Advanced Manufacturing (Q1 2025): Funding remains strong; advancements in AI, robotics, innovative printers, and materials

Charith Gunasekara • April 11, 2025

This Edge Insight focuses on notable activity relating to three SPEEDA Edge industries under the Advanced Manufacturing vertical—Smart Factory, Additive Manufacturing, and Digital Twin (DT)—from January 2025 through March 2025 (Q1 2025).

Key takeaways

Funding

- **Additive Manufacturing drove Q1 2025 funding growth, with total funding rising 4.2% QoQ to USD 584 million (Additive Manufacturing surged 117% QoQ)**, as Stratasys (USD 120 million) and Alloyed (USD 48 million) raised substantial funding to fuel growth strategies, product development, and manufacturing expansion. Large rounds like Neura Robotics' USD 123 million bolstered overall Advanced Manufacturing investments, despite a 21.6% QoQ decline in Smart Factory funding.

Partnerships

- **Holistic solutions remained central to Additive Manufacturing**, with printer providers collaborating with material, mold, and digital inventory solutions providers. Additionally, product partnerships focused on industry specialists (Siemens Healthineers to produce 3D-printed anatomically accurate phantoms) and research organizations (such as the University of Alabama) to develop innovative solutions. Other continuing trends included 1) a focus on metal additive manufacturing, 2) increased adoption in the healthcare, automobiles, aerospace, and energy sectors, and 3) geographical expansions (primarily in Asia and Europe).

- **NVIDIA drove DT partnerships** by integrating AI and DT technologies. This included offering AI-based DT solutions, improving AI industrial copilots using DTs, and optimizing AI infrastructure designs (e.g., enhancing data center efficiency and power management). Industries such as automobiles, energy, aerospace, and space exploration saw continued DT adoption, as DTs play an increasingly significant role from design to maintenance. **Smart Factory** partnerships also advanced robotic solutions, such as with Techman Robots, which improved its collaborative robots (cobots) through better robotic arm automations.

Product updates

- **Additive Manufacturing continued to see advancements, with cost-efficient new printers (including components) and materials launched** alongside transformative technologies, such as Caracol's large-format additive manufacturing (LFAM) extruder, enabling bi-material layer printing, Vertico's 3D printing robot for concrete applications, and ADDiTEC's portable metal directed energy deposition (DED) system for off-grid environments; these innovations enhance manufacturing efficiency and flexibility. Continuing trends included product launches in the dental sector featuring new printers, materials, and post-processing solutions, as well as metal-based on-demand additive manufacturing services.

- **AI-enabled solutions drove DT and Smart Factory technologies.** AI integrations boosted **DT** simulation capabilities, real-time monitoring, and customized model creation. Additionally, multiple AI copilots and agentic AI solutions were introduced to enhance **Smart Factory** software performance, assist decision-making, and improve defect detection and predictive maintenance. Robotics developments also progressed, with ABB launching a no-code software tool that reduces setup times by up to 80%. All these developments aim to enhance operational efficiency and accelerate smart factory adoption.

M&A

- **Acquisitions were driven by companies aiming to access advanced manufacturing technologies**, along with horizontal integrations by industry players to expand their respective offerings. Industries seeking advanced technologies include orthopedics (to create custom implants), automotive components (to produce precision metal components), and industrial equipment manufacturing (to improve quality control solutions). Meanwhile, through combinations of smart factory and supply chain solutions providers, **vertical integrations** continued this quarter (Eyelit Technologies acquiring Adexa).

Regulations

- **The US Military** continued to engage in funding and partnerships with several Additive Manufacturing disruptors (such as AML3D, Beehive, and HRL Laboratories) to jointly develop components or source them through contracts, including copper-nickel tailpiece components and propulsion systems for uncrewed combat aircraft.

- **Efforts to standardize advanced manufacturing technologies gained momentum** through US FDA guidance and the International Code Council (ICC) standards for 3D-printed concrete walls. This follows last quarter's initiatives by the National Institute of Standards and Technology (NIST). These actions should help address the lack of standardization in the industry, which has reportedly been a hindrance to additive manufacturing adoption.

Value chain

- **Activity during the quarter remained concentrated on production across the value chain**, despite it being less than last quarter. This was driven by partnerships and product updates in Additive Manufacturing, with the launch of new solutions, wider adoption of additive manufacturing technologies, and an expanded sales footprint that is likely to disrupt manufacturing operations globally. Meanwhile, **design and product development** activity rose during the quarter, with an uptick in DT partnerships, driven by collaborations aimed at improving simulations, industrial robot training, industrial copilot development, and data center efficiency and power management.

Outlook

- **AI is driving advancements in Smart Factory and DT, particularly through GenAI and AI agents:** This is likely to benefit manufacturing operations by enhancements in robotics, maintenance, defect detection, analytics, simulations, and remote operations, delivering superior content, insights, and interactions. Meanwhile, industrial copilots and AI agents are automating coding, improving decision-making, and addressing skill gaps, as 57% of manufacturing leaders identified workforce challenges in adopting

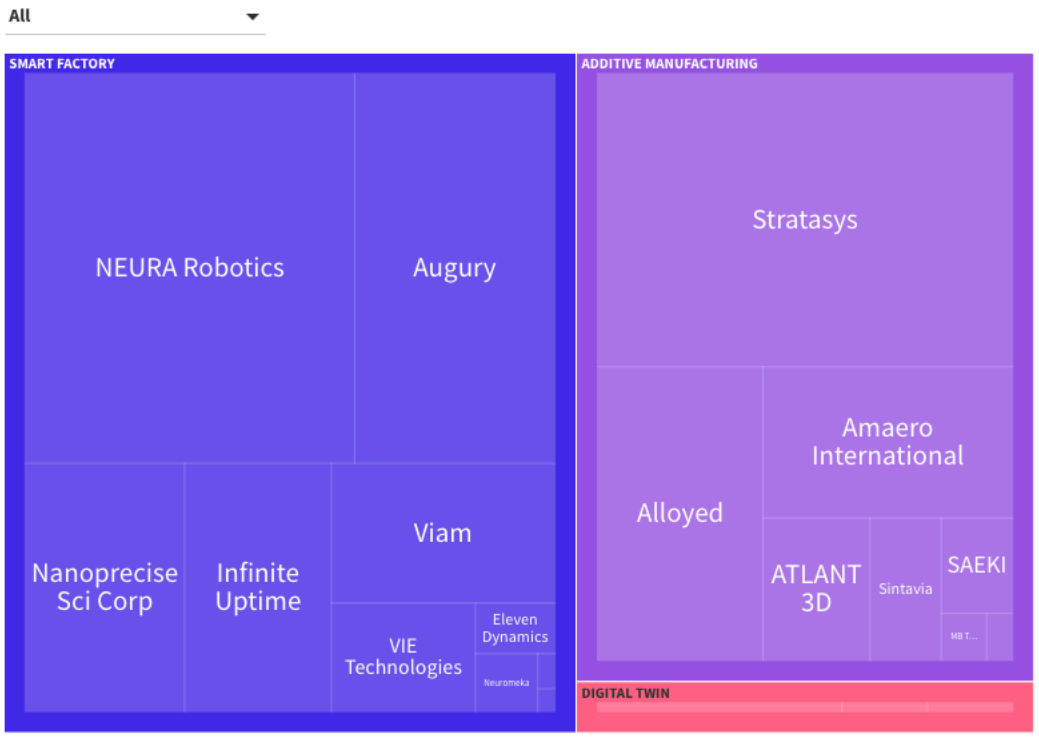
advanced technologies. Studies in 2024 have indicated that over 40% of respondents plan to increase investments in AI and ML over 2025–2027.

