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VDMA
Textile Care, Fabric and
Leather Technologies



THREADS OF THE FUTURE

FOOTWEAR & LEATHER TECHNOLOGY EDITION

Technology and Market Study for the European Footwear and Leather Technology Sector

Main Report — market position, technology priorities, adjacent markets, regulation and scenarios to 2045, with recommended actions for machine builders and for the VDMA

Prepared for VDMA e. V. – Textile Care, Fabric
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Document information and revision status

This Main Report is the consolidated deliverable of Project 25_205, a follow-up mandate awarded to Gherzi Germany GmbH by the VDMA specialist association Textile Care, Fabric and Leather Technologies. It supersedes the separate Management Report (Part A, up to Version 12) and the Full Technical Report (Part B, Version 09) as the single reference document for the study. Those earlier instalments remain available as working papers; where this report differs from them, this report governs.

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What changed in this consolidation

Three things distinguish this report from the instalments it replaces. First, the review findings raised against Part A and Part B — some ninety separate points — have been worked through on their merits rather than accepted or deleted; the substantive corrections are recorded in Section 3.3 and, where a figure moved, in the text itself. Second, two gaps that reviewers identified as the most serious have been closed with disclosed derivations rather than left open: the size of the machine market itself, including the addressable market in each adjacent field (Section 8.7 and Annex A1), and the economic threshold at which automation displaces the low-wage advantage (Section 6.4 and Annex A2). Third, the regulatory material, previously spread across three chapters with inconsistent dates, is now held in one place (Section 9) and re-verified against the primary legal texts.

Two corrections deserve to be flagged at the front, because both were load-bearing and both moved. The threshold at which soft-joining automation would change the location decision is not a single figure of roughly 40 per cent, as earlier drafts stated; a transparent calculation puts it between about half and nearly all of the manual labour content, depending on the product. And the addressable machine market in the adjacent industries, while real and worth pursuing, is roughly of the same order as the sector's existing world market rather than the two orders of magnitude that a comparison of material markets implied.

What changed in Version 2

Version 2 carries four corrections from the external review of Version 1 and changes nothing else. The reference to a Federal Trade Commission threshold of 70 per cent for "Made in the USA" labelling in Section 5.3 has been removed, because no such threshold exists; the standard is all or virtually all, and the 70 per cent is New Balance's own definition. The Prada transaction in Section 4.7 has been restated in its actual direction: Prada contributed two tanneries to the Rino Mastrotto Group in exchange for a minority stake rather than acquiring control of them. The transitional provisions of the Machinery Regulation are now cited as Article 52, and the corresponding open verification point was closed. And the Executive Summary now summarises all seven findings of Section 13 rather than five. The editorial cut-off for legal and market statements remains 17 August 2026.

What changed in Version 3

Version 3 works through the remainder of the external review and changes no conclusion of the study. Seven substantive points were corrected: the Jack Technology comparison is now stated with its segment definition attached; Annex A1 carries the sensitivity of the world-market derivation to the disputed Italian export figure; the automotive interior growth rate is 7.3 per cent over the window actually used; the 2025 United States tariff peak is given at its documented level; the robot price series is identified as a projection; the Comelz signing date, enterprise value and purchase price are corrected; and the Wortmann revenue figure is dated to the year it was last reported. Twenty editorial points were cleared in the same pass, among them the cross-reference under Figure 11, a duplicated section number in Chapter 15, the European consumption share, the packaging and CBAM scope statements, the PFAS timetable and the status of the two outstanding digital-product-passport standards. The editorial cut-off remains 17 August 2026.

What changed in Version 4

Version 4 carries the client review of Version 3. Three changes follow from it. schoen + sandt no longer appears as an active builder in this field: the company filed for insolvency in May 2026 and the family-owned Ring Group in Pirmasens took over its punching assets and most of its workforce in July 2026, so Ring now holds

that niche and one of the last German shoe-machinery programmes with it. The section on what the study could not settle has been removed, because the data gaps it named cannot be closed by a membership survey in a field where the association either has no members in the relevant segment or only one, whose figures could not then be published. And the register of open verification points has been removed from the report, with the cross-references to it taken out of the text. Figures that rest on a derivation or an estimate remain labelled as such at the point of use, so that no derived number reads as a measurement. Four sections were added at the client's request: 6.7 with five best-practice cases, 7.5 on the markets beyond Europe and China, 10.5 on the circular economy as a machine market, and 14.1 with the 2045 picture. They follow the structure of the first study, "Threads of the Future", in a shortened form.

What changed in Version 5

Version 5 carried the recommendations for the VDMA, the roadmap, the conclusion, the source list and the annexes through a further editorial pass. No conclusion of the study changed. The document metadata was not carried through that pass, with the result that the cover, the table above and the page footers stated three different versions and two different document numbers. Version 6 corrects that; the report now carries one version and one document number throughout.

What changed in Version 6

Version 6 carries the second client review. Its four content requests are taken into the structure of the report rather than left as appended sections. The Executive Summary now states each of them, because a reader who goes no further than Section 2 should still meet them: the five operating installations of Section 6.7, the markets beyond Europe and China of Section 7.5, the circular economy as a machine market of Section 10.5, and the 2045 picture of Section 14.1. The key messages of Sections 6, 7 and 10 point to the corresponding material. The circular economy is stated as Finding 8 and carried into the recommendations, where repair, inspection and refurbishment equipment is named as one of the diversification fields for machine builders and a fourth pilot consortium is proposed for the VDMA. Four corrections were made in the same pass. A column error in Table 3 placed a description of Ring Group's product range in the ownership column. The description of items marked for further examination in Section 15 still referred to the register of open verification points that Version 4 removed. The contents entry for Section 14.1 was set at chapter level rather than as a subsection. And the page numbers in the contents have been re-measured against this version. The editorial cut-off for regulatory and market statements remains 17 August 2026.

What changed in Version 6.1

Version 6.1 is an editorial and terminological revision. No fact, figure, source, derivation or conclusion of Version 6 has been changed, and the editorial cut-off for regulatory and market statements remains 17 August 2026. Three things changed. The binding title of the study is now “Threads of the Future — Footwear & Leather Technology Edition”, and it is carried consistently on the cover, in the running head, in the document information above and in the document properties; the short form “Footwear and Leather Edition” and the subtitle's reference to a “Machinery Industry” have been withdrawn. The subtitle now reads “Technology and Market Study for the European Footwear and Leather Technology Sector”. And Section 1.2 now states explicitly what technology covers in this report, because the change of title widens the declared subject beyond machines and that widening belongs in the scope rather than on the cover alone. The word machinery remains in the body wherever it names a measured quantity, a market segment, a company, a legal instrument or a cited source: the Assomac segment statistics, the Machinery Regulation, the machine builders themselves and the titles of referenced documents are unchanged, because renaming them would misstate the evidence.



1 Purpose, scope and how to read this report

1.1 Mandate and purpose

The VDMA commissioned this study to answer a question its members ask in plainer language than a study usually allows: if the large-volume market for footwear and leather has moved to Asia and is not coming back, what is left for European machine builders over the next twenty years, and what should they do about it? The mandate follows the earlier study "Threads of the Future" (Project 25_189) and narrows it to the footwear and leather technology field and its industrial neighbours.

The report is written for an expert readership — machine builders, processors, brand owners, retailers, association staff, researchers and policymakers who already know this industry. Its purpose is orientation and decision support, not promotion. It is deliberately sober: it neither dramatises the pressures on the European industry nor promises a recovery the evidence does not support. Where the evidence supports a firm statement, the report makes one. Where it does not, the report says so and explains what would need to be measured.

1.2 Scope and boundaries

The study covers the technology of leather processing and flexible-material processing for the European market — footwear, leather goods and automotive interiors — across the value stream from finished hide to finished product, with an outlook to 2045. Adjacent applications, principally aviation interiors, furniture and upholstery, technical textiles and protective equipment, are covered where they add demand for the same technological competence.

Technology is used here in the broad sense the title implies. It covers the machines and production plant themselves; the processes they perform and the process know-how that makes them productive; automation and robotics, including the handling of limp and variable materials; the digital layer that controls, connects and documents production, from machine data interfaces to the product passport; the materials that are processed and the material systems that substitute for them; and the production technologies and technological innovations that determine how footwear, leather goods and related soft-goods are made. Machines remain the quantitative backbone of the analysis, because that is where the sector's own statistics are collected and where measurement is possible. The wider technological fields are examined where the evidence supports it: automation readiness and the joining problem in Section 6, the digital and data-driven layer in Sections 6.2 and 9.3, materials and adjacent material systems in Section 8, and circular processing technology in Section 10.5.

Where a statement rests on machine-market data alone, the text says so, and no figure has been extended beyond the scope of the source it is drawn from.

Four things are out of scope by design. Precise euro market sizing is not attempted beyond the ranges and disclosed derivations given here, because category definitions in this sector vary by more than tenfold and a single point estimate would convey a precision the data does not support. Company valuations and transaction advice are excluded. Fashion-trend forecasting is excluded. And implementation projects beyond the level of the recommendations in Section 15 are outside the mandate.

1.3 How to read the numbers

This report distinguishes four kinds of statement, and the wording signals which is which throughout.

- **Documented external fact.** A figure published by a named source, with the year and the scope stated. Example: world footwear production of 24.6 billion pairs in 2025 (World Footwear Yearbook 2026).
- **Analytical derivation.** A figure the authors have calculated from stated inputs. Every derivation in this report shows its inputs and its arithmetic, either in the text or in Annex A. Example: the addressable machine market in Section 8.7.
- **Working assumption or hypothesis.** A quantity used because the argument needs one and no measurement exists. These are labelled as such.
- **Assessment.** A judgement by the authors on the balance of the evidence, phrased as such and separable from the evidence it rests on.

