

Christmas Tree Market Analysis for the Upstream Oil and Gas Sector

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The oil and gas sector is central to the global economy, providing both energy inputs and industrial raw materials. Within the upstream segment, a critical piece of equipment stands out: the "Christmas tree," a robust assembly of valves and fittings installed at the wellhead of producing wells to regulate hydrocarbon flow. This study maps the commercial dynamics and supply strategies of major global operators (Saudi Aramco, CNPC, ExxonMobil, and Chevron) in relation to their Christmas tree suppliers. The methodology consisted of a broad literature review, including the analysis of corporate and technical reports from 2003 to 2025, as well as publications from oil and gas business platforms. The findings reveal a heterogeneous and strategically structured network of commercial interactions. Saudi Aramco maintains strong, long-term relationships with suppliers such as Dril-Quip and TechnipFMC, which develop surface and subsea Christmas tree models tailored to the specific requirements of its projects. In a distinct approach, CNPC diversifies its supplier base by prioritizing domestic manufacturers such as BOMCO, Sanjack Petro, and Cepai, integrating solutions that include horizontal subsea equipment. Conversely, ExxonMobil and Chevron converge on a multilateral approach, establishing long-term contracts with the three largest global suppliers: TechnipFMC, SLB (OneSubsea), and Baker Hughes. These partnerships are characterized by the adoption of cutting-edge technologies, including Aptara™, Subsea 2.0™, and monobore configurations, all aimed at maximizing efficiency and operational safety. It is concluded that major upstream companies maintain a diversified supplier portfolio as a strategic cornerstone. The analysis demonstrates that supplier diversity reflects corporate policies focused on innovation, energy security, and, in some cases, the strengthening of local supply chains, thereby ensuring resilience and competitive advantage in the global landscape.

Keywords: Upstream. Oil&Gas. Tree Subsea. Commercial Relationship.

Among the sectors with the greatest relevance and robustness in the global economy, the oil and gas market stands out, being responsible for the supply of essential inputs such as natural gas and crude oil, as well as raw materials for the manufacturing of various products present in everyday life, including plastics, cosmetics, and asphalt. The production chain of this industry is traditionally segmented into three main stages: upstream, midstream, and downstream (Figure 1) [1].

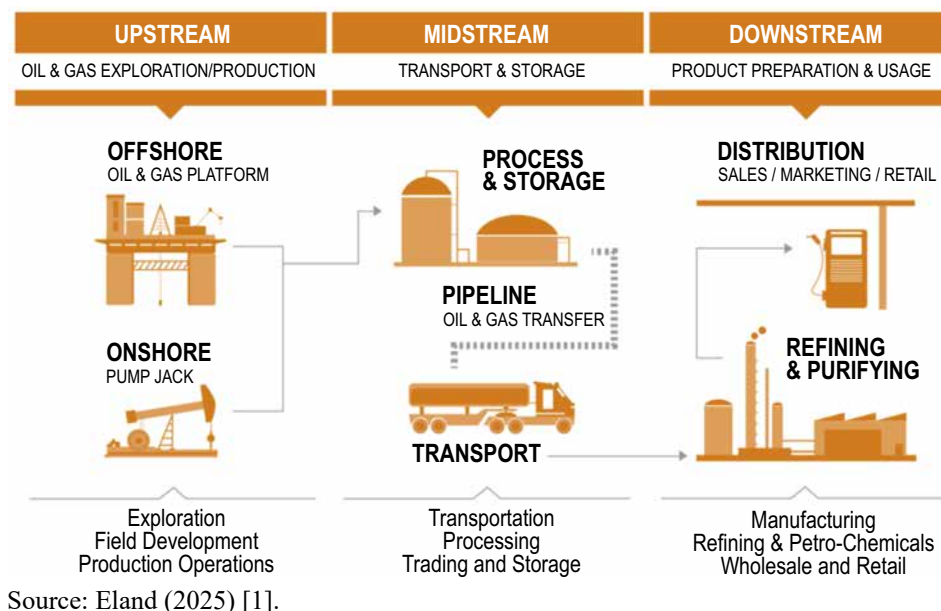
The upstream stage constitutes the core of the oil and gas industry, encompassing exploration and production activities. In this phase, a wide range of technologies and equipment is employed to ensure an efficient and safe extraction process. Among these,

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the Christmas tree stands out, consisting of a set of valves and connections installed at the wellhead of producing wells located in both onshore and offshore environments [2]. There are two main models: the SCT (Surface Christmas Tree), which is conventional and located at the surface, and the SBT (Subsea Christmas Tree), installed on the seabed. Specifically, for the SBT, varying operational conditions lead to further subclassifications, related to the depth of the well in which they operate.