- **Additive Manufacturing adoption is expected to benefit from advances in metal and holistic solutions:** Studies show key constraints include cost, availability of metal and plastic materials (85% of respondents), and design/post-processing issues (63%), with 96% looking to adopt metal materials if they were more affordable. Metal additive manufacturing is also hindered by other factors such as speed and scalability; therefore, it is likely we will continue to see metal solutions aimed at addressing these constraints. Moreover, design and post-processing issues indicate that future developments will likely include collaborations and developments to integrate across the value chain to offer comprehensive solutions.
- **Defense-related Additive Manufacturing demand is set to grow by steady military funding and adoption and bigger budgets:** Metal additive manufacturing enables on-demand production, boosting supply chain resilience, maintenance and repairs, and developing advanced military parts. Partnership with America Makes (a national Additive Manufacturing innovation institute under the Department of Defense [DoD])—including funding from military-related organizations—further drives innovation for advanced parts and repairs. Military Additive Manufacturing spending budgets are likely to increase (the US DoD Additive Manufacturing spend is forecast to grow at a 24% CAGR over 2023–2030) and support military adoption as well as internal 3D printing developments (such as its investment in Guam). This should continue to provide opportunities for military-focused additive manufacturing solutions providers, evidenced by several of them expanding capacity and opening new tech centers in recent times (Titomic, AML3D).

Funding: Additive Manufacturing funding doubles; offsets DT and Smart Factory declines

Analyst Take: Funding in Q1 2025 **rose 4.2% QoQ to ~USD 584 million,** driven mainly by Additive Manufacturing, as substantial funding was raised to fuel growth strategies, product developments, and manufacturing operations expansion. This growth was somewhat supported by the Smart Factory industry also seeing large funding rounds (such as Neura Robotics raising USD 123 million) and accounting for 55.6% of the quarterly funds raised, despite funding falling by 21.6% QoQ.

Advanced Manufacturing funding summary (Q1 2025)

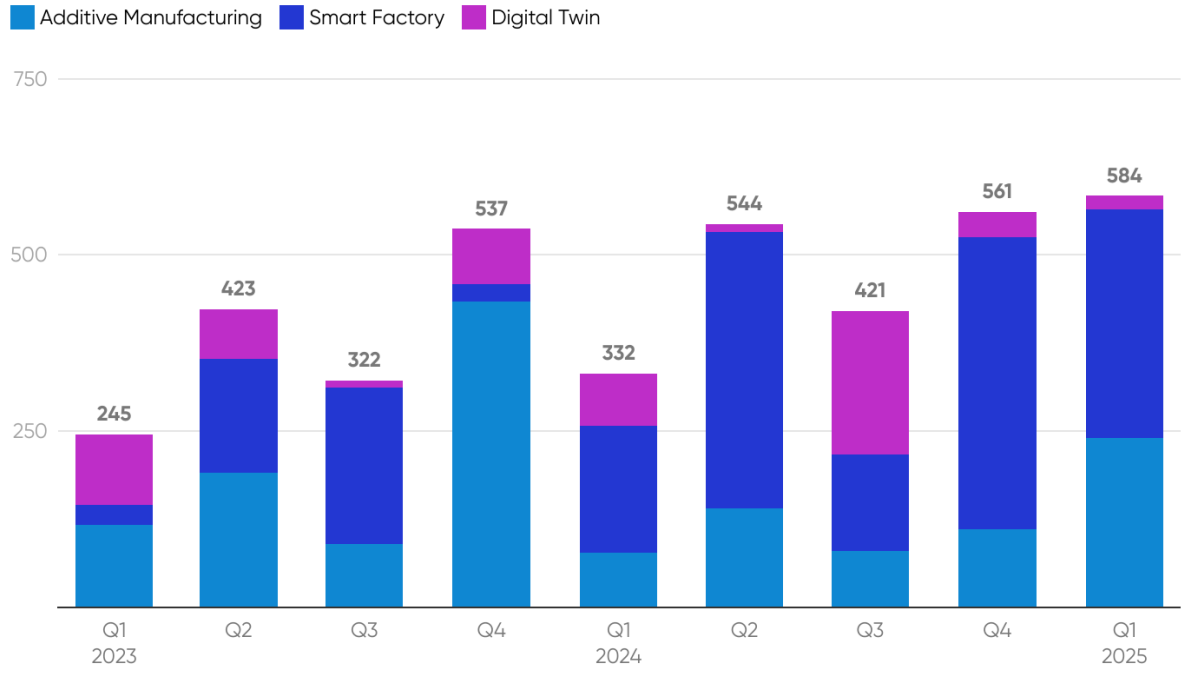


Source: SPEEDA Edge research • Funding data powered by Crunchbase
Note: Includes only the funding rounds in which the amounts were disclosed

- In Q1 2025, Advanced Manufacturing companies raised **USD 584 million across 23 funding rounds.** The total was **4.2% higher** QoQ, despite the number of rounds dropping 17.9% QoQ (USD 561 million across 28 rounds in Q4 2024).
- The uptick in Additive Manufacturing funding (up 117.4% QoQ) managed to more than offset the declines in Smart Factory (down 21.6% QoQ) and DT (down 46.1% QoQ). Additive Manufacturing funding benefited from a few notable funding rounds, such as Stratasys' USD 120 million funding to fuel its growth strategy (including inorganic growth), as well as Alloyed's USD 48 million funding to expand manufacturing operations and digital platform developments.

Funding by industry: Amount raised

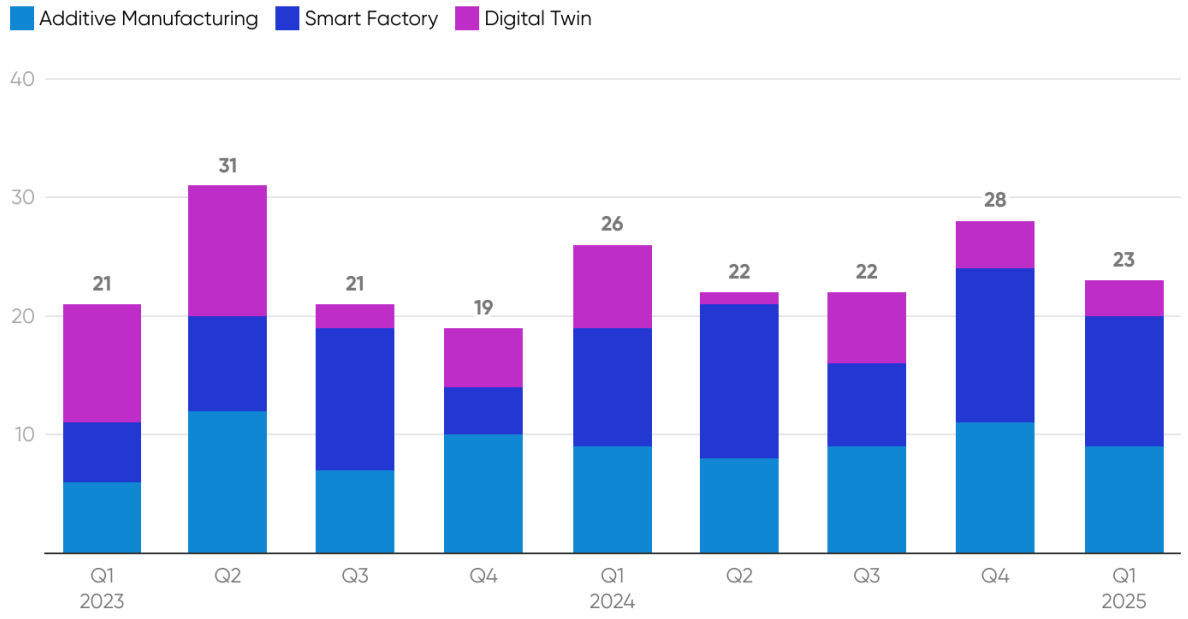
USD million



Note 1: Only includes rounds where the amount was disclosed
Note 2: Historical funding values have been adjusted to reflect the changes in our coverage

Source: Powered by Crunchbase

Funding by industry: Number of rounds



Note 1: Only includes rounds where the amount was disclosed
Note 2: Historical funding values have been adjusted to reflect the changes in our coverage

Source: Powered by Crunchbase

- The Advanced Manufacturing industry's overall average deal size **rose 26.9% QoQ**, mainly due to an increase in the average round size of the Other (up 159.5% QoQ) and Early (up 36.9% QoQ) funding rounds. However, the average size of the Growth funding round declined by 36.9% in Q1, mainly owing to the absence of growth funding-stage deals of over USD 100 million (Q4 2024 saw two such rounds from Tractian and Path Robotics).