Two conventions matter for reading the tables. Market sizes are single-analyst estimates unless a range is shown; where two analysts disagree materially, both are given. And figures drawn from the study's own internal work — the Gherzi/VDMA short study 25205-005, the project peer team and the expert interview — are named as internal sources rather than presented as independent corroboration.

2 Executive summary

This study was commissioned to answer a question the industry asks in plain language: if the large-volume market for footwear and leather has moved to Asia and is not coming back, what is left for European machine builders over the next twenty years, and what should they do about it? The answer is neither reassuring nor bleak.¹ The European footwear and leather machinery industry is not disappearing; it is changing shape, and the shape it is taking is smaller, more specialised and, on the evidence of the last three years, more defensible than the one it is leaving behind.

Where the industry's centre of gravity is. It is in China, and the report says so at the outset because a strategy written against a misdescribed starting point will fail whatever its merits. China produced 55.6 per cent of the world's footwear in 2025 and supplied 61.2 per cent of world export volume; on the Italian association's sector definition it holds 49 per cent of world trade in this machinery against Italy's 27 per cent. One Chinese firm, Jack Technology, turned over roughly EUR 0.85 billion in 2025, more than one and a half times the entire Italian sector — a comparison of two differently drawn baskets, since some 86 per cent of that revenue is apparel sewing machinery and only about a tenth is cutting-room equipment of the kind the Italian figure counts. Three precisions sit alongside that, and they are not consolations. Measured on the customs heading for dedicated tanning and leather-working machinery rather than on the association's wider basket, Italy still exports more than twice what China does. China's own imports of that equipment have fallen to about USD 15 million a year, 84 per cent of it Italian. And Chinese scale has not carried the high-end layer: against a domestic-share target of 80 per cent in high-end CNC machine tools the outcome was about 33 per cent, and the Chinese owner of Dürkopp Adler, Pfaff and KSL reported a group loss in 2025 that it attributed to its European operations. Europe will not win a contest of scale. The question this study answers is what can be won where scale is not the deciding factor.

What the European sector delivers. Before the pressures, the record. DESMA supplies approximately half of all direct-soling shoe machines in operation worldwide and exports more than nine tenths of its output. Lectra took EUR 506.7 million of revenue in 2025 with 75 per cent of it recurring and software-as-a-service growing 14 per cent — a European firm in this sector already operating, at scale, the business model this report recommends. And the technology delivers value a purchasing manager can put in a business case: a documented plant raised leather yield from 73 to 78 per cent, cut nesting time per hide by three quarters and reduced the skilled operators on the line from ten to two, while the industry benchmark puts manual utilisation at 50 to 60 per cent against up to 70 per cent for digital cutting — worth on the

¹Figures quoted in this summary are sourced at the corresponding place in the main text; the summary itself is deliberately kept free of footnotes.

order of EUR 100,000 a year for every percentage point saved in an automotive cutting room. These are assets that exist. The strategy in this report is built on them.

The starting position. World footwear production reached 24.6 billion pairs in 2025, essentially flat on the previous year, and 88.7 per cent of it was made in Asia, with China alone accounting for 55.6 per cent (World Footwear Yearbook 2026). Europe's share of production is low single digits. Its share of export value is disproportionately high — European exports leave at an average of USD 34.76 per pair against a world average of USD 11.65 — though part of that gap is an artefact of re-export through European logistics hubs rather than a measure of European manufacturing. The machinery layer that serves this industry has contracted for three consecutive years: Italian sector production fell to about EUR 512 million in 2025, down 11 per cent after a fall of 12 per cent in 2024, and Italy's share of world trade in this equipment has halved since 2005, from 42 per cent to 27 per cent, while China's has reached 49 per cent (Assomac, 2026).

The most informative fact in those accounts is not the decline but its shape. Every new-equipment segment fell in 2025 — tanning machinery by 24.5 per cent, leather-goods machinery by 9.8 per cent, footwear machinery by 4.1 per cent — while spare parts and service held broadly stable. The installed base survived the downturn; the new machine did not. That single pattern is the empirical foundation of everything this report recommends.

How large this market actually is. Earlier versions of this study never stated the size of the machine market, which made it impossible to judge whether diversification is a growth strategy or an evasion. On a derivation from the Assomac trade shares, world trade in footwear, leather-goods and tanning machinery is on the order of EUR 1.2 to 1.3 billion a year, and the global market including non-traded domestic supply is on the order of EUR 2 to 3 billion. Widely syndicated figures of USD 23 billion for this market are irreconcilable with the observable trade flows and should not be used. The addressable machine and system market in the adjacent industries — automotive interiors, technical-textile conversion, protective equipment, upholstered furniture and aviation seating — is estimated at roughly USD 1.2 to 3.2 billion a year against a core market of USD 2.2 to 3.3 billion that already includes footwear, leather goods and tanning. Diversification can therefore add up to about as much again as the sector's present market. That is a serious prize, and it is not the tenfold expansion that a comparison of downstream material markets suggests.

The technology position. Cutting and material optimisation, AI-based vision and inspection, direct soling of rigid parts and the digital layer are mature or near-mature, available from European suppliers, and directly saleable today. One step is not solved: the automated joining and handling of soft, variable materials — sewing, last-ing and bonding of uppers. The peer-reviewed literature is consistent in identifying flexible-material handling as the principal automation bottleneck in footwear, and the best documented research systems remain at laboratory validation. This report replaces the unsupported claim that automation of roughly 40 per cent of this work

would move the competitive boundary with a transparent calculation: reaching cost parity with Asian landed cost requires removing between about half and nearly all of the manual labour content, depending on the product. For premium, small-batch, fast-turn production the threshold is around 50 to 60 per cent and is within reach; for commodity footwear it is above 90 per cent and, on realistic capital costs, may not be reachable by automation alone.

What already works, and what it proves. The technology argument is easier to judge against operating installations than against a readiness scale, and Section 6.7 sets out five. BMW's Dingolfing plant has combined surface inspection, digital nesting and cutting in one operation since early 2022, with about 15 per cent lower leather consumption and roughly three quarters fewer wrongly cut parts. The Engelbert Strauss CI Factory has produced more than 300,000 pairs since 2019 with five ABB robots on about 6,000 square metres. Lectra earns EUR 380.1 million of recurring revenue within total revenue of EUR 506.7 million. DESMA and ABB hold an installed base of more than 1,700 robots in shoe factories. And one leather-furniture plant raised leather yield from 73 to 78 per cent while reducing the operators on the line from ten to two. Together the five mark the boundary of what is commercially proven today — cutting, nesting, inspection, direct soling, robotics for parts that hold their shape, and the recurring service layer. None of them solves the joining of soft materials, which is precisely why that step is where collective research belongs.

The competitive framework. The price contest with China is an industrial-policy question, not an efficiency one. OECD firm-level measurement published in June 2026 finds that Chinese firms received on average three to eight times more government support than firms based in the OECD over 2005 to 2024, across fifteen industrial sectors. None of those fifteen sectors is footwear, leather or the machinery for them, so the figure describes the policy environment rather than this segment; what is specific to this segment is the outcome. The contest is increasingly expressed through ownership as much as exports: Dürkopp Adler, Pfaff and KSL have been Chinese-owned for a decade or more, and in 2026 the Italian cutting specialist Comelz was acquired by Jack Technology for about EUR 140 million.² The EU instruments that might review such transactions do not reach them — the Foreign Subsidies Regulation notification threshold is EUR 500 million of EU turnover at the target, and Comelz turned over EUR 53.6 million in 2024. That gap is a defensible point for the VDMA to raise in the regulatory dialogue.

The markets beyond Europe and China. Reducing the industry to a two-way contest misdescribes where incremental demand will arise, and Section 7.5 sets out the other locations. India produced 3.0 billion pairs in 2025 and Vietnam 1.7 billion, with Vietnam alone supplying 11.2 per cent of world export volume; together with Indonesia and Bangladesh these are the principal production bases beyond China and therefore the most likely sources of incremental footwear-machinery demand. Purchasing

²Il Sole 24 Ore, June 2026. Comelz, Vigevano: revenue EUR 53.6 million and profit EUR 6.7 million in 2024, against EUR 81.4 million and EUR 13.7 million in 2023; about 190 employees. Signed 26 June 2026, completed in July 2026.

there is strongly price-sensitive, so a European supplier wins on yield, certification and process integration rather than on acquisition price. A second group is the European nearshore ring — Türkiye above all, with customs-union access and short overland delivery to Central Europe, alongside selected North African and South-East European locations, where the opportunity is modular, upgradeable equipment for shorter runs rather than a return of mass production. The Americas are principally a consumption market: the United States base is too small to be a broad machine market, and Mexico and Brazil are the regional production markets. The practical consequence is that the European offer must be defined by qualification, application capability, documentation and service in every geography, not by catalogue breadth or by price.

Regulation. The compliance economy is real, but the 2025 and 2026 record runs in both directions and the report is explicit about it. Extended producer responsibility for footwear is now mandatory and precisely dated: Directive (EU) 2025/1892 names footwear expressly, with transposition by 17 June 2027 and schemes operational by 17 April 2028. Against that, the EUDR has been postponed to 30 December 2026 and a delegated act adopted on 13 July 2026 would remove bovine leather from its product scope, though at the editorial cut-off that act had not entered into force. Footwear is expressly not a priority group in the first ESPR working plan and will not have a delegated act before 2028 at the earliest. The durable half of the regulatory argument is physical, not legal: collection, sorting, disassembly and recycling must largely happen inside Europe because used material is heavy and low in value per tonne. The volatile half is the legislative timetable. A second regulatory front reaches the machine builder directly — the Data Act, the Cyber Resilience Act, the Machinery Regulation and, favourably, the amended AI Act — and is set out as a compliance roadmap in Section 9.2.