Brazil has focused on the manufacturing of subsea Christmas trees (SBTs), with SLB OneSubsea facilities located in Taubaté (SP) and Curitiba (PR). Investments in this sector underscore a strategic capability that enables safe and efficient access to pre-salt reserves [3]. Therefore, understanding the global specificities in the supply of surface Christmas trees (SCTs) and subsea Christmas trees (SBTs) is essential to align operations with established market dynamics and supply-related requirements.

Figure 1. Diagram illustrating the stages of the Oil & Gas market.

From this perspective, the objective of this study is to analyze the interactions between major global oil and gas operators in the upstream segment and their main suppliers of Christmas trees, thereby elucidating the commercial and technological dynamics inherent to this strategic alliance.

Theoretical Framework

The Christmas tree is a sophisticated assembly of valves and fittings installed at the wellhead of production units, designed to regulate critical variables such as pressure and flow while ensuring operational safety during hydrocarbon extraction [4]. Two main models exist: the Surface Christmas Tree (SCT), employed in onshore and offshore platforms, and the Subsea Christmas Tree (SBT), deployed on the seabed for deepwater operations. The SBT, due to its technical complexity and high cost, represents a central element for the economic viability of pre-salt projects in Brazil as well as in other scenarios involving significant operational challenges [5]. The ability to design and manufacture this equipment domestically, as occurs in Brazil, reinforces its strategic importance by directly linking it to energy security and industrial competitiveness.

The Christmas tree market is characterized by a dense and complex network of interactions between operators and global suppliers, shaped by technological, strategic, and geopolitical factors that influence everything from supplier selection to the adoption of specific equipment models [6]. Each operator develops its own procurement strategy, seeking to balance efficiency, innovation, safety, and competitiveness.

Within this context, the analysis of commercial relationships demonstrates that the supply of Christmas trees transcends a purely transactional logic and assumes a strategic dimension. The equipment constitutes a central axis in the formation of global cooperation networks: suppliers rely on the capital resources and scale of operators to enable innovation, while operators depend on suppliers' technological expertise to access and exploit new reserves. This interdependence results in a system in which a small number of players concentrate control over the technological and commercial trajectory of the sector.

The main drivers of supplier diversification include technical robustness, risk mitigation, economic competitiveness, operational adaptability, incentives for innovation, and the strengthening of energy security. Thus, the

upstream Christmas tree market emerges as a highly strategic arena, sustained by a global network of technological and commercial cooperation that goes beyond the mere supply of equipment and lies at the core of ongoing competition for innovation, efficiency, and safety within the oil and gas sector.

Through Figure 2, it is possible to observe the aspect that guided the selection of the companies to be addressed in this study.

The selected documents were categorized by company, and their information was transformed into spreadsheets and flowcharts that illustrate this commercial interaction.

Results and Discussion

This section is dedicated to the analysis of the key commercial relationships established between the corporations Chevron, Saudi Aramco, CNPC, and ExxonMobil, as identified throughout the investigation focused on the procurement of Christmas tree equipment. Furthermore, their respective global operating regions and corporate structures will be examined, crucial elements for understanding the dynamics of the market under consideration.

Saudi Aramco

Saudi Aramco operates in an integrated manner across more than 40 countries, consolidating its

global presence in different segments of the energy sector value chain (Figure 3) [7].

Although publicly traded, Saudi Aramco remains largely controlled by the Saudi state, directly influencing its governance structure, corporate strategies, as well as investment decisions [8].