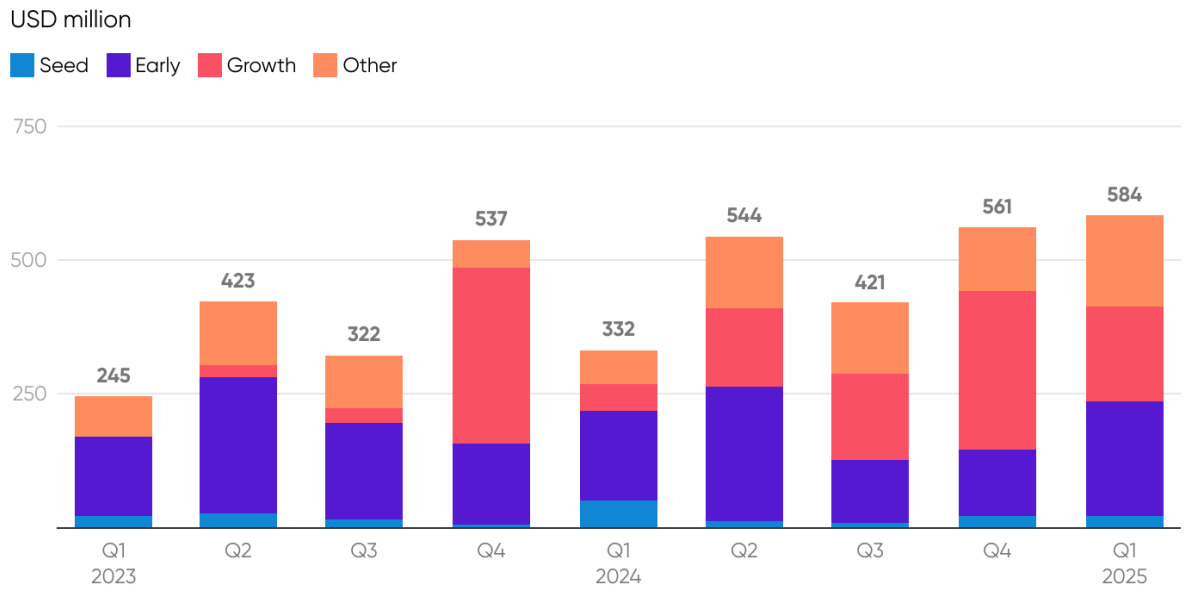
Average deal size

USD million

	Q1 2023	Q2 2023	Q3 2023	Q4 2023	Q1 2024	Q2 2024	Q3 2024	Q4 2024	Q1 2025
Additive Manufacturing	19.5	15.9	12.8	43.3	8.6	17.5	8.8	10.0	26.7
Smart Factory	5.7	20.2	18.5	6.4	18.0	30.2	19.7	31.9	29.5
Digital Twin	10.0	6.4	5.1	15.7	10.6	11.0	34.0	9.0	6.5

Note 1: Only includes rounds where the amount was disclosed
Note 2: Historical funding values have been adjusted to reflect the changes in our coverage
Source: Powered by Crunchbase

Funding by stage: Amount raised



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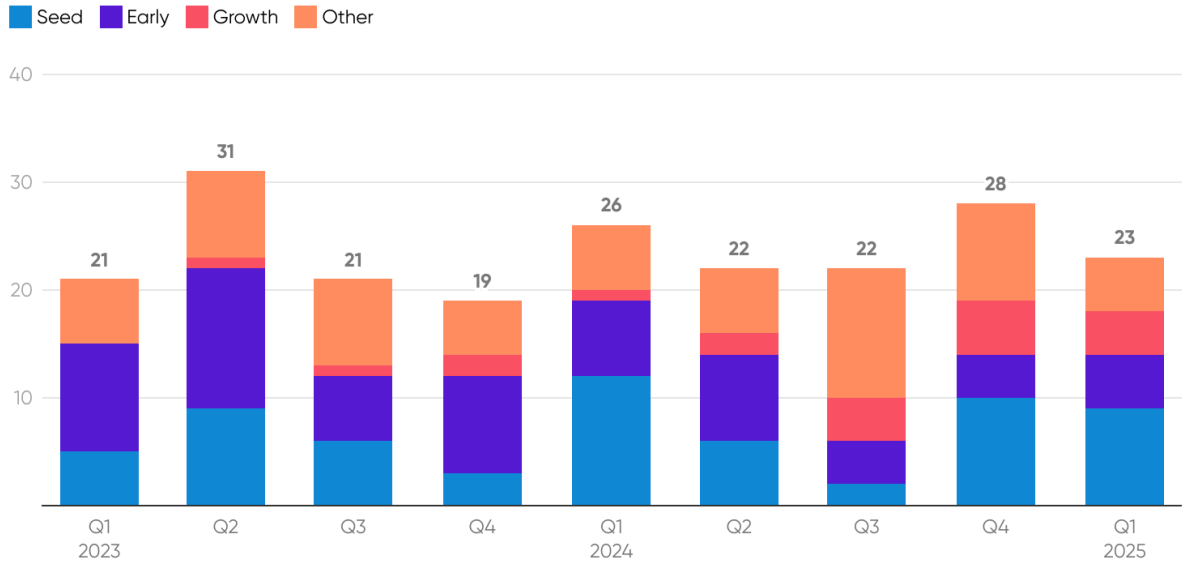
Source: Powered by Crunchbase

Funding by stage: Number of rounds



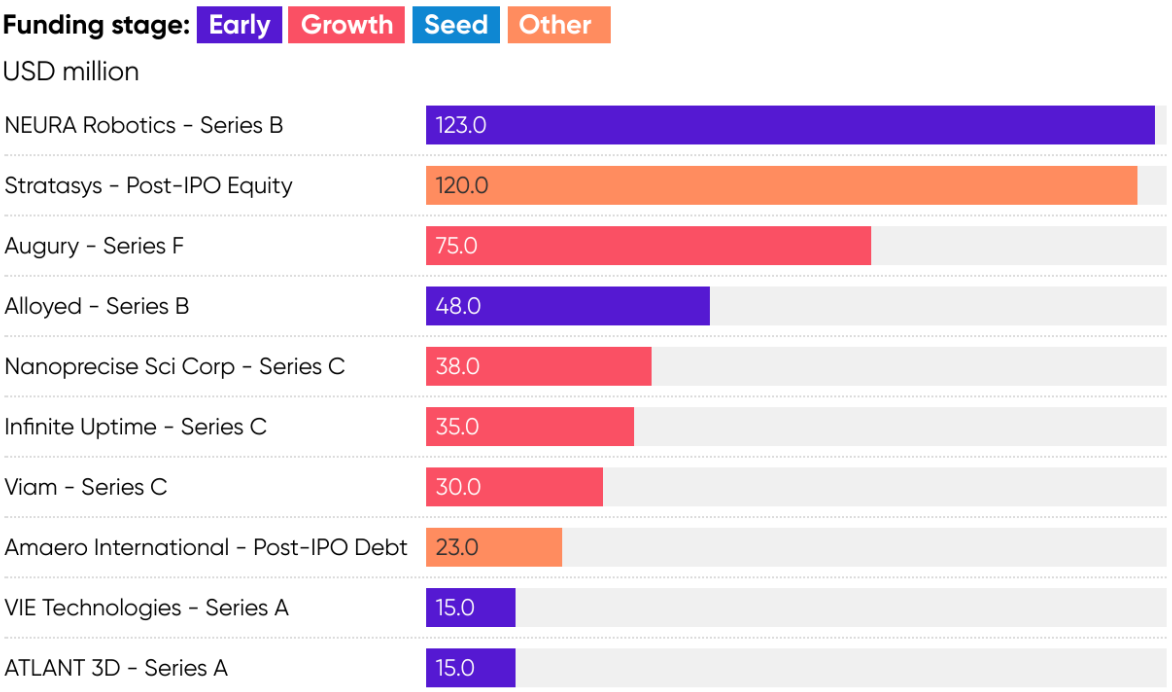
Note 1: Only includes rounds where the amount was disclosed
Note 2: Historical funding values have been adjusted to reflect the changes in our coverage
Source: Powered by Crunchbase

Notable funding rounds and investors

- Neura Robotics' USD 123 million Series B funding round (Smart Factory) was the largest funding round during the quarter. Meanwhile, Basetwo's USD 11.5 million Series A funding round for product development, global expansion, and hiring was the largest in the DT space.

- Notably, the **top 10 funding rounds** for the quarter had a combined value of ~USD 523 million (nearly 90% of the funds raised).