The circular economy as a machine market. Circularity is treated here as a market with two clocks rather than as a compliance theme, and Section 10.5 separates them. Repair, inspection and refurbishment are commercially accessible now: collection, cleaning and deodorising, machine-vision grading and authentication, and resoling and re-crafting stations that redeploy the lasting, bonding, stitching and edge-finishing competences European builders already own. That layer is decentralised, near-market and structurally non-offshorable, because used material is heavy and low in value per tonne, and it feeds directly into the sorting and disassembly obligations that extended producer responsibility creates from 2028. End-of-life processing runs on the longer clock: footwear is a multi-material assembly designed for durability rather than disassembly, and a broadly applicable, material-preserving disassembly cell for bonded footwear does not yet exist as a mature product category. The bound on the conclusion matters as much as the opportunity. Circularity does not replace the lost volume market in new machinery; it is, on the framework in Section 12.3, the one field in which a European builder can build input, transformation and access sovereignty at the same time.

Four industries, one competence. European leather divides roughly 38 per cent to footwear, 22 per cent to leather goods and accessories, 13 per cent to automotive interiors and 13 per cent to upholstered furniture, with garments taking most of the balance. All four are processed with the same front-end competence, and the report treats them accordingly: leather goods as part of the core alongside footwear, where the European position is strongest and where the luxury groups are visibly buying back their own tanneries and cutting centres; automotive, aviation, furniture, technical textiles and protective equipment as the fields the sector would be entering. The suppliers themselves make the point that the analysis would otherwise have to assert: Lectra and Zünd sell the same leather cutting platform into footwear, leather goods, furniture and car seats.

The eight conclusions that follow. They are stated as findings in Section 13 and summarised here. The volume business has moved and the surviving base is financially stronger for its size. Competitiveness now rests on the installed base and the service on it rather than on the new machine. The same core competence serves several markets and the shoe is only one of them, though the addressable prize is a doubling rather than a transformation. One technology gap separates a good outcome from a decisive one, and its economic threshold is product-specific rather than universal. Regulation is a source of European demand, but a position built on it is rented rather than owned. Capability remains substantially European while control increasingly is not, and the EU instruments that might review foreign state-backed acquisition do not reach targets of the size found in this sector. The binding constraint on the compliance business is the lead time needed to build a multi-tier product data record, not the legal deadline itself. And the circular economy is a machine market in its own right, with repair and refurbishment commercially accessible now and material recovery a longer-term systems opportunity.

Scenarios and the decision. Three development spaces to 2045 diverge on a single pivot — whether soft joining is pushed past the product-specific threshold. Moderate transformation is assessed as the most probable path on three grounds: it requires no technology that is not already at commercial readiness; none of the four indicators that would falsify it is currently in evidence; and its mechanism is already visible in the 2025 accounts, where the installed-base business held while every new-machine segment fell. The preferred path is moderate transformation executed with the accelerated outcome as a deliberate ambition.

The picture in 2045. Section 14.1 states what the moderate-transformation path looks like once it has run, because a scenario table describes a pivot but not a destination. Europe has not recovered volume production; standard footwear and standard leather-goods machinery remain in the Asian clusters. The European base is smaller and stable, and its customers are premium footwear and leather goods, certified safety and orthopaedic products, automotive and aviation interiors, furniture and selected technical textiles. The offer is a production capability rather than a stand-alone machine: configured systems sold on documented outcomes — material

saved, defects avoided, energy per unit, availability and compliance evidence — with hardware as the entry point to a longer relationship built on software, application engineering and service. Small-batch and high-mix production are economically viable in selected segments, which is not the same statement as the shoe returning to Europe. Quality, traceability and circularity run on one data foundation rather than three. And the sector operates as an interoperable specialist ecosystem, which is why the association's work on OPC UA, umati and common data models is a structural condition of that picture rather than a technical detail.

This is not a decline narrative, and it should not be read as one. The findings are candid about what has been lost, because a study that flatters its client is of no use to it. But the sector that emerges from the analysis has defensible world positions in named process steps, a demonstrated ability to convert engineering into recurring revenue, quantified customer value, and a home market that remains the most demanding in the world on quality, provenance and compliance. What the evidence rules out is a return to volume. What it leaves open is a great deal.

What should happen now. The recommendations in Section 15 are prioritised and dated. The immediate moves require no breakthrough: price and sell measurable outcomes rather than machine throughput; adopt the discipline of no new machine without a digital interface, built on VDMA-anchored data semantics; scale material-efficient cutting and AI inspection; place recurring revenue in the derived-data layer, because the Data Act leaves the raw stream to the customer; and build compliance into the machine as a standard output. The moves that need the association rather than the firm are equally clear: convene multi-member pilots on soft joining and the smart cutting room, publish the results as reusable reference architectures, deliver an OPC UA companion specification for this machinery under umati, and raise the ownership-screening gap in Brussels. The decisions that determine which scenario unfolds fall at the start of the period, not at its end.

3 Method and evidence base

3.1 Sources and verification

The study combines desk research on public data, the internal Gherzi and VDMA working papers prepared alongside it, an expert interview conducted for the study, and the peer review of the project team. For this consolidation every load-bearing external figure was re-checked against its primary source in August 2026. That exercise confirmed the majority of the study's data and corrected a material minority of it; the corrections are listed in Section 3.3.

Preference was given, in order, to official statistics and public authorities, European Union institutions and EUR-Lex for legal texts, national ministries, industry associations, peer-reviewed publications, company reports, technical standards bodies, and only then to commercial market research. Where a commercial market-research figure is the only source available, the report says so and states the scope of the definition, because in this sector the definitions differ enough to change a number by an order of magnitude. One such figure was rejected outright: syndicated estimates putting the global footwear machinery market at USD 23.3 billion cannot be reconciled with observable trade in the corresponding customs heading and are not used.

3.2 The separation of fact, derivation and assumption

The methodological commitment of this report is that every quantitative statement is traceable to one of four categories set out in Section 1.3. Two consequences follow, and both were reviewer requirements against the earlier drafts.

Where the study's own internal work is the source, it is named as such. This applies to the Gherzi/VDMA short study 25205-005, to the peer team meeting of 1 July 2026, and to the expert interview conducted with a manufacturer active in demand-integrated footwear production. An internal source is legitimate evidence; presenting it as an independent external reference is not, and earlier drafts occasionally did.

Where a figure is needed but no measurement exists, the report derives it openly rather than asserting it. Two such derivations are central and are set out in full in Annex A: the size of the addressable machine market, and the automation threshold. Both are presented as ranges with their inputs, assumptions and sensitivities stated. Where stronger evidence is not publicly available, the report identifies the limitation at the point of use rather than treating an internal survey as a substitute for market measurement.

3.3 Corrections carried into this report

The following corrections were made against the Part A and Part B drafts. They are listed because several were material to the argument, and because a reader of the earlier instalments needs to know which numbers moved.

Statement in earlier drafts	Correction in this report
Automotive interior leather USD 36.9 bn (2024) to USD 68.4 bn (2033) at 6.4 per cent	Internally inconsistent and not published in that form. Current figure: USD 44.9 bn (2025) to USD 78.7 bn (2033) at a compound rate of 7.3 per cent over 2025 to 2033 (Grand View Research, Automotive Interior Leather Market, August 2026; the publisher quotes 7.4 per cent for 2026 to 2033). The definition includes synthetic PU and PVC materials.
Genuine leather about 60 per cent of automotive interior leather value	Reversed in the source. Synthetic 62.4 per cent, genuine 37.6 per cent in 2025.
Chinese support to this sector up to eight times the OECD average	The OECD measurement is three to eight times, across fifteen industrial sectors, none of which is footwear, leather or this machinery. Restated as an indication of the policy environment.
USD 47.5 bn of Chinese guidance-fund investment by mid-2022, more than a fivefold rise 2015 to 2020	Misattributed. The figure is the third tranche of the semiconductor "Big Fund", closed May 2024. Removed; the argument does not depend on it.
Soft-joining automation threshold of about 40 per cent	Not derived and not supportable. Replaced by a product-specific range of roughly 50 to 100 per cent (Section 6.4, Annex A2).
EU consumption of 2,069 million pairs equals 13.5 per cent of world consumption	Two different aggregates combined. The 2,069 million figure is EU-27; the 13.5 per cent share is for Europe as a continent. Restated separately.
Europe holds 38 per cent of world export value in leather footwear	The 38 per cent is the share of leather footwear in world footwear export value (data year 2023), not a European share. Restated.
PPWR 50 per cent empty-space cap applying from 12 August 2026	Applies from 1 January 2030. From August 2026 only the general packaging-minimisation duty applies.
BOOTS Act as enacted US law	Introduced 8 July 2025; not enacted. Restated as a legislative proposal.

Statement in earlier drafts	Correction in this report
BMW the first carmaker to join the Leather Working Group	BMW was the second, in January 2022. Bentley was first.
Footwear repair market USD 3.8 bn	That figure covers clothing and footwear repair together. Shoe repair alone is about USD 1.4 bn (Fact.MR, 2025).
Low-value parcels into the EU "quadrupled"	Tripled, from 1.4 bn (2022) to 4.6 bn (2024). The report now uses one figure throughout.

Table 1 — Principal corrections carried from the Part A and Part B drafts into this Main Report. Sources as named; full references in Section 18.

3.4 Assumptions, and how they were set

Two of this report's conclusions rest on calculations rather than on published figures, and a calculation is only as good as the assumptions inside it. They are therefore listed here in one place, with the value used, the reason for it and the direction in which the conclusion would move if the assumption is wrong. A reader who disagrees with an assumption can substitute their own and follow the arithmetic in Annex A.