The commercial relationships established between Saudi Aramco and its Christmas tree suppliers have been concentrated on leading companies in the production technology sector, notably Dril-Quip and TechnipFMC [9]. Each supplier has contributed different technologies and Christmas tree models tailored to Aramco's operational needs in both onshore and offshore projects.

Although there are no public records explicitly detailing the specific type of Christmas trees acquired by Saudi Aramco, it is possible to associate the equipment types with the advanced technical features offered by these companies.

TechnipFMC provides a wide range of models, including surface Christmas trees — Conventional, Unihead®, and for shale formations — as well as subsea vertical and horizontal models, and equipment designed for high-pressure, high-temperature (HPHT) environments [10–11].

Dril-Quip, for instance, has developed both subsea and surface Christmas trees, notably the VXTe™ and SBTe™ models, which are widely recognized for their reliability and performance in deepwater operations [12–13].

Figure 2. Ranking of the four leading companies in crude oil production (2023–2024).

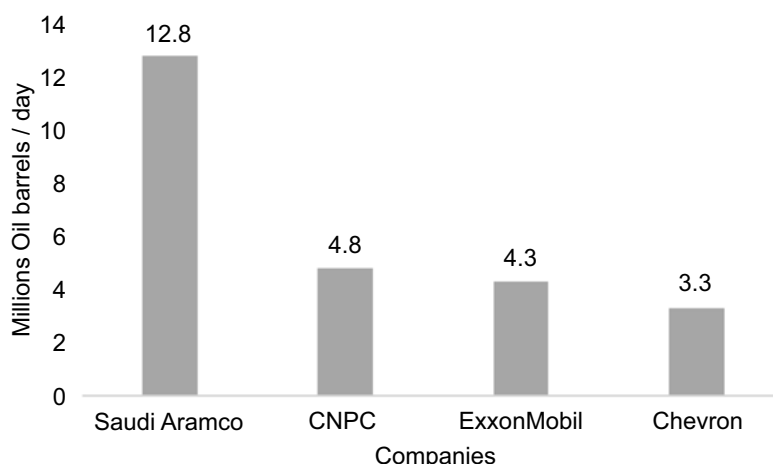
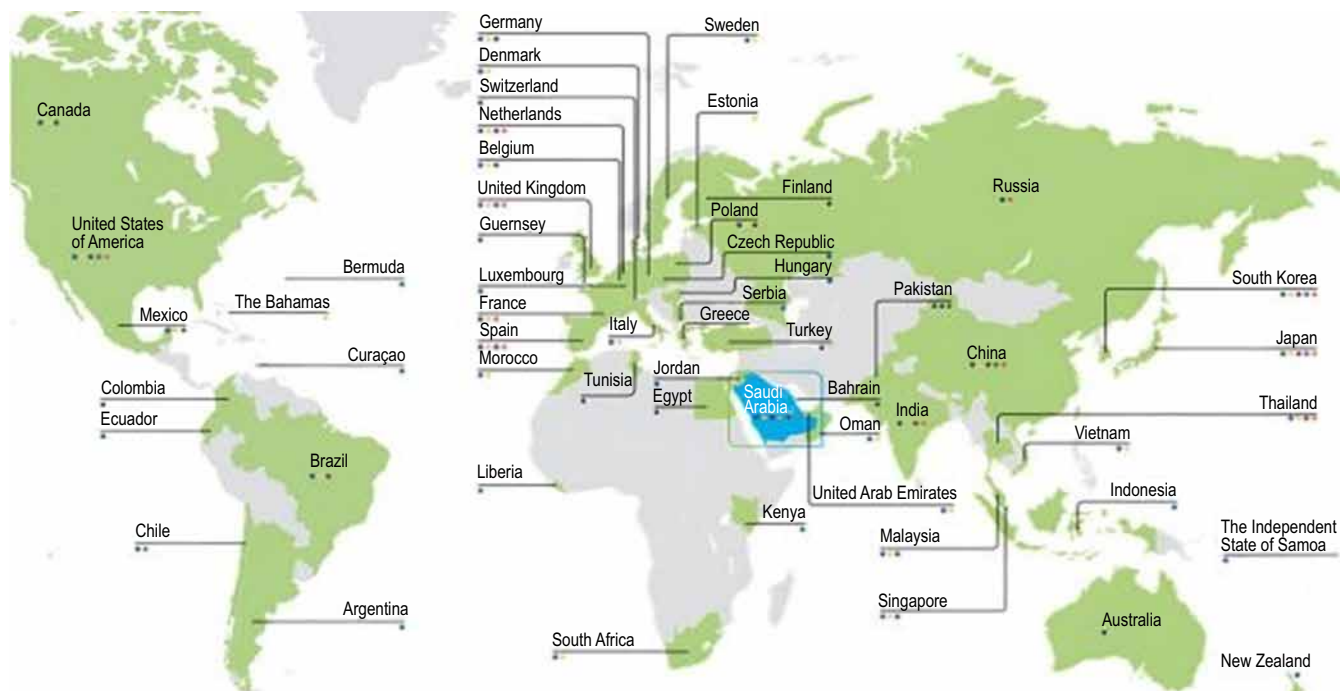