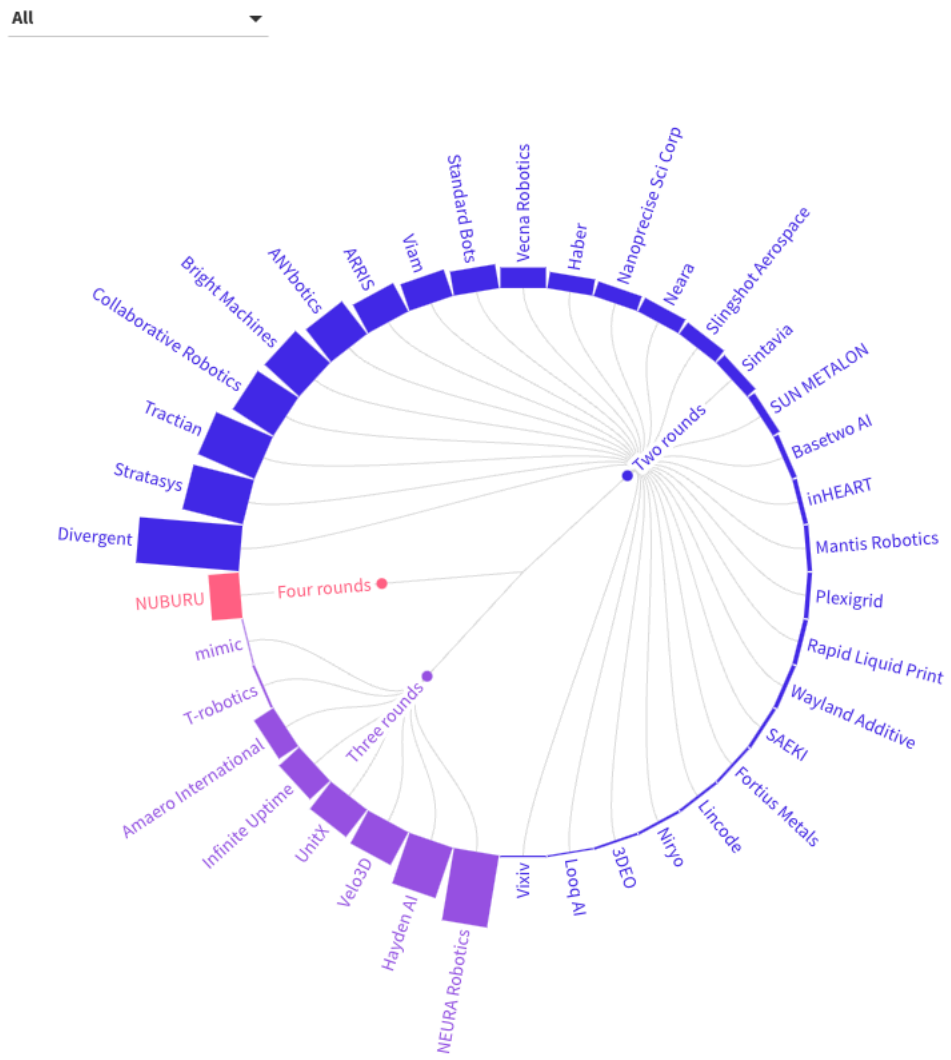
Top 10 funding rounds across Advanced Manufacturing (Q1 2025)



Note: Only includes the funding rounds in which amounts were disclosed
Source: Powered by Crunchbase

Repeat funding rounds over the past two years

NUBURU was the only company to record four funding rounds during the trailing 24 months (over Q2 2023–Q1 2025), while eight companies—including NEURA Robotics, HaydenAI, Velo3D, and UnitX—reported three funding rounds each. Meanwhile, 29 companies reported two funding rounds each.



Source: SPEEDA Edge research • Funding data powered by Crunchbase •
Note: 1) Amounts in USD millions, 2) The numbers listed are the funding amounts raised since Q2 2023

Partnerships: Industry-specific and research-based collaborations in Additive Manufacturing; NVIDIA integrates AI and DT technologies

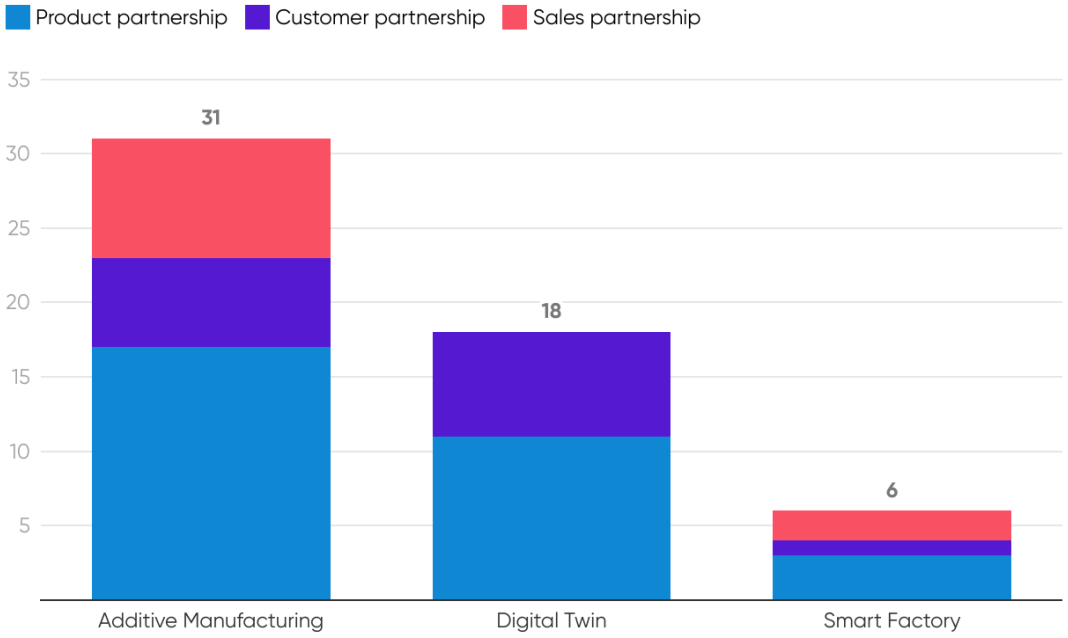
Analyst Take: Additive Manufacturing partnerships in Q1 2025 saw several collaborations with industry specialists, such as in healthcare (Siemens Healthineers) and aerospace (Jaxa), while leveraging collaborations with researchers, such as the University of Alabama, to drive innovations. Other continuing themes included a focus on metal additive manufacturing; increased adoption in healthcare, automobiles, and aerospace; geographical expansions (primarily in Asia and Europe); and continued collaboration by industry players in design and post-processing to develop holistic solutions. **DT** partnerships were

mainly driven by NVIDIA integrating AI to deliver improved collaboration and simulation capabilities, faster DT creation, and industrial robot training. There is a growing role of DT from design to maintenance, across sectors (including automobiles, aircraft, energy, and space exploration). Meanwhile, **Smart Factory** partnerships continued to be driven by collaborations to improve robotic solutions.

- **Customer partnerships** were driven by DT adoption across a range of sectors, including 1) **automobiles**: to simulate, test, and refine new production processes without disrupting operations (GM, Volkswagen Group) and to test autonomous driving systems (Hyundai), 2) **aircraft**: to simulate the manufacturing operations of a blended wing aircraft that aims to reduce fuel consumption and noise (JetZero), 3) **energy**: to create a unified digital view of physical assets through the visualization of engineering and operational data (BP), and 4) **space exploration**: to test and simulate designs before building them to boost its commercial space station and spacesuit programs (Axiom).