Assumption	Value used	Why it was set there	If it is wrong
Ratio of world trade to world production in this machinery	0.45 to 0.65	Bounded above by Italy's own observed ratio of 0.66 in 2025; China serves a large domestic market and will sit below it	A lower ratio makes the world market larger, and strengthens rather than weakens the case for the sector
Material share of footwear manufacturing cost	40 to 50 per cent	No published figure exists; the range is the one used in industry practice and is bounded below by the verified labour share of 31 per cent	A lower material share reduces the derived machine-intensity ratio and therefore the addressable adjacent market
Machine intensity of processed-material value	1 to 2 per cent per year	Derived from the sector's own observable pair of figures rather than assumed independently	The single most sensitive input in Annex A1; it is why the result is stated as an order of magnitude

Assumption	Value used	Why it was set there	If it is wrong
Share of the technical-textiles market that is downstream converting	20 to 30 per cent	Fabric formation is a different machinery class; only making-up transfers	A narrower share reduces the technical-textile opportunity but does not change the ranking of the adjacent fields
Material share of the protective-equipment product market	25 to 35 per cent	A product market; the balance is components, moulded parts and assembly this industry does not process	A lower share reduces the largest single adjacent estimate
Covering share of the upholstered-furniture product market	15 to 25 per cent	A product market; frames, foam and logistics sit outside the covering step	A lower share reduces the furniture estimate, which is already the second smallest
Leather share of upholstered-furniture coverings	not applied	No published leather-versus-fabric split exists outside paid research; the covering share above is material-neutral because both leather and fabric are cut and sewn	If the machine relevance were restricted to leather only, the furniture estimate would fall materially
Ratio of European to Asian labour cost in footwear manufacturing	5 to 8	Eurostat 2025 hourly labour costs against USITC monthly wages for the principal Asian producing countries	Eurostat does not publish the footwear-specific series; the true ratio is lower, which would lower the required automation share in every product segment
Landed-cost premium on Asian supply	12 per cent of manufacturing cost	Freight, duty and inventory carrying cost on a long ocean chain	A higher premium lowers the required automation share
Value the customer places on proximity, speed and flexibility	20 to 70 per cent of manufacturing cost,	The spread between a commodity sneaker and a certified safety boot is at least this wide in practice	The most sensitive input in Annex A2, and the one most

Assumption	Value used	Why it was set there	If it is wrong
	by product type		worth measuring with members
Capital service and maintenance charge for automation	10 to 30 per cent of the Asian benchmark cost	Spans a range of depreciation periods and utilisation rates	Reported as a range throughout rather than as a point estimate

Table 2 — Assumptions used in the report's two derivations. Source: Gherzi. Each is an assumption, not a measurement.



4 The starting position: a smaller, financially sounder base

Key message. World footwear production is stable at 24.6 billion pairs and overwhelmingly Asian; Europe is small in volume and disproportionate in value, though part of that value premium reflects re-export through European hubs rather than European manufacturing. The machinery base has contracted for three years running, but unevenly and informatively: every new-equipment segment fell in 2025 while spare parts and service held. The world market for this machinery is on the order of EUR 2 to 3 billion a year — small enough that the strategic question is position, not scale.

4.1 Volume has settled in Asia; value has not

The headline picture is of a world market that is not shrinking and a European share of it that is small. Global output reached 24.6 billion pairs in 2025, up 0.1 per cent after a strong 2024³, which confirms that footwear demand rises with population and income rather than falling away. What has changed over three decades is location. Asia produces 88.7 per cent of world output; China alone produces 55.6 per cent and supplies 61.2 per cent of world export volume.⁴ This concentration reflects accumulated capability in integrated supply networks, component ecosystems, logistics and workforce depth, not a single price advantage that one policy could reverse. For the machinery industry the consequence is direct: the volume market for machines follows the volume market for shoes, and both sit in Asia.

³APICCAPS / World Footwear, "24.6 billion pairs: global footwear production in 2025", 4 August 2026, drawing on the World Footwear Yearbook 2026, 16th edition. <https://www.worldfootwear.com/news/246-billion-pairs-global-footwear-production-in-2025/11690.html>

⁴World Footwear Yearbook 2026 (APICCAPS), data year 2025: China 13.7 bn pairs; India 3.0 bn; Vietnam 1.7 bn. Reported by World Footwear, 4 August 2026 and 31 July 2026.

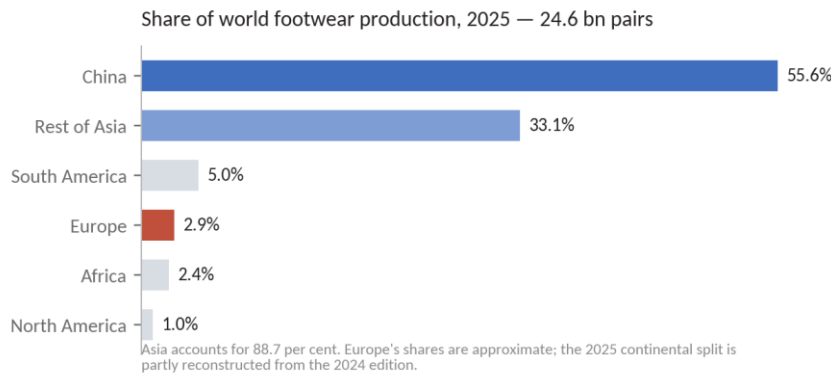


Figure 1 — Share of world footwear production, 2025. Source: World Footwear Yearbook 2026 (APICCAPS), data year 2025. Continental shares below China are partly reconstructed from the 2025 edition, where Europe accounted for 2.3 per cent of world production

The counterpoint is value, and it needs one qualification the earlier drafts omitted. Europe accounts for about 12.6 per cent of world export volume — a 2024 figure; the 2025 continental split is behind the publisher's paywall — while European exports leave at an average of USD 34.76 per pair against a world average of USD 11.65 and an Asian average of USD 8.02.⁵ The asymmetry between a small share of quantity and a much larger share of worth is the argument of this study in a single observation. The qualification is that European export volume substantially exceeds European production volume, because the trade category captures intra-European movement and re-export of high-value goods through Dutch, Belgian and German logistics hubs. Germany, Belgium and the Netherlands stand ahead of Italy in the Yearbook's exporter ranking, which no one would read as a statement about where shoes are made.⁶ The defensible claim is therefore narrower than "Europe sells at a premium": European-made footwear commands a high price, and the European trade position additionally reflects the continent's role as a distribution hub.

⁵World Footwear Yearbook 2026, reported by World Footwear, 31 July 2026: world footwear exports of USD 172 bn in 2025, +1.6 per cent, at an average of USD 11.65 per pair. The European average price rests on a single trade-press report of the Yearbook and should be confirmed against the Yearbook itself before external quotation.

⁶World Footwear Yearbook 2026, exporter ranking by volume, in which Germany appears fourth worldwide. The ranking captures re-export through European distribution hubs.

Small in quantity, disproportionate in value



Figure 2 — Volume and value in world footwear trade. Sources: World Footwear Yearbook 2025 and 2026 (APICCAPS). Export-volume shares are for data year 2024; prices for 2025.

On the demand side, the EU consumed about 2,069 million pairs in 2024, the fourth-largest single market after China, India and the United States.⁷ Europe as a continent accounts for roughly 13.6 per cent of world consumption; the EU-27 alone for roughly 9 to 10 per cent, which is this study's own calculation rather than a published share. These are different aggregates and earlier drafts combined them; they are stated separately here. Per capita, North America consumes about 4.6 pairs a year and Africa about 1.5; the European per-capita figure of about 4.1 pairs is not stated in the publicly available extracts and is carried as an internal estimate. Europe is therefore a large consumer market supplied largely from abroad and a small, high-value producer — the mirror image of Asia's position, and the structural reason the European opportunity lies in value, compliance and adjacent industries rather than in re-domesticating mass supply.

4.2 The European machinery base has contracted, unevenly

The Italian sector is the closest available proxy for the European machinery industry, being the largest and by far the best documented, and the Assomac figures are the most reliable window onto it. They describe a real and continuing contraction: sector production fell to about EUR 512 million in 2025, down 11 per cent, after a fall of about 12 per cent in 2024, with the decline running since 2023.⁸

The composition of that decline is more informative than its size.

⁷World Footwear Yearbook 2025 (data year 2024), country and region ranking of consumption, in which the EU-27 is treated as one region. The continental share of 13.5 per cent quoted in the same edition refers to Europe as a continent and is a different aggregate.

⁸Assomac Centro Studi, figures presented at the Assomac General Assembly, June 2026. The figure is estimated production for the Italian sector as a whole rather than association-member turnover, and the estimation method is not published.

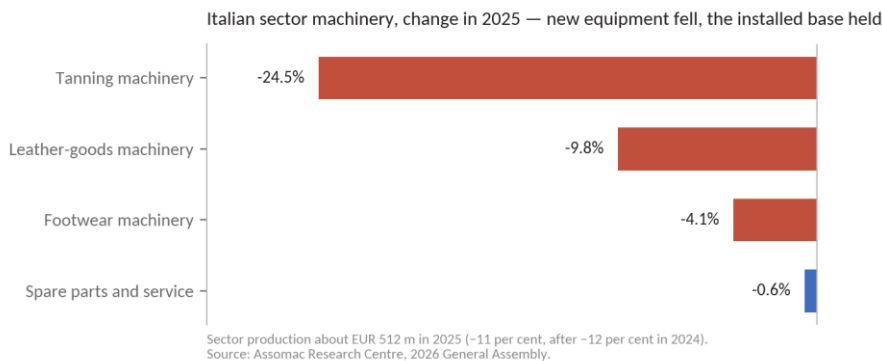


Figure 3 — Italian sector machinery, change by segment in 2025. Source: Assomac Research Centre, reported at the 2026 General Assembly (June 2026). The figure is estimated production for the Italian sector as a whole, not association-member turnover; Assomac does not publish its estimation method or the segment weights.

Two readings of the tanning-machinery collapse have circulated in this study's drafts, and they are not the same: that tanning machinery is the segment most exposed to the migration of tanning capacity to Asia, and that it is the segment most exposed to subsidised price competition. The distinction is not cosmetic. If the customer base is leaving, the answer is diversification; if the price is being undercut, the answer is a change of business model. On the available evidence both mechanisms are at work and neither is separately measured, so this report carries them as competing hypotheses rather than choosing one, and recommends both responses — which happen to be complementary.

