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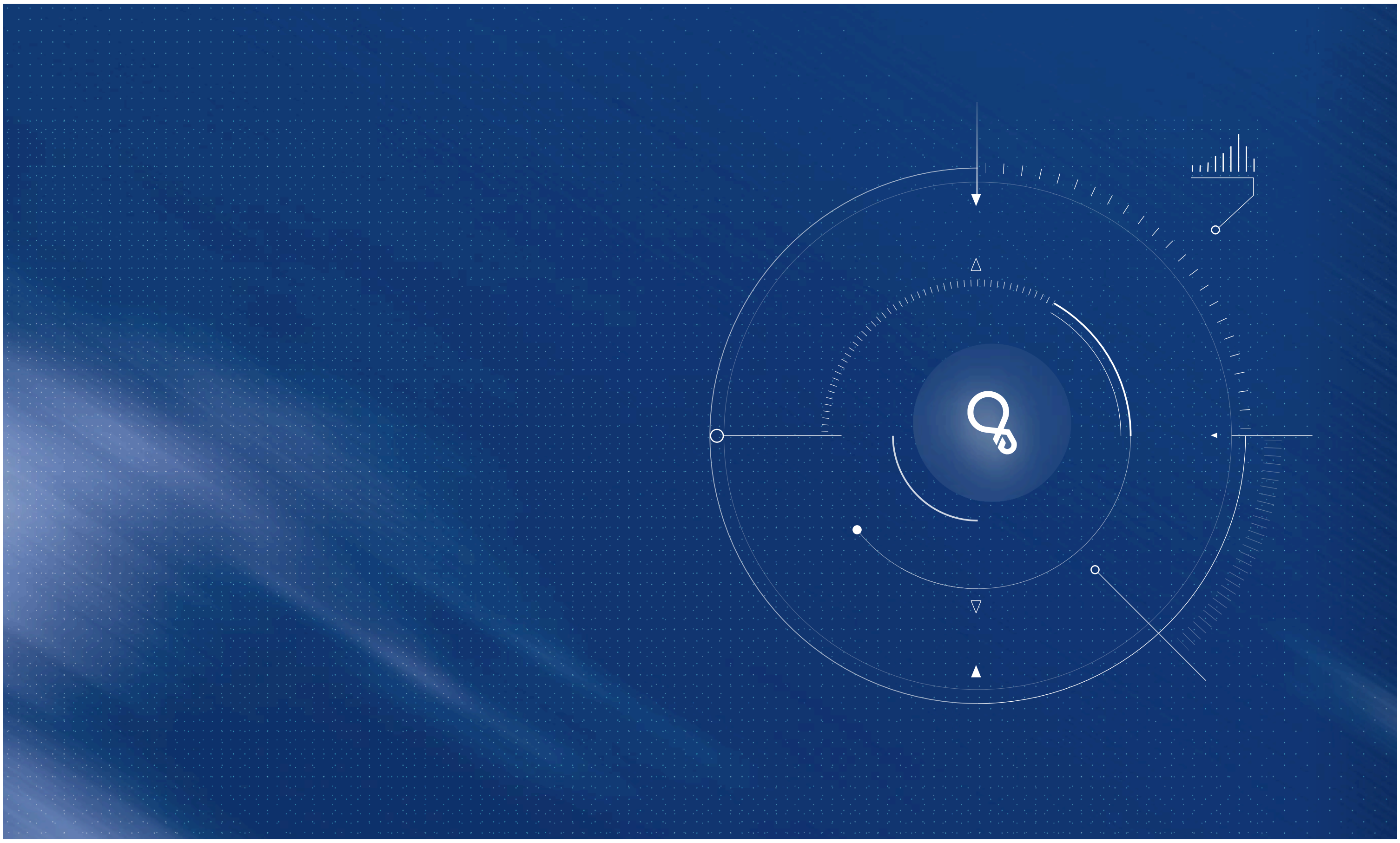

RESEARCH BRIEF

Market Size & Five-Year Outlook for Collaborative Robots (Cobots) in Industrial Manufacturing

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Executive Summary

This Research Brief quantifies the current U.S. market size and total addressable market (TAM) for collaborative robots (cobots) in industrial manufacturing and develops a transparent, evidence-backed market outlook using publicly available data sources. The analysis defines the cobot market through a structured segmentation outlined by payload classes and core manufacturing use cases such as assembly, material handling, packaging, welding, and machine tending. Historical indicators, including shipping activity and deployment patterns, serve as the empirical foundation to establish the market's recent evolution and current state. The analysis combines bottom-up and top-down methods, incorporates sensitivity ranges for key uncertainties, and extends the model into a forward-looking, five-year compound annual growth rate (CAGR) framework grounded in documented market drivers and constraints. The resulting model equips decision-makers with a defensible, data-informed view of the cobot market opportunity that enables them to benchmark internal assumptions, assess automation potential across task pools, and evaluate growth trajectories grounded in observable market dynamics.