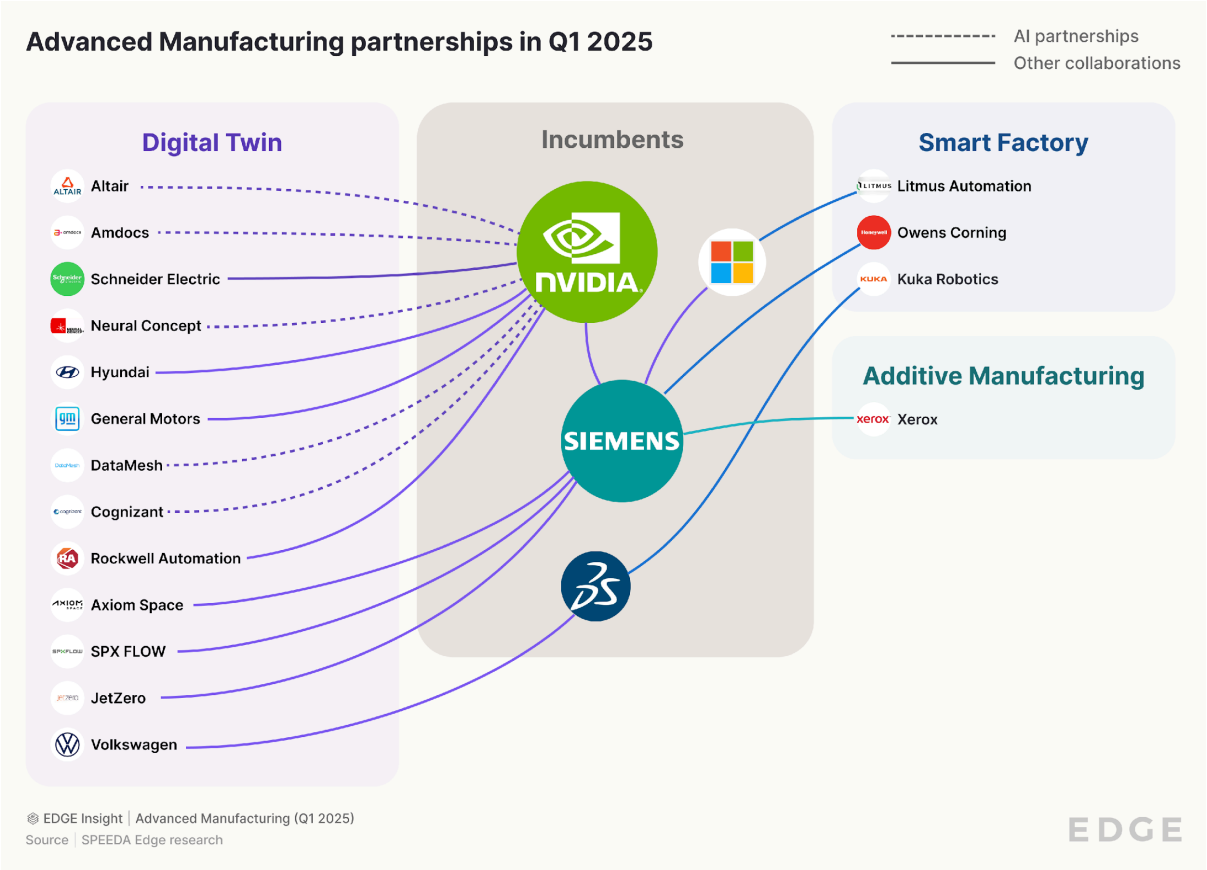
- We observed **55 partnerships** in **Q1 2025**, with the involvement of several incumbents (accounting for ~46% of partnerships) like Siemens, NVIDIA, Microsoft, and Dassault Systèmes. Additive Manufacturing saw the most partnerships (31), followed by DT (18), and Smart Factory (6). Meanwhile, product partnerships (31) were the most common, followed by customer partnerships (14) and sales partnerships (10).

Advanced Manufacturing: Q1 2025 partnerships by type



Note: For more details on incumbent partnerships, please refer to the Appendices
Source: SPEEDA Edge research

Notable incumbent partnerships in Advanced Manufacturing in Q1



- **Additive Manufacturing partnerships were driven by product collaborations with industry specialists, researchers, material developers, and software providers**
    - **Product development** dominated Additive Manufacturing partnerships during the quarter, with disruptors driving over 80% of activity. While most collaborations targeted industry-agnostic solutions, several focused on healthcare and aerospace applications. **Product partnerships comprised three types**:
        i. **Leveraging industry specialists to develop solutions:** 1) to produce high-precision, low-cost, **space components** (using carbon fiber-reinforced plastics and metal materials), including rocket engines (Nikon and Jaxa), 2) to produce 3D-printed **anatomically accurate phantoms** that enhance CT scanner calibration and improve diagnostic precision (Stratasys integrating Siemens Healthineers' advanced algorithms), 3) to reduce the setup time (by up to 98%) for **dental 3D printing** (Axtra3D integrating Oqcam's automated dental data

preparation software), and developing permanent dental restorations (such as crowns and inlays) within a single visit (SprintRay integrating Solventum's restorative solutions), and 4) to develop **aluminum casting solutions** that produce 100% recycled aluminum components (Voxeljet leveraging aluminium foundry expertise of Sarginsons)

ii. **Partnerships with research organizations and universities to develop solutions:** 1) Xerox partnering with Siemens' Charlotte Advanced Technology Collaboration Hub (CATCH) to **improve metal additive manufacturing** capabilities (including embedding DTs to optimize printing), 2) Titomic partnering with the University of Alabama in Huntsville to **improve its industrial cold spray systems**, and 3) Freemelt collaborating with the NC State University to establish an Application Center **for development projects and feasibility studies**

iii. **Collaborations by Additive Manufacturing solutions providers to enhance their offerings:** 1) **3D printer companies partnering with materials providers** (CONCR3DE and Tethon 3D for ceramic materials), **mold providers** (Lynxter and 3Deus Dynamics for anatomical models), **digital inventory solutions providers** (Raise3D; enables manufacturers to manage part workflows, authenticate digital parts, and distribute them), and **other 3D printer manufacturers** (Tethon3D launching a printer for mass production of large models), 2) **software providers collaborating** to improve additive manufacturing designs (Authentise and AutoDesk), and 3) **post-processing solutions** providers developing Continuous Fiber Injection Process (CFIP)-based reinforcement methods in partnering with additive manufacturing engineering specialists (Reinforce 3D and Sprint Srl) to improve fiber reinforcement methods

- **Customer partnerships** spanned multiple sectors but were dominated by the **automobile** sector (as seen over the past few quarters) to develop and enhance high-performance automobiles (Red Bull Racing) and for remote 3D printing of spare parts (Daimler). Other notable sectors included 1) **energy** (to manufacture gas turbine nozzles using stainless steel; Doosan), 2) **aerospace** (metal component manufacturing; Sintavia), and 3) **firearm manufacturing** (to make composite components for firearms; Henry Repeating Arms).

- **Sales partnerships** continued to be used by disruptors for their global expansion strategy. Multiple companies expanded in Asia (Phase3D

and Roboze in Japan and One Click Metal in India) and the UK (Eplus3D). Meanwhile, in the **dental additive manufacturing space**, several companies entered reseller agreements to expand sales. This included Trumpf partnering with Skillbond Direct (UK) and Stratasys partnering with three European dental companies.

- **DT product partnerships were driven by NVIDIA integrating AI and DT technologies; customer partnerships were led by automobile sector adoption**
    - Product partnerships primarily stemmed from **NVIDIA** facilitating **AI and DT technology integration**. This included the following:
        i. Offering **AI-based solutions to enhance DTs** through NVIDIA Omniverse Blueprints to deliver improved collaboration and simulation capabilities (Altair), faster DT creation, industrial robot training (Datamesh), and enhanced plant layout and process simulations (Cognizant)
        ii. Providing **DT integrations to AI industrial copilots**, which can improve network planning and deployment (Amdocs) and accelerate product development times by up to 75% (Neural Concept)
        iii. Offering **DTs to improve AI infrastructure** through power simulation to enhance data center efficiency and power management (Schneider Electric and ETAP)

      Moreover, NVIDIA partnered with Siemens to embed real-time ray tracing capabilities into Siemens' Teamcenter Digital Reality Viewer to **develop photorealistic, physics-based DTs** for industrial use.
    - In addition, DT providers are collaborating with industry specialists to create targeted industrial solutions. This includes Synopsys partnering with industrial software provider Vector Informatik to deliver pre-integrated solutions for **automotive software development** and Siemens partnering with SPX Flow, a fluid processing technology and equipment provider, to develop **DTs for fluid system design and optimization**.
    - **Customer partnerships** were driven by DT adoption across a range of sectors, including 1) **automobiles**: to simulate, test, and refine new production processes without disrupting operations (GM, Volkswagen Group) and to test autonomous driving systems (Hyundai), 2) **aircraft**: to simulate the manufacturing operations of a blended wing aircraft that aims to reduce fuel consumption and noise (JetZero), 3) **energy**: to

create a unified digital view of physical assets through the visualization of engineering and operational data (BP), and 4) **space exploration**: to test and simulate designs before building them to boost commercial space station and spacesuit programs (Axiom).