The segment pattern that does support a firm conclusion is the contrast between new equipment and the installed base. All three new-equipment segments fell; spare parts and service did not. Selling a new machine puts European engineering against a subsidised price on a specification the customer wrote. Selling parts, uptime and service into an installed base is a position the customer cannot leave without replacing the machine. This is the empirical core of Section 12 and of every recommendation in this report.

Over twenty years the world-market position reversed. Italy's share of world trade in this equipment fell from about 42 per cent in 2005 to 27 per cent in 2025, while China reached about 49 per cent and overtook Italy as the world's largest exporter of this machinery in 2024.⁹ This is the product of scale and industrial policy rather than of a productivity gap a European firm could close by working harder, a point developed in Section 7.

⁹Assomac Centro Studi, 2026 General Assembly, on the association's own sector definition. See Section 4.3 for the difference between that definition and the customs heading..

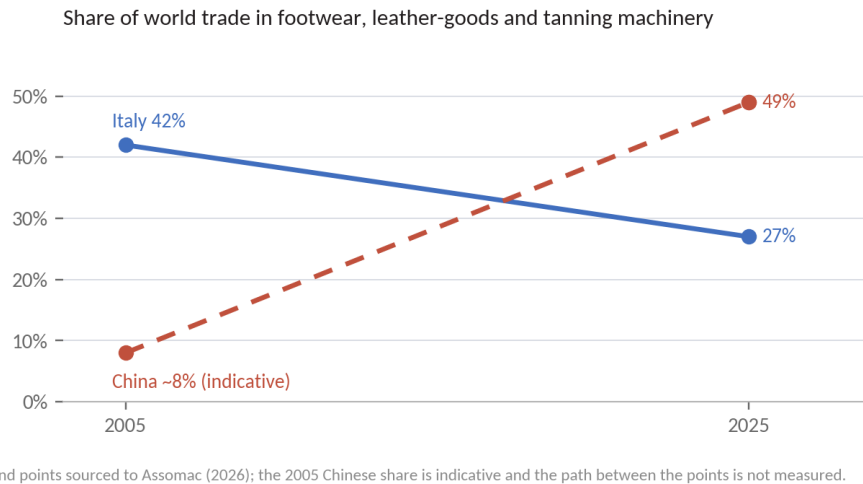


Figure 4 — Share of world trade in footwear, leather-goods and tanning machinery. Source: Assomac (2026); Arsutoria Studio (2026). End points are sourced; the 2005 Chinese share is indicative and the path between the two points is not measured.

A note on the sector's structure, because the earlier drafts carried figures that could not be verified. Assomac reported 235 companies and 3,900 employees in the Italian sector for 2021, alongside production of EUR 572 million; that is the most recent publicly documented structural data¹⁰, and it is consistent with the roughly 225 companies and 3,800 employees cited for 2025 in the study's internal short study. The base year of 1996, with about 400 companies and 7,200 employees, could not be verified against a public source and is carried as an internal estimate. The same applies to the average equity ratio said to have risen from about 47 to about 59 per cent through the shake-out: no published equity-ratio series exists for this sector. The direction — a consolidation that left fewer and financially stronger firms — is consistent with the survivorship pattern and with the sector's capacity to keep investing through a three-year downturn, but the specific ratios are an unpublished internal analysis and are labelled as such wherever they appear. They should not be quoted externally without the sample size, the years and the calculation method being stated.

4.3 The centre of this industry is in China, and the report starts from that fact

Any assessment of the European position has to begin by stating plainly where the industry's centre of gravity now lies, because a strategy written against a misdescribed starting point will fail whatever its merits. On every measure that counts volume, the centre is in China.

¹⁰Assomac data for 2021 as reported by Innovation Post, 4 November 2022. Set against production of EUR 512 million in 2025, this documents a contraction of roughly a tenth in output value over four years on a broadly stable enterprise base.

China produced 13.7 billion pairs of footwear in 2025, 55.6 per cent of world output, and supplied 61.2 per cent of world export volume.¹¹ The machinery follows the production. On the sector definition used by the Italian association Assomac, China accounted for 49 per cent of world trade in footwear, leather-goods and tanning technologies in 2025 against Italy's 27 per cent, having overtaken Italy as the largest exporter of this equipment.¹² At the level of the individual firm the asymmetry is starker still: Jack Technology, the Chinese sewing-machine group that acquired Comelz in 2026, reported revenue of RMB 6.59 billion for 2025, roughly EUR 0.85 billion, more than one and a half times the entire Italian sector's production value of EUR 512 million. That comparison has to be read with its definition attached. Intelligent industrial sewing machines account for RMB 5.6 billion of Jack's revenue, some 86 per cent, and intelligent cutting and spreading equipment for RMB 706 million, about 11 per cent; only the second of those lines is drawn on the same basket as the Italian figure, and Jack's own footwear and leather position was added only with Comelz. What survives the correction is the point that matters: a single acquirer from an adjacent machinery segment can deploy more capital than the entire Italian sector generates in output.¹³

Three qualifications belong with those figures, and they are not consolations. They are precision, and precision is what makes the rest of this report usable.

The first concerns what is being counted. Assomac's 49 per cent rests on the association's own sector definition, which it does not publish and which is wider than the customs nomenclature for this equipment. Under customs heading 8453.10 — machinery for preparing, tanning or working hides, skins and leather — the relationship runs the other way: in 2023 Italy exported USD 126.1 million of such machinery against China's USD 58.4 million.¹⁴ The two measures are not in conflict; they count different baskets. China leads the wide basket, which includes industrial sewing and general cutting equipment. Italy still leads the narrow one, which is the dedicated tanning and leather-working machinery at the technical core of this study. Both statements should be made, and neither alone.

¹¹APICCAPS / World Footwear, "24.6 billion pairs: global footwear production in 2025", 4 August 2026, and "Global footwear production holds steady in 2025", 31 July 2026, both drawing on the World Footwear Yearbook 2026. <https://www.worldfootwear.com/news/246-billion-pairs-global-footwear-production-in-2025/11690.html>

¹²Assomac Centro Studi, figures presented at the Assomac General Assembly, June 2026, reported by MPA Style, 21 June 2026 and Insider Trend, 18 June 2026. <https://www.mpastyle.it/en/assomac-assemblea-2026-tecnologie-calzatura-pelletteria/>

¹³Jack Technology Co. Ltd (SSE 603337), 2025 Annual Report Summary, filed 23 April 2026: operating revenue RMB 6,586.96 m, +8.1 per cent; net profit attributable to shareholders RMB 855.94 m, +5.4 per cent. Converted at approximately RMB 7.8 to the euro.

¹⁴UN Comtrade via World Bank WITS, heading 845310, reporting year 2023. <https://wits.worldbank.org/trade/comtrade/en/country/ITA/year/2023/tradeflow/Exports/partner/ALL/product/845310>

The same market, measured two ways

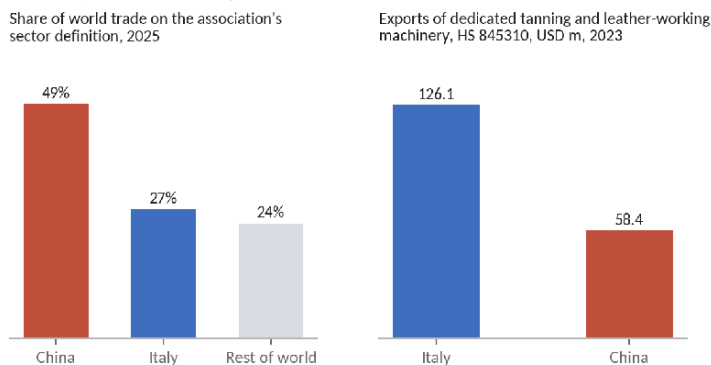


Figure 5 — The same market, measured two ways. Sources: Assomac Centro Studi (2026); UN Comtrade via World Bank WITS, heading 8453.10 (2023). Obtaining the customs basket behind the Assomac figure would allow the two measures to be reconciled.

The second concerns what China buys. Its imports of dedicated tanning and leather-working machinery have fallen to a very small absolute figure — about USD 15.5 million in 2023, of which 84 per cent came from Italy.¹⁵ Two readings are possible and both are true: China has substituted domestic supply for European equipment across the mass market, and what it still imports is almost entirely top-end Italian machinery. The residual European position in China is small, and it sits exactly where this report argues the European position generally sits.

The third concerns what Chinese scale has and has not achieved. In the high-end capital-goods layer, China's own targets have been missed by a wide margin. Against a Made in China 2025 objective of an 80 per cent domestic share in high-end CNC machine tools, the outcome was about 33 per cent, with Fanuc, Mitsubishi and Siemens holding some 69 per cent of the Chinese CNC market.¹⁶ And Chinese ownership of European technology has not automatically produced European commercial success: ShangGong Group, which has owned Dürkopp Adler since 2005 and Pfaff and KSL since 2013, reported a group net loss of RMB 142 million for 2025 and named its European operations as the cause.¹⁷

None of this reverses the volume position, and this report does not claim that it does. It sets the terms on which the rest of the analysis proceeds. Europe is not going to win a contest of scale in this industry. The question the study answers is what can be won in the layers where scale is not the deciding factor — the precision, the process control, the systems integration and the service — and the evidence above is the reason that question is worth asking rather than rhetorical.

¹⁵UN Comtrade via World Bank WITS, heading 845310, Chinese imports, reporting year 2023: USD 15.52 m from 168 shipments; Italy USD 13.11 m, Germany USD 1.04 m. <https://wits.worldbank.org/trade/comtrade/en/country/CHN/year/2023/tradeflow/Imports/partner/ALL/product/845310>

¹⁶U.S.-China Economic and Security Review Commission, "Made in China 2025: Evaluating China's Performance", 14 November 2025. https://www.uscc.gov/sites/default/files/2025-11/Made_in_China_2025--Evaluating_Chinas_Performance.pdf

¹⁷Shang Gong Group Co. Ltd (SSE 600843), 2025 Annual Report Summary, filed 28 April 2026: operating revenue RMB 4.351 bn, -1.36 per cent; net loss attributable to shareholders RMB 142 m, improved from RMB 244 m in 2024. The filing attributes the loss to overseas, in particular European, operations.