Analyst Opinion

The U.S. collaborative robot market in 2025, estimated at approximately **$124.6M**, is a structurally significant but still early-stage segment within industrial automation. This estimate was built bottom-up from A3 order data with cobots representing an estimated 12.6% of industrial robot orders and reflects roughly 3,600 annual cobot units entering U.S. manufacturing facilities. The market was segmented across three payload classes with manufacturer-level ASPs derived from transparent distributor pricing. The medium and heavy payload tiers account for a significant portion of the cobot models offered by OEMs. This could suggest that the commercial center of gravity in collaborative robotics is shifting beyond lightweight precision tasks toward higher-throughput applications in material handling, palletizing, and welding.

The TAM estimate of approximately **$118.3B** was grounded in U.S. manufacturing employment data across six task pools and bounded by automation potential ceilings of 30-65%. This reveals a large penetration gap between current adoption and theoretical demand. This gap is not a signal of imminent explosive growth but rather a measure of how early the market likely remains relative to its long-term ceiling. The TAM expands modestly to $131B by 2030 at a **2.07% CAGR**, driven by rising automation potential in Assembly & Dispensing and Finishing & Surface Treatment where enabling technologies such as CAD-driven path generation and 3D vision-based inspection are commercially deployed but do not yet seem widely diffused.

The five-year outlook projects the current market growing to **$186.2M by 2030 at an 8.36% CAGR**, with the cobot share of industrial orders rising to a conservative 15.8%. Several dynamics will shape this trajectory. Labor shortages are substantial, with projections of 1.9M unfilled manufacturing roles through 2033, however capital expenditure thresholds and integration complexity remain meaningful friction points. An analysis of selling price in archived distributor offerings data do not show a consistent directional pricing trend, supporting the decision to hold prices flat in the base case. The emergence of AI-enabled programming interfaces may prove the most consequential catalyst for penetration gains beyond what historical growth rates alone might predict. Overall, the market is positioned for sustained, moderate expansion grounded in observable demand signals.

Market Definition & Segmentation Logic

Collaborative robots (cobots) are defined as industrial robots designed to work alongside or directly with human workers in a shared workspace, without the need for hard physical barriers such as safety cages. Unlike traditional industrial robots that operate in fenced-off cells, cobots are distinguished by their built-in force and torque sensing, speed and force limiting capabilities, and compliance with collaborative operation standards, most notably ISO/TS 15066, which governs the safety requirements for human-robot collaboration. The International Federation of Robotics (IFR) classifies cobots as a subset of industrial robots, meaning they share the core definition of a reprogrammable, multipurpose manipulator with three or more axes, but are further characterized by their ability to perform collaborative operations as defined under ISO 10218. In practice, cobots are predominantly deployed in applications such as assembly, machine tending, pick-and-place, and palletizing, where the ability to operate near human workers delivers flexibility advantages that conventional industrial robots cannot match.

Autonomous Mobile Robots (AMRs) and Automated Guided Vehicles (AGVs) are excluded from this analysis because they constitute a categorically distinct market segment from arm-based collaborative robots. The IFR formally classifies AMRs as professional service robots, tracking them in a separate World Robotics – Service Robots publication rather than the World Robotics – Industrial Robots report from which the base cobot installation data are sourced for the model. Moreover, academic analysis of the IFR dataset confirms that AMRs lack the manipulation axes required to qualify as industrial robots.[1] Including them could conflate two different value chains and overstate the addressable market for cobot applications.

