic systems).

• End subcontracting for generic, low-value tasks in turnkey contracts (e.g., pipe installation, insulation, and carpentry assembly).

• It also suggested experimenting with network contracts to encourage collaboration among local businesses.

Union agreements consistently aim to:

a) Contain outsourcing and, more explicitly, subcontracting.

b) Promote the rationalisation, qualification, and reliability of contractors.

c) Ensure contractors have sufficient resources to perform the work.

d) Require contractors to meet minimum capital and workforce criteria.

e) Encourage improvement through consortia, joint ventures, and network contracts.

Many contracting companies operate under a single-client model, exclusively serving Fincantieri. Losing these contracts would often result in their closure.

From a financial standpoint, some data from past contractor financial statements reveal significant vulnerabilities:

• Some companies reported a capital base below the €50,000 minimum threshold.

• Others had net assets below their capital due to operational losses, indicating minimal reserves and poor financial stability.

• Workforce levels often fell below the 20-employee requirement.

• Fixed assets, such as machinery and equipment, were notably low.

Even when formal requirements for capital and workforce were met, it was difficult to describe such contractors as "qualified."

Union agreements stipulate that contractors must declare the sectoral collective bargaining agreement (CCNL) they apply to their workers. Nevertheless, compliance remains questionable. For example, during the COVID-19 lockdown, a contractor with 58 employees applied for the artisanal sector CCNL, which offers worse conditions than the industrial CCNL. However, with a workforce of 58 workers, the company exceeded the size limits for artisanal businesses.

The number of employees alone does not always reflect a contractor's ability to meet its obligations. Much depends on how Fincantieri schedules project deadlines. For instance, if a task requiring 200 man-hours is expected to be completed in two days, the contractor must concentrate sufficient workers into that short timeframe, potentially requiring temporary hires.

This dynamic also influences the system of calculating man-hours. Often, the estimated man-hours fail to account for real needs, such as travel time within the shipyard, the weight of materials to be moved, or the condition of the worksite. Negotiations between contractors and Fincantieri's project coordinators (COPs) over man-hour estimates frequently occur, with COPs pressuring companies to hire additional staff to meet tight deadlines.

Such hires are often inexperienced and serve only to comply with Fincantieri's time and cost requirements. This practice undermines the declared goal of a qualified supply chain.
In conclusion, contractors often face immense financial and operational pressures due to Fincantieri's stringent deadlines and cost-control measures, creating a fragile and unsustainable contracting ecosystem.

Conclusions

Fincantieri's production system relies heavily on an extensive network of contractors and subcontractors.
The number of workers and the hours worked under contract are numerous, accounting for over 80% of the total workload required to build a ship. Fincantieri's decision to use extensive subcontracting for ship production reflects the fact that nearly all phases of production involve minimal direct involvement of Fincantieri employees. Comparing the average cost of subcontracted personnel in Fincantieri's shipyards with that of Fincantieri employees reveals differences of €20,000–€30,000 per person in some cases.
Fincantieri uses the Work Breakdown Structure (WBS) method, which breaks down a ship into all its constituent parts. This breakdown makes it possible to calculate the working time required to produce each individual part. The calculation system for determining the work hours needed to construct each part of the ship has been standardised and computerised to minimise production times and reduce costs. Also, once the ship is broken down into each single part/component, decisions are made on whether components will be produced internally or outsourced ("Make or Buy"). Again the calculation system for determining the work hours needed to construct each part of the ship and therefore the economic cost, acts as a powerful form of pressure on subcontractors, and thus on the workers of these companies.
These factors significantly impact the working and wage conditions of contract workers, who are forced to endure high work intensity and low pay.
One of Fiom-Cgil's main battles is precisely focused on improving the conditions of contract workers, who represent both the majority of the workforce on construction sites and the part that suffers the most from pay and working conditions problems. But not only that: the more general objective is to be able to rediscuss the overall organisation of work, based on these long chains of subcontracting.
Therefore, the production organisation system in Italian shipyards should be completely overhauled, involving a drastic reduction in contracting (i.e., internalising these tasks and integrating the respective workers into the company).