4.4 How large is this market, actually?

Neither Part A nor Part B stated the size of the market they were about. For a reader deciding whether to invest in diversification, that is the missing number: it determines whether the adjacent markets are a growth opportunity or a lifeboat. This section closes the gap with a derivation whose inputs and arithmetic are set out in Annex A1.

Three anchors are available. Italian sector production was EUR 512 million in 2025 and Italian exports EUR 338 million.¹⁸ Italy accounted for 27 per cent of world trade in this equipment and China for 49 per cent. Dividing Italian exports by the Italian trade share gives world trade of approximately EUR 1.25 billion. Adding domestic supply that never crosses a border — using Italy's own export ratio of 0.66 as an upper bound and a lower ratio for China, which serves a very large home market — puts the global market for footwear, leather-goods and tanning machinery at roughly EUR 2 to 3 billion a year. Independent corroboration comes from the trade data at sub-heading level, where individual bilateral flows in footwear machinery run in single-digit millions of euro, consistent with a heading total in the low billions and inconsistent by a factor of about twenty with the syndicated USD 23.3 billion figure that circulates in commercial market reports.¹⁹

The European market for this equipment — consumption rather than production — is estimated at EUR 350 to 550 million a year. The method is stated in Annex A1 and the uncertainty is at least plus or minus fifty per cent. A more robust measurement would require a reconciliation of Eurostat PRODCOM code 28943030 with Comext trade data under heading 8453. The German portion cannot be inferred reliably from the available public series, and the narrow supplier base does not permit a representative or publishable member survey. Given the narrow supplier base and confidentiality constraints, it should not be inferred from a VDMA member survey; a future measurement would require an independently administered, sufficiently broad market study.

What follows from a market of this size is a strategic point rather than a statistical one. A world market of EUR 2 to 3 billion cannot be won by scale. It can be held by position — by occupying the process steps where the customer cannot easily substitute, and by extending the same competence into neighbouring fields where the same machines earn more. That is the argument of Sections 8 and 12.

¹⁸Production: Assomac Centro Studi, 2026 General Assembly. Exports: Arsutoria Studio (2026), reporting a fall from EUR 385 million in 2024. The export series is not corroborated by a published Assomac release.

¹⁹IMARC Group, Footwear Manufacturing Machines Market, giving USD 23.3 bn for 2025 rising to USD 32.2 bn by 2034. The figure is irreconcilable with world trade in the corresponding customs heading and with Italian sector production of EUR 512 million, and is cited here only to explain why it is not used.

4.5 Capability is European; control increasingly is not

The machines that define the critical process steps still come predominantly from Europe: direct soling and injection (DESMA), band-knife splitting and skiving (Fortuna), industrial sewing and three-dimensional robotic joining (Pfaff, KSL, Dürkopp Adler), punching presses and shoe machinery (Ring Group, which took over the punching assets of schoen + sandt in July 2026), CAD, CAM and automated cutting (Lectra, Comelz, Atom, Teseo, Zünd). Their technological lead in those steps is intact. What is changing is who owns them.

Firm	Base	Position	Owner at August 2026
DESMA Schuhmaschinen	Achim, DE	World leader in direct-soling automation; about 220 employees	NAME & MAWI Partners S.A.S. (DE/FR); sold by Salzgitter AG, announced 30 July 2025
Klöckner DESMA Elastomertechnik	Fridingen, DE	Elastomer and silicone injection moulding; over 500 employees	NAME & MAWI Partners S.A.S.; sold by Salzgitter AG, 3 August 2026. A separate company from DESMA Schuhmaschinen.
Fortuna Spezialmaschinen	Weil der Stadt, DE	World market leader in splitting and skiving	NAME & MAWI Partners S.A.S., since January 2017
Dürkopp Adler	Bielefeld, DE	Largest European industrial sewing builder	ShangGong Group (China), since 2005
Pfaff Industrial · KSL	Kaiserslautern · Lorsch, DE	Industrial sewing; 3D and robotic joining	ShangGong Group (China), since 2013
Ring Group (Ring Maschinenbau)	Pirmasens, DE	Punching and perforating machines; one of the last German shoe-machinery producers	Family-owned Ring Maschinenbau GmbH. In July 2026, Ring acquired the punching-machine assets and substantial parts of the workforce of the insolvent schoen+sandt. The relevant footwear- and leather-machinery activities continue within Ring.
Comelz	Vigevano, IT	CNC leather cutting and software; about 190 employees	Jack Technology (China), signed 21 April 2026, completed 23 July 2026, enterprise value about EUR 140 m

Firm	Base	Position	Owner at August 2026
Lectra	Paris, FR	CAD/CAM, automated cutting and nesting	Listed on Euronext Paris; no controlling owner
Atom · Teseo · Main Group	IT	Cutting and die-cutting; automated cutting tables; PU/TPU direct soling	Independent, privately held
Zünd Systemtechnik	Altstätten, CH	Digital flatbed multi-tool cutting	Independent, Swiss family-owned

Table 3 — Selected European footwear and leather machinery builders and their ownership. Sources: Salzgitter AG press releases, 30 July 2025 and 3 August 2026; Jack Technology Co. Ltd, ad-hoc filing of 22 April 2026 and completion notice of 24 July 2026; Il Sole 24 Ore, 26 June 2026; BeBeez, August 2026; company registries and histories.

Read at sector level the pattern is sharper than at firm level: Germany still sets the technology standard in four machine niches — splitting and skiving, industrial sewing, direct soling, punching presses — and three of the four now sit outside a purely German industrial group. The fourth moved in the opposite direction in 2026: Ring Group in Pirmasens acquired the punching-machine assets and substantial parts of the workforce of the insolvent schoen+sandt. The relevant footwear- and leather-machinery activity therefore remains in German family ownership. This is not an argument against foreign capital, which brings market access and investment the sector needs. It is an observation about where decisions on standards, on data and on where value is booked will ultimately be taken. The study's internal count of the VDMA specialist grouping — roughly fifty machinery members, of which about forty are European-owned and ten owned from outside Europe, eight of those Chinese and concentrated in sewing, cutting and CAD — is an internal membership analysis and should be published only with a stated reference date. A more useful version of that table would add a column for employees and development sites located in Europe, which would turn an assertion about the distinction between ownership and location into evidence.

4.6 Who places footwear on the European market

The machinery industry is best understood in relation to the firms that put footwear on the European market, because their sourcing decisions determine where machines are needed and because the extended-producer-responsibility and product-passport obligations fall legally on them. The ranking below is by revenue, which is a proxy and a poor one for the metric that actually matters under EPR — pairs placed on the European market. Only two of these companies publish that figure. The table is therefore titled for what it measures.

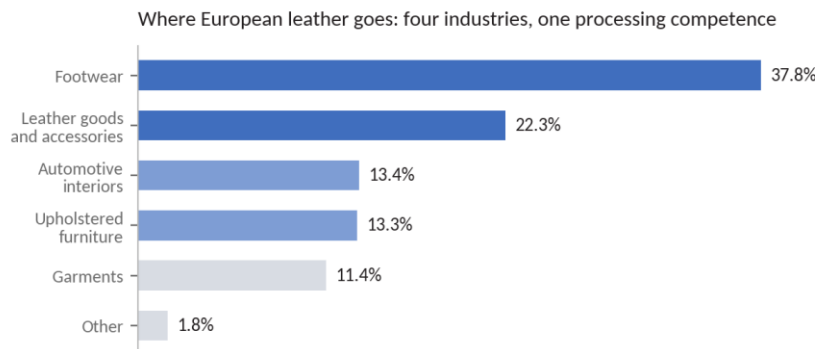
Company or group	HQ	Type	Revenue, latest year	Pairs placed on the EU market
Deichmann Group	DE	Discount shoe retailer, integrated	EUR 8.7 bn gross (2024)	Over 180 m per year (reported)
Zalando SE	DE	Online fashion marketplace	EUR 10.6 bn (2024), all categories	Not published
adidas AG	DE	Sportswear brand	EUR 23.7 bn (2024), global, all product groups	Not published; EU share only a portion
JD Sports Fashion	UK	Sports and athleisure retailer	About GBP 11.5 bn (FY24/25), global	Not published
Puma SE	DE	Sportswear brand	EUR 8.8 bn (2024), global	Not published
CCC Group	PL	Retailer and online, Central Europe	About EUR 2.4 bn (2024)	Not published
Birkenstock	DE	Footwear brand, integrated	EUR 1.8 bn (FY2024), global	Not published
Wortmann Group	DE	Manufacturer and wholesaler	EUR 1.02 bn (2014/15, last officially reported)	About 64 m per year (reported)
Tod's Group	IT	Luxury footwear and leather goods	EUR 1.01 bn (2024)	Not published
Geox	IT	Footwear brand and retailer	EUR 0.66 bn (2024)	Not published

Table 4 — Largest participants in European footwear distribution, ranked by revenue. Sources: company reports and trade press, 2024 to 2025. Revenue figures for adidas, Puma, JD Sports and Birkenstock are global and cover all product groups; they are not measures of EU footwear placed on the market. On that metric Deichmann and Wortmann lead this list. Snipes is consolidated within Deichmann; Görtz and Reno entered insolvency between 2023 and 2025.

The demand side is itself consolidating and, in places, failing. Discount and online formats are gaining share while mid-market specialist chains are under acute pressure. The signal matches the one upstream: volume and price consolidate toward scale players and online, while defensible value sits with firms that control quality, provenance and, increasingly, compliance.