Payload Classes

For this analysis, collaborative robots are segmented into three payload classes aligned to distinct industrial applications. **Light-payload cobots (≤5 kg)** are typically optimized for precision tasks like electronics assembly and small-part handling and tend to be the most narrowly specialized across application areas. **Medium-payload cobots (6–14 kg)** represent the largest and most versatile segment, spanning assembly, machine tending, material handling, finishing, inspection, and welding which makes this the workhorse tier of collaborative automation. **Heavy-payload cobots (≥15 kg)** serve palletizing, heavy machine tending, and welding applications requiring manipulation of larger parts or tooling. Across all three tiers, assembly and material handling seem to be the most universally supported applications, while welding and finishing capabilities concentrate in the medium and heavy classes.

Industrial Use Cases

Cobots are deployed across a range of industrial manufacturing tasks where they work alongside or near human operators. The most common applications include assembly operations such as screwdriving and parts insertion, material handling and palletizing, machine tending (loading and unloading CNC machines, injection molders, and presses), surface finishing tasks like sanding and polishing, quality inspection, and welding. These use cases span sectors including automotive, electronics, metal fabrication, food and beverage, pharmaceuticals, and consumer goods manufacturing. Cobots are particularly well-suited to repetitive, ergonomically challenging, or precision-demanding tasks that were previously performed manually or with semi-automated

[1] Anne Jurkat et al., “Tracking the Rise of Robots: The IFR Database,” *Jahrbücher Für Nationalökonomie Und Statistik* 242, nos. 5–6 (2022): 669–89.

tooling. Their built-in safety features allow deployment in shared workspaces without the full guarding required by traditional industrial robots.

Historical Market Data

In North America, industrial robot orders followed a boom-and-correction cycle over the 2020-2025 period, providing important context for interpreting cobot market dynamics. Orders climbed steadily from 2020 to a peak in 2022, a record driven largely by automotive manufacturers accelerating electric vehicle production and companies pulling forward orders amid supply chain uncertainty. The sharp 30% decline in 2023 was attributed to a slow U.S. economy, elevated interest rates, and normalization following pandemic-era over-purchasing. Orders stabilized through 2024 before recovering in 2025, with the year closing as the strongest for North American robot orders since 2022, driven by broad-based momentum across general industries rather than any single sector. According to IFR analyses, U.S. industrial robot installations tracked this cycle closely, generally ranging between 31,000 and 40,000 annual units over the period and representing roughly 6-7% of global installations throughout.

Against this broader backdrop, cobots grew from a niche category into a structurally significant segment. IFR data shows worldwide cobot installations grew significantly over the last five years, with cobots' share of total industrial robot installations rising to nearly 12%. Growth was particularly pronounced between 2020 and 2022, when annual global cobot installations nearly doubled, driven by pandemic-era labor dislocations and accelerating adoption across light manufacturing, electronics assembly, and food processing. Notably, cobot volumes held roughly flat through the 2023 broader robotics correction before resuming growth in 2024, suggesting cobot adoption has developed a degree of structural independence from the traditional industrial robot cycle. By 2025, collaborative robots accounted for nearly 20% of all robot units ordered in North America, highlighting their growing importance within modern automation strategies.

A key contextual shift over the period was the broadening of end-market demand beyond automotive into general manufacturing. Non-automotive customers outpaced automotive counterparts in units ordered throughout 2025, with food and consumer goods, semiconductors and electronics, and life sciences all contributing to broad-based momentum. This diversification is particularly consequential for cobots that are often better suited to the shorter production runs, flexible cell configurations, and smaller facility footprints common in general manufacturing. Labor shortages have acutely intensified the pressure to automate and cobot economics are increasingly compelling for these sectors relative to traditional industrial robots.

Current Market Size Estimation

The U.S. collaborative robot market is estimated at approximately **\$124.6M in 2025, growing to \$186.2M by 2030 at an 8.36% five-year CAGR, built bottom-up from industrial robot order data with cobots representing an estimated 12.6% share**. The market is segmented across three payload classes spanning light (≤5kg, 18.4% of cobots models on the market, ~\$23,400 ASP), medium (6-14kg, 42.1% of cobots models on the market, ~\$34,400 ASP), and heavy (≥15kg, 39.5% of cobots models on the market, ~\$40,100 ASP). Growth in the model is driven by rising total industrial robot orders and an expanding estimated cobot share of industrial installations (from 12.6% to 15.8%). Detailed calculations, source citations, and sensitivity assumptions are documented in the accompanying Excel workbook.