Figure 3. Geographical distribution of Saudi Aramco's operational units worldwide.

Source: Adapted Saudi Aramco (2024) [7].

China National Petroleum Corporation (CNPC)

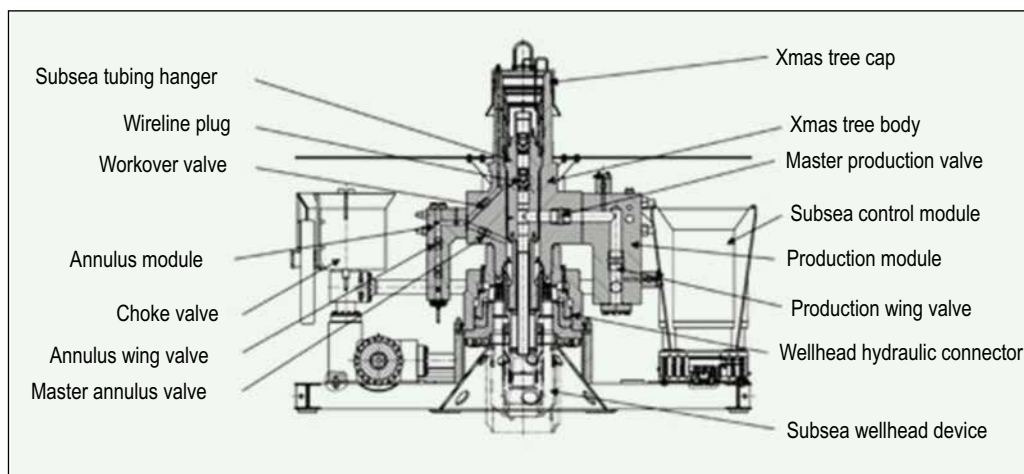
CNPC is a Chinese state-owned enterprise operating in more than 30 countries, with a broad portfolio ranging from oil exploration to refineries and natural gas supply [14] (Figure 4).

Over the past two decades, the China National Petroleum Corporation (CNPC) has

incorporated a wide variety of Christmas tree models, reflecting the technological diversity available in the international market for both subsea and conventional applications. Among the identified suppliers, Baoji Oilfield Machinery Co. Ltd. (BOMCO) stands out for supplying horizontal subsea Christmas trees (Figure 5) [15].

Figure 4. Global map of CNPC operations in Oil & Gas exploration and production, oilfield services, and petroleum equipment manufacturing.

Source: CNPC (2024) [14].

Figure 5. Description of subsea horizontal christmas tree equipment.