4.7 Leather goods and accessories: the second core end market

Footwear is the largest single outlet for European leather, but it is not the only one, and a study that treats the shoe as the whole industry misreads the machine builder's customer base. Four industries process leather at scale in Europe, and the same front-end competence — grading, nesting, cutting, splitting, skiving, edge finishing and joining — serves all of them.



Share of European leather consumption by end use. Source: COTANCE and industriAll-Europe, European Leather Industry Social and Environmental Report 2020; the underlying data are EU-28 for 2019 and the split itself carries no stated reference year.

Figure 6 — Where European leather goes, by end use. Source: COTANCE and industriAll-Europe, European Leather Industry Social and Environmental Report 2020. The underlying industry data are EU-28 for 2019; the split itself carries no stated reference year in the source.

Leather goods and accessories — handbags, small leather goods, belts and luggage — take about 22 per cent of European leather, second only to footwear and more than automotive interiors and upholstered furniture individually.²⁰ For the machine builder this is the segment closest to the European customer, and it behaves differently from footwear in three respects that matter.

It is a value market that is currently contracting in volume. The Italian leather goods industry — the largest in Europe and the natural reference — turned over EUR 11.39 billion in 2025, down 4.9 per cent, with exports of EUR 9.68 billion, down 5.4 per cent, and an industrial production index down 16.1 per cent after a fall of 22.9 per cent in 2024. The company count fell to 4,297 and employment to 47,398.²¹ The first quarter of 2026 continued the pattern and sharpened it: turnover down 3.5 per cent, volumes down 12.4 per cent, and an average export price of about EUR 160 per kilogram, up 9.9 per cent.²² Fewer units at higher prices is the same volume-and-value decoupling this report describes for footwear, compressed into four quarters.

²⁰COTANCE and industriAll-Europe, European Leather Industry Social and Environmental Report 2020: footwear 37.8 per cent, leather goods 22.3 per cent, car interiors 13.4 per cent, upholstered furniture 13.3 per cent, garments 11.4 per cent, other 1.8 per cent. The rounded version appears on the COTANCE statistics page without a date.

²¹Assopellettieri and Centro Studi Confindustria Accessori Moda, Italian Leather Goods Industry — Preliminary Industry Statistics 2025, February 2026. The 2024 comparators are turnover EUR 11.98 billion, minus 8.9 per cent against EUR 13.15 billion in 2023, with the production index down 22.9 per cent.

²²Centro Studi Confindustria Accessori Moda for Assopellettieri, survey of April and May 2026, reported by Pambianco News and HUB Style, July 2026.

Its brands are moving manufacturing back into Europe, and they are buying the tannery. Over four years the largest luxury groups have taken direct control of leather supply and leather-goods capacity: LVMH Métiers d'Art acquired a majority stake in the Tuscan tannery group Nuti Ivo in June 2023; Prada took 43.65 per cent of Tannery Superior in September 2022 and, in June 2025, contributed Conceria Superior and Tannerie Limoges in full to the Rino Mastrotto Group in exchange for a 10 per cent stake in it; Richemont announced a EUR 10 million expansion of its Scandicci leather hub in June 2026, more than doubling the site to 12,000 square metres, adding an advanced leather cutting centre and testing laboratories and raising headcount from 150 to 250, with 300 as the stated target; and Hermès operated 24 leather goods workshops in France at the end of 2025, with four more announced through 2030, on Leather Goods and Saddlery revenue of EUR 7.07 billion.²³ The stated rationale is control of quality, capacity and provenance. The Rino Mastrotto transaction is the exception that sharpens the rule: there Prada consolidated its tanneries into a larger specialist rather than internalising them, which is the same search for secure, documented supply pursued by a different route. That is a machine market: a new workshop or an expanded cutting centre in Tuscany or Charente is equipped, and it is equipped to a specification in which traceability and yield matter more than unit cost.

The machinery segment is European-led but shrinking with its customers. Italy accounted for roughly 35 per cent of world exports of leather goods machinery in 2024, against 52 per cent in tanning machinery and 12 per cent in footwear machinery; Italy's share across the whole basket was 30 per cent in that year, against the 27 per cent reached in 2025.²⁴ Leather goods machinery fell 9.8 per cent in 2025 — less than tanning machinery but more than footwear machinery, and consistent with a customer base whose output is contracting while its unit values rise.

Leather goods is therefore not an adjacent market to be entered. It is part of the core market this report has already sized in Section 4.4, and it is the part where the European position is strongest, the customer is nearest and the willingness to pay for documented quality is highest. It is also, per the derivation in Section 6.4, the product family in which the automation threshold is lowest — small batches, high value, short lead times and a customer that pays for proximity.

4.8 What the European sector delivers

A study commissioned by an association has an obligation to be candid about decline, and this one is. It has an equal obligation to record what the sector actually delivers, because that record is the asset any strategy has to build on, and because a reader

²³LVMH Métiers d'Art and Nuti Ivo: World Footwear and WWD, 7 June 2023. Prada: Prada Group press release, 15 September 2022, and reported transactions of June 2025. Richemont: International Leather Maker, 7 July 2026. Hermès: Hermès 2025 Full-Year Results, 12 February 2026, and the announcement of the Les Andelys site in January 2026.

²⁴Assomac figures reported by Zeroventiquattro, 2025. These are three separate world-export shares by segment, not a composition of one total; they should not be read as summing to the sector. The sector-level share fell from 30 per cent in 2024 to 27 per cent in 2025.

who takes only the decline away from this report will draw the wrong conclusion from it. The following is documented performance, not advocacy.

World positions in defined technical niches. DESMA in Achim supplies, on its former owner's statement at the point of sale, approximately half of all direct-soling shoe machines in operation worldwide, exports more than 90 per cent of its output, and delivers on the order of forty production lines a year, each capable of about 3,000 pairs a day.²⁵ Fortuna in splitting and skiving, Dürkopp Adler, Pfaff and KSL in industrial sewing and three-dimensional joining, and Ring in punching and shoe machinery hold comparable positions in their niches, though none publishes a verifiable market share and the claims in this paragraph rest on company statements rather than on independent measurement.

A European firm already operating the business model this report recommends. Lectra reported revenue of EUR 506.7 million for 2025, of which EUR 380.1 million — 75 per cent — was recurring, with software-as-a-service revenue of EUR 89.3 million growing 14 per cent and annual recurring revenue of EUR 97.2 million, at an EBITDA margin before non-recurring items of 15.7 per cent, employing 2,800 people.²⁶ This matters beyond one company's results. The recommendation in Section 15 — that the machine becomes the cost of entry and the recurring layer becomes the product — is not a consultant's proposition awaiting proof. A European firm in this sector is already running it at half a billion euro of revenue with three quarters of that revenue recurring, through a year in which the underlying equipment market fell.

Measurable value delivered to the customer. The clearest documented case is a leather-furniture plant in which automated nesting and cutting raised leather yield from 73 to 78 per cent across 100,000 square feet, cut nesting time per hide from sixteen minutes to four, raised throughput by 40 per cent and reduced the skilled operators required on the line from ten to two.²⁷

²⁵Salzgitter AG, press release on the sale of DESMA Schuhmaschinen GmbH to NAME & MAWI Partners S.A.S., 30 July 2025, describing DESMA as "technology and world market leader" and stating that approximately half of all direct-soling shoe machines worldwide originate from DESMA. Operational detail — export share above 90 per cent, about forty lines a year, roughly 3,000 pairs per line per day — from aktiv-online, 12 May 2021, and to be refreshed before external quotation.

²⁶Lectra, "2025 results: growth in recurring revenues and operational resilience", 11 February 2026. <https://www.globenewswire.com/news-release/2026/02/11/3236607/0/en/LECTRA-2025-results-growth-in-recurring-revenues-and-operational-resilience.html>

²⁷I. Elamvazuthi, N. Kamaruddin and M. S. Azmi, "Automation of Nesting and Cutting Processes of Leather Furniture Production: A Case Study", International Journal of Mechanical and Mechatronics Engineering, 2013. A single plant and a single product family; indicative of the order of magnitude, not a sector average.

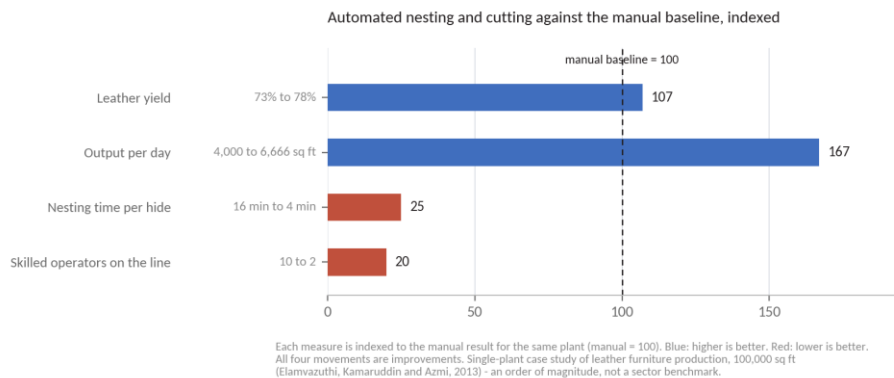


Figure 7 — Automated nesting and cutting against the manual baseline in one documented plant, indexed. Source: Elamvazuthi, Kamaruddin and Azmi (2013). Single-plant evidence; the values should be read as an order of magnitude rather than as a sector benchmark.

The wider benchmark points the same way. Traditional manual cutting achieves material utilisation of roughly 50 to 60 per cent against up to 70 per cent for digital cutting, and in automotive interiors each percentage point of material saved is worth on the order of EUR 100,000 a year to a cutting operation.²⁸ The BMW installation described in Section 6.2 sits at the upper end of that range because it combines nesting with hide-defect scanning. Taken together, a defensible statement of what this technology delivers is five to ten percentage points of leather yield, productivity gains in the range of a third to a half, and a substantial reduction in the skilled hand-cutting labour a plant must find and retain — the last of which is now a binding constraint in its own right.