- **Smart Factory players collaborated to advance robotics solutions and expand the sales footprint**
    - Smart Factory players leveraged **product partnerships** to **improve robotics solutions.** For instance, Techman Robots partnered with ASMPT, a company offering high-precision manufacturing and intelligent automation systems for semiconductor and electronics manufacturing, to **improve its cobots** through better robotic arm automations. Meanwhile, KUKA Robotics partnered with Dassault Systèmes to **embed DTs into its industrial automation software**, thereby supporting the development of robotics and automation solutions.
    - Meanwhile, multiple companies entered partnerships to **expand the global** reach of their smart factory solutions, including BEET partnering with Tech Mahindra and Schneider Electric partnering with RS Group.

Product updates: Additive Manufacturing leads with new printers, materials, and robotics; embedding AI continues

Analyst Take: **Additive Manufacturing** saw transformative launches during the quarter, including Caracol's LFAM extruder enabling bi-material layer printing, Vertico's Solo Robot offering 270-degree concrete printing range, and ADDiTEC's portable metal DED system for off-grid environments, offering greater manufacturing efficiency and flexibility. Several themes continued, including the launch of new printers (including components) and materials with superior properties (such as Stratasys launching two materials with better design flexibility and heat and chemical resistance) and metal-related developments. **DT and Smart Factory** continued to see **AI-enabled integrations**, with Siemens launching industrial AI copilots and HCL's Agentic AI solution providing real-time defect detection to enhance predictive maintenance and reduce the need for internal data science and development skills. Meanwhile, ABB continued to offer robotics developments, most notably a no-code tool cutting setup times by up to 80%, addressing the critical industry challenge of technical expertise shortage, potentially accelerating smart factory adoption across manufacturing sectors.

- We observed **26 new product updates** in Q1 2025, driven by disruptors (nearly two-thirds), primarily in the Additive Manufacturing industry (over 60%).
- **Additive Manufacturing product updates centered on new printer and material launches, together with an expansion in on-demand manufacturing**
    - New **printers and components** launched during the quarter included the following:
        i. **LFAM advanced extruders for various materials were being developed**, such as 1) pellet-based extruders that deliver superior mechanical properties and serve several materials such as metal, ceramics, and polymers (AIM3D) and 2) an extruder with bi-material layer printing capability that allows allows the production of composite parts by combining materials (cost-effective core material with only the outer skin of high-performance thermoplastics) to deliver cost savings while retaining quality (Caracol—refer Startup spotlight)
        ii. **Robotics integrations to 3D printing solutions**, with 5–6 axes of movement (compared with typical gantry-based 3D printers that only have 3 axes). This included Vertico (refer Startup spotlight) launching a robotic 3D concrete printing system for the construction industry that has a 270-degree printing range around its base and Rapid Fusion launching a hybrid solution that combines 3D printing robot capabilities with Computer Numerical Control (CNC) milling at its robot demonstration center in the UK
        iii. A new **portable metal-based laser-DED system**, suitable for off-grid environments and harsh conditions for industries like emergency response and defense (ADDiTEC)
        iv. **Cost-effective desktop printers** (Ultimaker and Sinterit) that outperform predecessors by delivering better material flow (2.5x higher), productivity, print speeds (35% faster), and affordability (20% more affordable)
    - **Materials with superior properties for mission-critical applications launched** were as follows: 1) Stratasys launched two materials with better design flexibility and ability to handle extreme temperatures and harsh chemicals to create lightweight, durable parts mainly for aerospace and defense and 2) Boston Micro Fabrication launched a

flame-retardant material for industries where fire safety is crucial, like aerospace and consumer electronics.

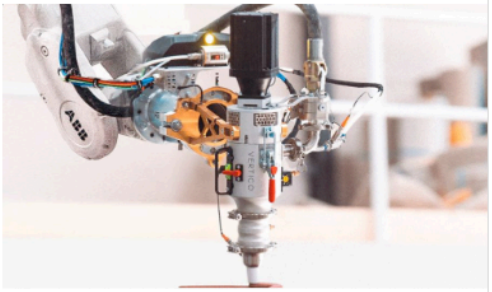
- There were also several additive manufacturing solutions launched for the **dental** sector, including 1) **new printers and complementing materials** to enable rapid customized denture production, with improved properties such as strength, durability, and aesthetics (3D Systems and Carbon), and 2) an **automated post-processing solution** that can clean 20x more parts than manual processing (PostProcess Technologies).
- Meanwhile, **on-demand additive manufacturing saw an expansion** for **metal additive manufacturing**, with 1) a leading metal additive manufacturing 3D printer provider launching on-demand services (Velo3D) for the aerospace, defense, and energy sectors to help shorten design cycles and maintain high quality at scale and 2) an on-demand 3D printing services provider expanding with new facilities for metal LFAM (up to 1.5 meters tall) to produce high-performance, complex components more efficiently (ATI).

- **Embedding AI drove Smart Factory and DT updates, as robotics advancements continued**
  - **AI-based solutions drove product updates** in the **DT** space, with companies carrying out the following:
    i. **Embedding AI to improve DT simulation capabilities and performance** and to reduce the need for extensive data science teams (Altair)
    ii. **Introducing GenAI and ML capabilities** to improve real-time monitoring and simulations of complex systems (ScaleOut Software)
    iii. **Launching an AI-powered virtual heart model**, which can create highly customized models and generate virtual patient twins to train GenAI (Dassault Systèmes)
    iv. Launching an AI-powered DT solution **for warehouses and factories** (NVIDIA upgrading its "Omniverse Blueprint" launched last quarter)
  - In the **Smart Factory** space, several AI-based software solutions were launched to improve manufacturing decision-making, defect detection, and predictive maintenance. This included **Siemens launching**

multiple industrial copilots; some assist shop floor workers and maintenance engineers with decision-making and GenAI-powered copilots with predictive maintenance. Meanwhile, HCL launched an **agentic AI**-powered solution for advanced data insights and analytics to identify and address product defects.

- **Robotics developments** continued in **Smart Factory**, including 1) a new robot cell to automate machine tool tending (Halter CNC Automation) and 2) a no-code software tool to create customized robotic user interfaces, which reportedly reduces setup times by up to 80% (ABB). This indicates a notable continuation of ABB launching robotic development solutions, as key launches from last year include an energy efficiency service, an ultra-accuracy feature for its "GoFa" robot family, and an advanced robotic automation platform integrating AI.

Startup spotlight

Vertico	Caracol
	
Description: Offers concrete 3D printing printheads (named Standard and Accelerator) for large-scale industrial projects and complex designs	**Description:** Develops LFAM printers targeting the production of advanced industrial components and offers on-demand additive manufacturing solutions
Differentiator: Offers "Solo Robot," a robotic 3D printing solution, offering a 3.2 meter reach and a 270-degree printing range around its base	**Differentiator:** Robotized extrusion system that helps maintain a high flow rate of polymers and composite materials while minimizing the risk of colliding with the printed parts
Funding: N/A	**Funding:** Raised EUR 10.6 million (USD 11.3 million) in a Series A funding round from several investors (March 2023)
Industry: Additive Manufacturing (3D printers)	**Industry:** Additive Manufacturing (3D printers, On-demand manufacturing)
Product Stage: Go-to-market	**Product Stage:** Go-to-market
Total Funding: N/A	**Total Funding:** USD 15.8 million

Source: SPEEDA Edge research

M&A: Acquisitions were used to access emerging technology and for industry consolidation

Analyst Take: M&A continued to be driven by **companies accessing advanced manufacturing technologies** through acquisitions. This included companies in diverse industries, such as orthopedics, automotive components, industrial equipment, and luxury brands showing interest in adopting additive manufacturing to enhance speed and offer product customization. Meanwhile, **horizontal integrations**—a common theme in the recent past—also continued, with **Additive Manufacturing** players expanding their materials and printer offerings and **Smart Factory** players expanding their digital solutions. **Vertical integrations** through combinations of smart factory and supply chain solutions providers continued with Eyelit Technologies acquiring Adexa, similar to Nulogy acquiring Mingo Smart Factory last quarter. Meanwhile, some crucial M&A deals announced in 2024 were completed this quarter (Altair; announced last quarter, Desktop Metal; announced in Q3 2024, and Matterport; announced in Q2 2024).