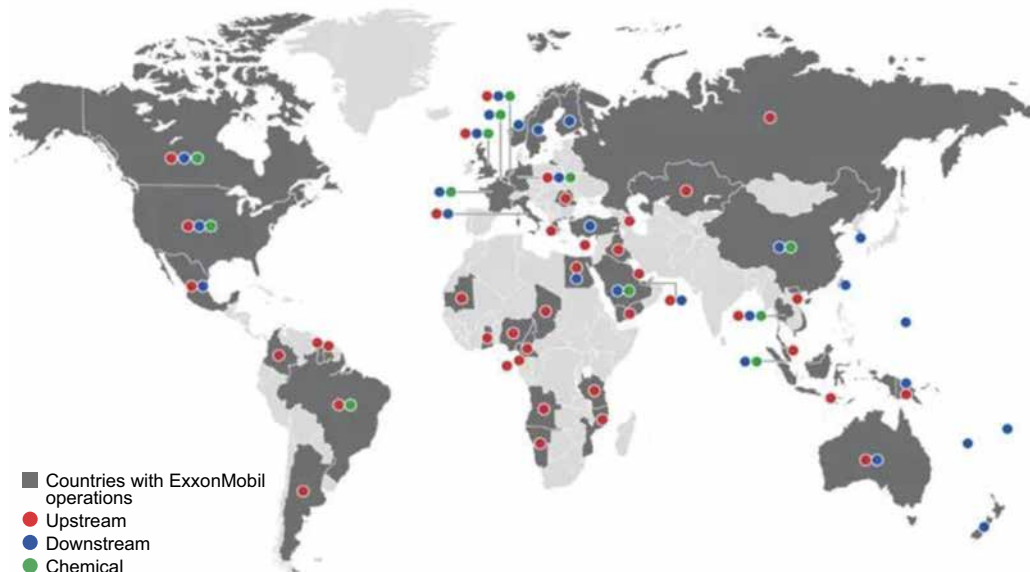
Source: CNPC (2014) [15].

TechnipFMC has contributed with HXT (Horizontal Xmas Tree) and VXT (Vertical Xmas Tree) models, both designed for subsea operations [16]. In the conventional Christmas tree segment, within the supplier landscape, notable companies include Sanjack Petro, Cepai (Yulin Machinery), and Saintwah, whose products — in the case of the latter two — comply with API 6A specifications, an industry benchmark standard for the standardization of wellhead (surface) and downhole (subsurface) components [17–19].

ExxonMobil

ExxonMobil is a publicly traded company with global operations in more than 60 countries. Its activities encompass multiple integrated stages of the oil and gas industry value chain (Figure 6) [20].

ExxonMobil's acquisitions for the supply of subsea Christmas trees have been concentrated among TechnipFMC, OneSubsea (SLB), and Baker Hughes. TechnipFMC supplied the

Figure 6. ExxonMobil's global operations.

Source: ExxonMobil (2022) [20].

EVDT and Subsea 2.0® models [21–22], while OneSubsea (SLB) and Baker Hughes provided subsea Christmas trees without disclosed technical specifications [23–24]. The diversity of suppliers and models employed reflects ExxonMobil's strategy of adopting technology solutions tailored to specific operational environments and technical requirements.

Chevron

Chevron Corporation is a U.S.-based publicly traded company that operates in an integrated manner across the entire oil and gas industry value chain, covering upstream through downstream segments. The company maintains a significant concentration of exploration activities in North and South America (Figure 7) [25].

Over the past decades, Chevron has established and maintained strong commercial relationships with leading subsea equipment suppliers, including OneSubsea (SLB), TechnipFMC, and Baker Hughes. Baker Hughes supplied Aptara™ model Christmas trees [26]; TechnipFMC provided the Subsea 2.0™ system [27]; and OneSubsea (SLB) delivered vertical monobore production trees

[28]. The diversity of suppliers and technologies adopted reflects Chevron's strategy of integrating advanced and modular solutions into the various operational conditions of its offshore assets.

Conclusion

Therefore, it can be concluded that the commercial dynamics of the upstream sector in the acquisition of Christmas tree equipment present an organized and strategic structure, in which major international companies maintain relationships with multiple suppliers. This diversity is shaped by factors such as specific exploration conditions, technological cooperation agreements, regional partnerships, and objectives related to local economic development, as well as alignment with each corporation's business model. As a result, a diversified and integrated commercial network is established, tailored to the operational and strategic demands of the sector.

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Figure 7. Chevron's global operations.



Source: Chevron (2021) [25].

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