Market Segment	2025	2030
Light (≤5 kg) Payloads	$15,666,540	$23,405,455
Medium (6-14 kg) Payloads	$52,552,087	$78,511,622
Heavy (≥15 kg) Payloads	$57,456,266	$85,838,353
Market Size	**$124,600,777**	**$186,150,724**

Total Addressable Market (TAM)

The TAM model estimates the theoretical ceiling for U.S. cobot demand by quantifying the existing labor pool across six core industrial task areas: Assembly & Dispensing, Material Handling/Palletizing/Packaging, Machine Tending, Finishing & Surface Treatment, Quality Inspection & Testing, and Welding. We used the U.S. Bureau of Labor Statistics, Occupational Employment and Wage Statistics (OEWS) occupational employment data mapped to specific Standard Occupational Classification (SOC) codes. For each task pool, the model applies segment-specific automation potential ceilings (ranging from 30-65% in 2025 and rising gradually through 2030) and a uniform 2-to-1 workers-to-cobots conversion ratio (assuming lights-out capability in a day plus night shift production environment) to translate labor counts into addressable cobot units. The estimated cobot units are then multiplied by task-pool-weighted average selling prices (ASP) to produce TAM values by task pool. The **combined model yields approximately 3.45M estimated cobots and a total TAM growing at a 2.07% five-year CAGR**, with meaningful opportunity across the identified market segments. The framework treats the TAM as a penetration ceiling with the gradual increase in automation potential percentages over the forecast period reflecting expanding technical feasibility leading to a higher automation potential and increased cobot adoption.

Market Segment	2025	2030
Assembly & Dispensing	$9,373,484,885	$12,497,979,846
Material Handling/Palletizing/Packaging	$90,352,771,836	$97,302,985,054
Machine Tending	$11,357,977,951	$12,304,476,113
Finishing & Surface Treatment	$1,684,189,217	$2,165,386,136
Quality Inspection & Testing	$4,228,461,006	$5,285,576,257
Welding	$3,704,114,460	$4,115,682,734
Total Addressable Market (TAM)	**$118,310,649,182**	**$131,081,192,235**

Task Pools

We segmented the U.S. cobot market in industrial manufacturing into six primary task pools where collaborative automation has demonstrated meaningful commercial adoption. These use cases collectively define the task pool boundary for the TAM model and serve as the segmentation spine for penetration assumptions throughout the workbook.

- **Assembly & Dispensing:** Includes occupations performing manual and semi-automated joining, fastening, insertion, and component placement tasks across manufacturing sectors. These are the workflows most directly paralleled by cobot screwdriving, pick-and-place, and dispensing applications.
- **Material Handling/Palletizing/Packaging:** Includes occupations involved in moving, sorting, packing, palletizing, and staging materials and finished goods within manufacturing facilities. These high-repetition, low-variability tasks represent the one of the largest labor pools addressable by cobot pick-and-place and end-of-line automation.
- **Machine Tending:** Includes occupations that load, unload, and monitor CNC machines, presses, lathes, molding equipment, and other production machinery. Machine tending is the most established and among the highest-volume cobot deployment categories due to its repetitive, ergonomically hazardous nature.
- **Finishing & Surface Treatment:** Includes occupations operating or tending grinding, polishing, plating, and coating equipment. Cobots have been commercially deployed for consistent-pressure surface finishing and precision dispensing of adhesives, coatings, and paints.
- **Quality Inspection & Testing:** Includes occupations performing manual visual inspection, measurement, sorting, and testing of manufactured parts. Cobot-mounted vision and sensor systems are increasingly deployed to augment or replace repetitive human inspection tasks.
- **Welding:** Includes occupations performing manual welding, soldering, brazing, and tending welding equipment. Collaborative welding cobots are a fast-growing application segment that addresses both chronic skilled-labor shortages and the ergonomic and safety hazards inherent in manual welding operations.

Automation Potential

The penetration ceilings for each task pool reflect the gap between total technical automation potential and the subset realistically addressable by collaborative robots operating under force and speed constraints set by industry safety standards. McKinsey's manufacturing automation research establishes that approximately 60% of manufacturing working hours involve activities automatable with currently demonstrated technology, but that this potential varies sharply by task type. Material handling, palletizing, and sorting seem to represent the highest-maturity category and are already widely automated, while assembly, surface treatment, and welding require substantially more human input and are less likely to be fully automated in the near term (**Figure 1**). In the TAM model, the penetration ceilings, or automation potential, follow this hierarchy.