- **Acquisitions were used to gain access to advanced manufacturing technologies in healthcare, automotive, and industrial equipment manufacturing**

    - In the **Additive Manufacturing** space, we saw acquisitions across multiple industries, including 1) **healthcare (orthopedics)** to create custom implants for patients, specializing in foot and ankle care (Ortho Solutions acquiring Meshworks), and printing advanced solutions like definitive prosthetic sockets through several filament materials within two hours (PROTEOR acquiring Filament Innovations) and 2) **automotives** to produce precision metal components and access metal powders to manufacture driveline and drivetrain components (American Axle & Manufacturing acquiring Dowlais, parent of GKN Powder Metallurgy). Meanwhile, specialty metals provider United Performance Materials (UPM) acquired Fabrisonic to access its 3D printing technologies, such as its ultrasonic vibrations method to weld layers of metal to serve several industrial sectors.

    - In the **Smart Factory** space, Atlas Copco acquired Neadvance Machine Vision to access the latter's quality control solutions for smart integrated assembly operations.

    - Meanwhile, luxury-brands solutions provider Together Group acquired IMERZA to offer **DT** solutions to its customers across several segments, including real estate, fashion, beauty, hospitality, and art.

- **Horizontal and vertical integration aimed at expanding offerings in Additive Manufacturing and Smart Factory**

- **Horizontal integration** was used in **Additive Manufacturing** by companies to expand their resin material portfolios and compatibility with hardware platforms (Tethon 3D acquiring TA&T) and broaden their metal 3D printer offerings (Sodick acquiring Prima Additive). Meanwhile, in the **Smart Factory** space, we saw ABB acquiring Sensorfact to expand its digital energy management portfolio of solutions.

- Meanwhile, the less pronounced trend of **vertical integration** continued in **Smart Factory**, with manufacturing execution and planning systems provider Eyelit Technologies acquiring Adexa, an AI-driven supply chain and enterprise business planning solutions provider. Last quarter, we saw a similar integration with supply chain technology disruptor Nulogy acquiring manufacturing analytics solutions provider Mingo Smart Factory.

Regulations: Military funding and partnerships together with industry standardizations drive adoption

Analyst Take: The **US Military** continued to show strong interest in **Additive Manufacturing** developments through funding to set up 3D printing centers, open project calls, joint development projects, and contracts to source 3D printed components (partnering with AML3D as it did last year). Meanwhile, leading organizations continued to work toward standardization and providing guidelines for using advanced manufacturing technologies, including the US FDA and the ICC, similar to last quarter's initiatives by the NIST. All these actions should help address the lack of standardization in the industry, which has reportedly been a hindrance to additive manufacturing adoption. Meanwhile, President Trump's recent tariff announcements to promote US manufacturing might also support advanced manufacturing technology adoption, as it may help manufacturers manage expenses as they look to reshore (for instance, Honda is expanding manufacturing in the US instead of Mexico in response to the tariffs).

- **Military demand for Additive Manufacturing accelerated with funding, development partnerships, and manufacturing contracts**

    - **Funding for additive manufacturing was driven by the following:**

        i. The DoD (through the US Navy) plans to **invest USD 40 million in a 3D printing training** center in Guam to print ship and

submarine components

ii. The US Army awarded **USD 3.1 million** to the University of Arizona to develop 3D printed parts that can fly at speeds of Mach-5 or higher

iii. America Makes launched a **project call worth USD 1.1 million** funded by the OSD (R&E) to enhance interoperability between the US and UK military supply chains for laser powder bed fusion (L-PBF) of critical parts

- **Partnerships entered to develop 3D printed solutions** in collaboration with startups and research labs included 1) Beehive Industries partnering with the US Air Force to study propulsion systems for uncrewed combat aircraft and 2) America Makes partnering with the Ames National Laboratory to develop refractory alloys that can serve extreme applications.

- **Partnerships with solutions providers to access their 3D printed solutions** included 1) AML3D delivering copper-nickel tailpiece components for the US Navy's nuclear submarine program (reportedly reducing component lead time by nearly 14x to 5 weeks) and 2) HRL Laboratories entering a USD 8.9 million contract with the US Defense Advanced Research Projects Agency (DARPA) to develop ways to predict the lifetime of 3D printed components, based on in-situ sensing technologies, process modeling, and microstructure-based fatigue-life methods.

- **Standards, guidelines, and SME funding boosted advanced manufacturing technology adoption**
  - The **FDA** finalized guidance to assist sponsors in participating in the Advanced Manufacturing Technology (AMT) designation program and published guidelines on batch uniformity and drug product integrity, which should **facilitate advanced manufacturing technology adoption in drug development**, indicating continued interest from the FDA to support advanced manufacturing technology adoption in healthcare. Last quarter, it partnered with Dassault Systèmes to launch guides on using DTs to accelerate clinical trials.

  - The ICC **developed the first 3D Automated Construction Technology (3DACT) standard** for **3D-printed concrete walls**. The standard provides structural criteria for interior and exterior printed walls in single- and multi-story buildings and should therefore help

additive manufacturing adoption in the construction industry.

- Meanwhile, Materialise obtained the EN 9100 certification, enabling it to manufacture flight-ready metal parts for aerospace applications (similar to A3D Manufacturing last July). Meanwhile, GE's Catalyst turboprop engine, which **features components additively manufactured** to enhance efficiency and reduce weight, **received US Federal Aviation Administration (FAA) certification**.

- **The US Department of Energy (DOE)** provided **USD 13 million** in funding as part of the State Manufacturing Leadership Program **to boost SME access to smart manufacturing** tech (the third round of funding under the second phase of the USD 50 million program announced in March 2023— following two rounds, in the last quarter and the one before, offering a cumulative USD 44.3 million).

- **European governments funded DT developments for supply chain and energy operations**

  - The UK Government, through UK Research and Innovation (UKRI), awarded GBP 5 million (USD 6.5 million) to Queen's University Belfast to establish the ReImagining Supply Chains Network Plus (RiSC+). This network aims to leverage digital tools, including DT, to **identify and prepare for future risks and supply chain disruptions**. The network focuses on three main sectors: food, critical minerals, and fashion.

  - DSO Entity, an association of European Distribution System Operators (DSOs), launched the "DSO4DT" program (a 36-month program starting January 2025), funded by the EU. The program aims to develop DTs for the energy sector to improve power grids.

Value chain: Concentration in production led by Additive Manufacturing; DT drives uptick in design and development

Production activity remained high, albeit lower QoQ, and was driven by product updates and partnerships in Additive Manufacturing. This was led by the continued adoption of 3D printing solutions to enhance production across several industries, including healthcare (primarily in the dental field), aerospace and defense (including space exploration), automobiles, and energy. Other notable developments included

developing metal additive manufacturing and LFAM solutions, printers for off-grid environments, integrating robotics into additive manufacturing, and expanding the sales footprint across the globe.

Design and product development activity increased compared with the last quarter, driven by significant partnerships in the DT space. This was primarily NVIDIA integrating AI to improve simulations, industrial robot training, industrial copilot development, and data center efficiency and power management. Meanwhile, companies across several industries adopted DTs to enhance manufacturing operations, including automobiles, aircraft, energy, and space exploration.

Materials activity declined this quarter; however, newer materials for additive manufacturing with superior properties, such as heat and chemical resistance, for industries like aerospace and defense and consumer electronics, together with materials for the dental industry, were launched. Meanwhile, acquisitions were also used by manufacturers to access materials and expand the portfolio of materials offered.

Maintenance activity saw a slight dip compared with the last quarter. However, activity was driven by DT adoption in the energy sector for physical asset management and in the industrial sector with Siemens' GenAI-based industrial copilot for predictive maintenance.

Quality assurance activity also saw a slight reduction this quarter; however, post-processing additive manufacturing solutions continued to be launched, including the development of CFIP-based reinforcement methods. Meanwhile, HCLTech launched an agentic AI-powered solution for advanced data insights and analytics for defect responses.