The five-year growth increments are conservative and tied to specific, observable technology trajectories across the various task pools. The larger increases apply to task pools where identified enabling technologies that are commercially deployed but may not be widely diffused yet including CAD-driven and scan-based path generation tools and 3D vision-based inspection systems. The smaller +5% increases apply to more mature categories where gains are incremental or categories that face regulatory ceilings (e.g., welding). Over the next five years, higher-payload cobot models are projected to grow and expand the addressable weight range, plug-and-play CNC interfaces are standardizing machine tending integration, and adaptive seam-tracking software is addressing joint variability in welding applications.

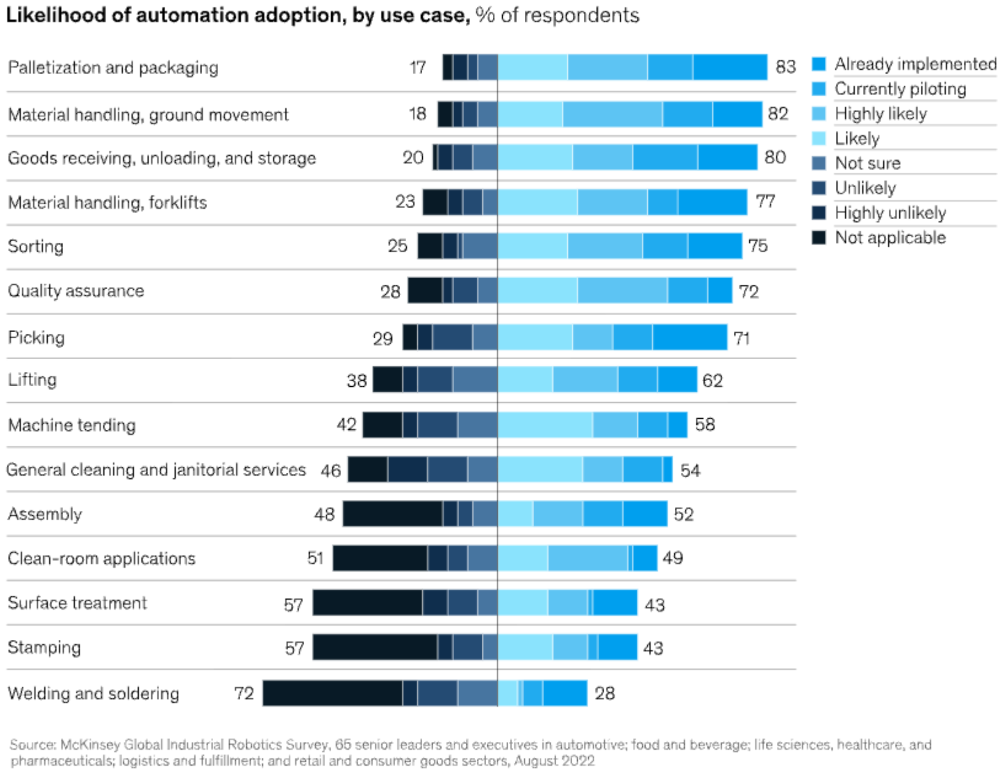

Figure 1: Key use cases for automation in industrial companies by task (Image Source: McKinsey).

Five-Year Market Outlook

Our model projects the **U.S. industrial cobot market growing from approximately $109M in 2025 to roughly $163M by 2030, reflecting a base-case five-year CAGR of 8.36%**. In this case, unit volumes rise from an estimated 3,633 cobots to 5,427 annually as the cobot share of total industrial robot orders climbs from approximately 12.6% to 15.8%. Simultaneously, the **total addressable market (TAM) expands from approximately $118.3B to $131B at a conservative five-year CAGR of 2.07%**. This estimated growth is driven by task pools where automation potential ceilings are projected to rise from current levels toward 40-50% of the relevant task pool such as Assembly & Dispensing and Finishing & Surface Treatment. More seemingly mature segments like Material Handling/Palletizing grow more modestly as penetration assumptions approach their upper bounds. Several structural drivers support the assumptions we used for the current market growth rate including persistent U.S. manufacturing labor shortages. In 2024, Deloitte and The Manufacturing Institute projected that 1.9M of 3.8M new manufacturing roles needed through 2033 could go unfilled. Separately, the 2025 revisions to ISO 10218, which formally integrate the former ISO/TS 15066 collaborative safety requirements, provide clearer compliance pathways for manufacturers. Further, AI-enabled usability improvements including embedded vision and pre-loaded task libraries are compressing deployment timelines. Finally, according to the IFR's World Robotics 2025 report, global cobot installations have grown from 11,100 units in 2017 to 64,500 units in 2024 rising from 2.8% to 11.9% of all industrial robot installations over that period. We used this trajectory to directly inform the conservative cobot share projections embedded in our model.

Key constraints moderating the outlook include macroeconomic uncertainty and tariff-related capital expenditure hesitancy, payload-speed limitations that exclude cobots from high-throughput applications, integration complexity for small- to mid-sized enterprises (SMEs) without in-house automation expertise, and flat U.S. manufacturing output growth as measured by the Federal Reserve's Industrial Production Index (IPMAN). This directly influenced the task pool growth rates embedded in the TAM model assuming the flat production trend continues over the next five years. Full year-by-year calculations, sensitivity ranges, and scenario modeling for both the current market and TAM projections are documented in the accompanying Excel workbook sheets called ***Market Size*** and ***TAM***.

Data Sources & Modeling Approach

All inputs, assumptions, sources, and intermediate calculations are documented in the accompanying Excel workbook enabling stakeholders to benchmark assumptions, test scenarios, and apply a reusable framework for decision-making and future updates.

Public Datasets

The model draws on a hierarchy of primary public sources. IFR World Robotics reports and A3 quarterly reports provide cobot installation volumes and growth trends. BLS Occupational Employment Statistics supply the labor counts (by SOC code) underlying the TAM framework, and the Federal Reserve's IPMAN index informs manufacturing output growth assumptions. Manufacturer product catalogs from major OEMs (Universal Robots, FANUC, ABB, KUKA, Doosan, Kawasaki) supply the technical specifications used for payload-class segmentation. Distributor platforms with transparent listed pricing (e.g., Vention, Devonics) provide ASP benchmarks, adjusted downward by 20% to approximate manufacturer-level pricing consistent with published industrial distributor markup ranges.

We considered using U.S. trade data as the model base (HS 847950 - Industrial robots, not elsewhere specified or included) and it is included in the workbook as a cross-reference but is not used as a direct volume input in the model. Import volumes under this code consistently and significantly exceed reported installations from A3 sources, suggesting the HS classification captures broader equipment categories beyond arm-based collaborative and industrial robots. Therefore, we decided to use the North American robot order volumes published by A3 with a subset estimated as the U.S. volumes.

Assumption Validation

Key assumptions are validated across independent sources and where primary data was unavailable (e.g., unit-weighted shipment distributions by payload class), the model uses observable proxies (manufacturer model-count distributions) and documents the limitation. Growth rates are derived from A3 quarterly data using the FORECAST.ETS function in Excel with no seasonality adjustment to smooth volatility. For the TAM estimates, manufacturing output growth is benchmarked to the FRED IPMAN index and remains flat.

Distributor pricing for comparable cobot models observed via archived and current Vention listings show no consistent directional trend between 2024 and 2026. The example cases cover a light payload model declining modestly (-7%), a medium payload model remaining flat (0%), and a heavy payload model increasing (+5%). Accordingly, our models holds ASP constant over time as the base case and leave price change as a potential sensitivity variable.

Separately, TAM penetration ceilings are set at the task pool level based on documented automation feasibility, with sensitivity ranges around key variables including cobot-to-worker ratios and segment-level penetration bounds.

Navigating the Workbook

The workbook is organized into the following tabs:

- **Documentation:** Description and hyperlinks to data sources used throughout the workbook
- **Market Size:** Current market size by payload class with five-year CAGR estimate
- **TAM:** TAM segmented by task pools with five-year CAGR estimate
- **Average Selling Price:** Distributor pricing, manufacturer-level ASP derivation, and trend analysis
- **Industrial Robot Orders:** A3 quarterly data and growth rate calculations
- **Industrial Robot Installations:** IFR installation volumes and historical cobot trends
- **Task Pools & Payload Classes:** Payload segmentation matrix and application mapping
- **U.S. Manufacturing Employment:** BLS employment data by SOC code
- **Automation Potential:** Task-level feasibility estimates and penetration assumptions

Source citations and methodology notes accompany each input. Stakeholders can modify key variables including ASP levels, penetration rates, and growth assumptions to test scenarios without altering the model structure.

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