Appendices

01. Notable incumbent partnerships across Advanced Manufacturing

Company	Partnered company	Relevant industry	Partnered date	Description
EOS	Sintavia	Additive Manufacturing	March 5, 2025	Expanded its fleet of 3D printing hardware by acquiring an “AMCM M290-2 FLX” industrial metal 3D printer. The printer integrates an nLIGHT AFX beam-shaping fiber system, reportedly making it the first machine deployed to a North American customer with this technology
Nikon	JAXA	Additive Manufacturing	February 27, 2025	To develop Japan's first large-scale metal 3D additive manufacturing system for producing high-precision, low-cost space components, including rocket engines and structural elements, with a focus on carbon fiber-reinforced plastics and innovative metal 3D printing methods
Hexagon	Red Bull Racing	Additive Manufacturing	February 20, 2025	To focus on 3D laser scanning and digitalization solutions for F1 racing and sim racing development
Siemens	Xerox	Additive Manufacturing	February 13, 2025	To strengthen metal additive manufacturing capabilities by combining Siemens' automation expertise and Xerox's liquid metal 3D printing technology, enabling on-demand part manufacturing and improved supply chain resilience
EOS	Doosan	Additive Manufacturing	February 12, 2025	Acquired an EOS M 400-4 Laser Beam Powder Bed Fusion (PBF-LB) machine to produce gas turbine nozzles
HP	Structure Sensor	Additive Manufacturing	February 6, 2025	To provide HP's 3D printing clients with Structure's AI-powered SDK, enabling them to develop custom 3D scanning applications for product development and healthcare, with the partnership aiming to offer end-to-end 3D scanning and printing services
NVIDIA	Cognizant	DT	March 25, 2025	To accelerate the cross-industry adoption of AI technology, Cognizant announced advancements built on NVIDIA AI in five key areas: enterprise AI agents, industry-specific large language models (LLMs), DTs for smart manufacturing, foundational infrastructure for AI, and the capabilities of Cognizant's Neuro AI platform
NVIDIA	Altair	DT	March 20, 2025	To integrate Altair's simulation, AI, and high-performance computing (HPC) solutions with NVIDIA's GPU acceleration, microservices, and Omniverse technologies, enabling the seamless deployment of DTs and improved performance of Altair's products

Company	Partnered company	Relevant industry	Partnered date	Description
NVIDIA	Schneider Electric and ETAP	DT	March 20, 2025	To develop a DT solution that integrates mechanical, thermal, networking, and electrical systems to enhance data center efficiency and power management, leveraging NVIDIA Omniverse Blueprint technology
NVIDIA	DataMesh	DT	March 19, 2025	To develop high-fidelity DT solutions faster, create time-space-consistent virtual environments, and unlock applications, such as root cause failure analysis, intelligent scheduling optimization, and AI-driven training for industrial robots
NVIDIA	Amdocs	DT	March 18, 2025	To launch AI network agents that leverage DTs to help network operators plan, deploy, and enhance their networks for optimal performance and superior customer experiences
NVIDIA	Neural Concept	DT	March 18, 2025	To accelerate product development by up to 75%, Neural Concept's Engineering AI platform now fully integrates with NVIDIA Omniverse Blueprint and the latest GPUs, enabling OEMs and Tier 1s to innovate design through AI-driven workflows
NVIDIA	GM	DT	March 18, 2025	To virtually test new production processes without disrupting existing vehicle production
NVIDIA	Rockwell Automation	DT	March 14, 2025	To enable factory-scale virtual controls testing and automation system validation before deployment
Siemens	Axiom Space	DT	March 10, 2025	To enhance the development processes for building era-defining space infrastructure, Axiom Space has selected software from the Siemens Xcelerator portfolio, enabling digital transformation, streamlining manufacturing, and advancing its space programs
Synopsys	Vector Informatik	DT	March 10, 2025	To accelerate the automotive industry's transition to software-defined vehicles by delivering pre-integrated solutions that leverage Vector's software factory expertise and Synopsys' electronics DTs expertise, enabling automotive companies to "shift-left" software validation and improve developer productivity
Dassault Systemes	Volkswagen	DT	February 4, 2025	To leverage Dassault Systèmes' 3DEXPERIENCE platform to enhance Volkswagen's vehicle development processes, enabling virtual simulation, testing, and refinement before physical production
Siemens	SPX Flow	DT	January 29, 2025	To develop a DT technology that enables virtual simulation, optimization, and predictive maintenance for fluid processing systems, leveraging SPX FLOW's expertise and Siemens' IoT connectivity and Computational Fluid Dynamics (CFD) capabilities
Siemens	Microsoft	DT	January 22, 2025	To deliver AI-based natural language assistance to its “NX X” software via Azure to automate design tasks

Company	Partnered company	Relevant industry	Partnered date	Description
NVIDIA	Hyundai Motor Company	DT	January 13, 2025	To develop a software-defined vehicle stack, autonomous driving systems, smart factory operations, and product design using NVIDIA's Omniverse platform, data center infrastructure, and Isaac simulation framework
Siemens	NVIDIA	DT	January 6, 2025	To embed real-time ray tracing capabilities into Siemens' Teamcenter Digital Reality Viewer to develop photorealistic, physics-based DTs for industrial use
Siemens	JetZero	DT	January 6, 2025	To simulate the manufacturing operations of a blended wing aircraft that aims to reduce fuel consumption and noise
Microsoft	Litmus	Smart Factory	March 31, 2025	To create integrated edge-to-cloud AI solutions for industrial applications by combining Litmus' edge computing capabilities with Microsoft's cloud services to enable the streamlined processing and analysis of industrial data
Schneider Electric	RS Group	Smart Factory	March 24, 2025	To offer Schneider Electric's Lexium portfolio, including cobots and integrated smart manufacturing solutions, to small and medium-sized industrial organizations through RS, enabling access to advanced automation technologies
Dassault Systemes	KUKA Robotics	Smart Factory	February 24, 2025	To provide KUKA customers access to Dassault Systèmes' 3DEXPERIENCE platform and applications through the mosaixx platform, enabling virtual twin technology and enhanced collaboration for manufacturers across multiple sectors
Siemens	Owens Corning	Smart Factory	January 21, 2025	To automate and simulate the glass mat manufacturing plant in Fort Smith, Arkansas, US, leveraging Siemens' expertise to boost efficiency, quality, and availability of the equipment and manufacturing line

Source: SPEEDA Edge research

02. Startups that raised external funding for the first time during the quarter

Company	Industry	Founded	HQ	Funds raised (USD million)	Stage	Description
MB Therapeutics	Additive Manufacturing	2022	FRA	2.1	Minimum Viable Product	MB Therapeutics specializes in developing personalized medications using 3D printing technology. The company's MED-U Modular printer enables the production of customized oral medications that can combine multiple active ingredients into a single dose. The printer uses various 3D printing technologies, including gel/paste extrusion with volumetric dosing and fused modeling deposition to ensure precision and

Company	Industry	Founded	HQ	Funds raised (USD million)	Stage	Description
						reproducibility in material deposition
Reinforce 3D	Additive Manufacturing	2022	ESP	1.2	Minimum viable product	Reinforce3D develops proprietary technology for reinforcing 3D-printed parts; this is called the continuous fiber injection process (CFIP). The company's “Delta” machine injects continuous fibers such as carbon, glass, or Aramid into pre-designed tubular cavities within 3D-printed components during post-processing to improve their strength and performance. The process enables the creation of hollow parts that can achieve the same rigidity as solid components and facilitates the integral bonding of different components
MetAI	DT	2023	TWN	4.0	Minimum viable product	MetAI specializes in AI-powered DT technology that converts CAD files into simulation-ready 3D environments. The company's proprietary generative model, MetSynthesizer, enables the instant generation of SimReady (Simulation-Ready) DTs designed for advanced semiconductor fabs, smart warehouses, and automation systems

Source: SPEEDA Edge research • Funding data powered by Crunchbase

03. Advanced manufacturing value chain definitions

#	Value chain	Definition
1	Design and product development	Designing products and manufacturing processes, including simulations, product optimization, and factory planning
2	Materials	Developing new materials and research on materials
3	Production	Adopting advanced manufacturing tech for production activities
4	Quality assurance	This includes post-processing finishing activities to ensure the final product meets the production standards
5	Maintenance	Includes predictive maintenance and the use of advanced manufacturing for repairs and product enhancements

Source: SPEEDA Edge research