A customer base that still matters at European scale. The European tanning industry produces leather worth close to EUR 8 billion a year, and the downstream leather value chain it supplies comprises more than 40,000 companies and around two million people generating some EUR 125 billion of turnover.²⁹ Italy alone accounts for about 27 per cent of world leather production by value, from 877 companies employing more than 17,000 people, with two thirds to seven tenths of output exported.³⁰ This is a smaller customer base than it was, and it is still one of the most concentrated pools of high-value leather processing in the world.

The honest reading of this section is not that the sector is safe. It is that the sector has something specific to defend: documented world positions in named process steps, a demonstrated ability to convert engineering into recurring revenue, quantified customer value that a purchasing manager can put in a business case, and a European customer base that, while shrinking, remains the most demanding in the

²⁸Frédéric Gaillard, Lectra, quoted in Leather International, "Cut through the waste", 22 October 2020. <https://www.leathermag.com/analysis/cut-through-the-waste-8190898/> The figures are vendor-attributed and published in independent trade press; they are used here as an order of magnitude.

²⁹COTANCE, Economic Overview, <https://www.cotance.com/about-us/statistics>. The page does not state a reference year; the dated companion document is COTANCE and industriAll-Europe, "The European Leather Industry — Social and Environmental Report 2020".

³⁰UNIC — Concerie Italiane, "The Italian Tanning Industry", <https://unic.it/en/italian-tanneries/the-italian-tanning-industry/>. The page does not state a reference year. Italian tanning turnover for 2025 was EUR 4.0 billion, down 5.6 per cent and a fourth consecutive annual decline, per MilanoFinanza, 12 June 2026.

world on quality, provenance and compliance. A strategy has to be built on assets that exist. These do.

4.9 Interim conclusion

The market picture supports a specific conclusion rather than a general mood. The European industry has ceded the volume contest and has emerged from that loss smaller but financially sound, holding a disproportionate share of value from a small share of quantity. Its machines remain critical in the steps that decide quality and yield; its competence transfers into adjacent markets that are larger and more stable; and its customers increasingly need what European machines do best. The structure of the market does not condemn the European industry. It points it toward a specific, defensible, high-value position — and it says clearly that the position will not be won on scale, because there is not enough scale in this market to win.



5 How the industry got here, and what the American case shows

Key message. The departure of footwear production from Europe is one instance of a repeatable pattern of industrial relocation, not an isolated misfortune. The United States ran that pattern to its end: a base that supplied essentially the whole national market fell to about one per cent of domestic supply and roughly eleven thousand manufacturing jobs. High tariffs did not reverse it and an automated reshoring attempt closed within three years. Five elements of the American case transfer to Europe; three important ones do not.

5.1 Relocation as a repeatable sequence

Industrial relocation follows a sequence rather than a single cause. The most labour-intensive steps move first. As they arrive they pull in suppliers, skilled workers, logistics and infrastructure, and a cluster forms. Once that foundation exists, more demanding stages follow and the destination economies climb from contract manufacturing toward design, technology and brands. The originating regions keep the highest-value segments — for a time.

The pattern is visible sector by sector, each roughly a decade behind the last: textiles and clothing first, then electronics, then chemicals and pharmaceutical ingredients, then vehicle assembly, batteries, solar modules and the refining of critical raw materials. China's share of global manufacturing value added rose from under a tenth in the middle of the 2000s to about 29 per cent in 2023.³¹ The precise year in which China overtook the European Union depends on whether one measures value added or gross output, EU-27 or EU-28, current or constant prices; the literature varies by several years and this report therefore states the direction rather than a date.

What makes the pattern useful is that it is staged, which means the past is a reasonable guide to the sequence of the future. That is the entire justification for the weight this study places on the American case.

5.2 The United States as a completed case

For most of the twentieth century the United States made the shoes it wore; footwear manufacturing employed roughly a quarter of a million people at its peak in the early 1940s.³² By 2017 imports supplied about 99 per cent of the market, and that share

³¹Shares of global manufacturing value added differ materially between datasets — UNIDO, World Bank and national accounts — and between value added and gross output, in current and in constant prices. The report therefore states the direction and the order of magnitude rather than a precise crossover year.

³²American Enterprise Institute (2019) for the peak employment estimate; US Bureau of Labor Statistics, NAICS 3162, via FRED, for the current figure of about 11,100.

has held through 2025.³³ Footwear manufacturing employment now stands at about 11,000.

Two features of the decline generalise. First, migration did not stop at the first off-shore location: measured consistently by value, China fell from 55.6 per cent of US footwear imports in 2017 to 38.4 per cent in 2022, while Vietnam reached 30.4 per cent³⁴ — offshoring is a continuing movement down the cost curve, not a one-time move to a stable partner. (Earlier drafts compared a 2017 value share with a 2025 volume share, which understated the shift; the series above is consistent on one metric. That 55.6 per cent is also China's share of world footwear production in 2025 is a coincidence of two unrelated, separately sourced figures.) Second, the volume did not return at any point in fifty years, under any policy.

Two remedies were tried and can be assessed. Tariffs were not absent: the regular US tariff schedule carries rates up to 67.5 per cent on footwear, with an average across all footwear of 23.6 per cent³⁵, and in April 2025 the IEEPA measures alone reached 145 per cent on Chinese goods, with the US footwear trade association putting the total burden on footwear at 150 to 220 per cent once Section 301 duties and the regular schedule were added. Those high duties coincided with the rise to a 99 per cent import share, which is a direct empirical rebuttal of the idea that tariffs alone reshore volume.

The second remedy was technological, and it is the more instructive. Between 2016 and 2019 adidas built two highly automated Speedfactories, in Ansbach and metro Atlanta, to make shoes close to the consumer. They worked technically and failed commercially. Their combined nameplate capacity was about one million pairs a year against adidas production of 409 million pairs in 2018 and 448 million in 2019.³⁶ — at most a quarter of one per cent of output — and they could economically make only a narrow range of models. adidas announced the closures on 11 November 2019, with production ending by April 2020, and redeployed the technology to suppliers in Asia.

The lesson this report draws from that case is narrower than the one earlier drafts drew, and more defensible. The Speedfactory is strong evidence of the limits of a capital-driven leap attempted **without a supplier ecosystem**, and it is the best available illustration of how much the surrounding component and tooling base matters. It is not proof that a technological leap is unavailable in principle. The plants were designed before the current generation of learning-based perception and control, and

³³United States International Trade Commission (2017) and Footwear Distributors and Retailers of America (2025). In 2022 about 2.7 billion pairs were imported against roughly 25 million made domestically.

³⁴United States International Trade Commission, import value shares. Measured by volume rather than value the same series runs from about 59 per cent (2022) to 47.8 per cent (2025) for China and 28.5 per cent (2025) for Vietnam (FDRA). The two metrics are not interchangeable and are not mixed here.

³⁵Footwear Distributors and Retailers of America, on the Harmonized Tariff Schedule. Rates above 90 per cent arose only in 2025 and only on Chinese goods, once Section 301 and IEEPA duties were stacked on the most-favoured-nation rate.

³⁶adidas AG annual reports for 2018 and 2019. adidas never published Speedfactory output; the figure of about one million pairs a year is nameplate capacity for the two plants combined and is therefore an upper bound.

this study elsewhere identifies artificial intelligence as a force that changes the economics of exactly that problem. Using pre-AI evidence to bound post-AI possibility would be an error, and the report does not make it.

5.3 What transfers to Europe, and what does not

What survived in the United States was not a smaller version of the old industry but a residue of protected and premium niches: military footwear procured under the Berry Amendment, and a handful of premium and specialist survivors. Even that protected niche is contested — the Better Outfitting Our Troops (BOOTS) Act was introduced on 8 July 2025 to tighten enforcement and has not been enacted.³⁷ New Balance, the largest domestic athletic-footwear maker, runs five New England factories producing around four million pairs a year and labels shoes as "Made in the USA" where the domestic value is at least 70 per cent.³⁸ That 70 per cent is the company's own definition rather than a regulatory threshold: the Federal Trade Commission requires that an unqualified "Made in the USA" claim be supported by all or virtually all of the product being of domestic origin, and sets no percentage at all. Earlier drafts treated the figure as a regulatory floor. The underlying point stands on other evidence, because New Balance does source many components from Asia.

The deepest lesson is the erosion of what Gary Pisano and Willy Shih called the industrial commons³⁹ — the shared base of suppliers, component makers, tooling shops and process engineers that any one firm draws on but none owns. It hollows out before final assembly does, and returns last, if at all. Europe still holds much of that commons in machinery, tanning and components, which is why the time to defend it is while it exists.

Factor	United States, what happened	Europe, where it differs
Volume manufacturing	Fell to about 1 per cent of consumption	Also ceded; not recoverable at scale on price
Machinery engineering	Largely vanished with the base	Substantially retained in Italy and Germany
Luxury and tanning base	Never large; little to reshore	Strong, and reshoring into Italy and France

³⁷Introduced by Senators Collins and King and by Representative Golden on 8 July 2025. The House did not include it in the National Defense Authorization Act; it is a legislative proposal, not law in force.

³⁸The 70 per cent is New Balance's own labelling rule for its domestic line, not a Federal Trade Commission threshold. For an unqualified "Made in USA" claim the FTC requires that all or virtually all of the product be of domestic origin and sets no percentage at all; consumer-protection commentary treats the 70 per cent claim as a departure from that standard. Earlier drafts of this study read the figure both as a regulatory threshold and as a measured average. The underlying observation, that New Balance sources many components from Asia, rests on other evidence. [ftc.gov](https://www.ftc.gov), Complying with the Made in USA Standard.

³⁹G. P. Pisano and W. C. Shih, "Restoring American Competitiveness", Harvard Business Review, July–August 2009, and "Producing Prosperity", Harvard Business Review Press, 2012.

Factor	United States, what happened	Europe, where it differs
Nearshoring ring	None comparable	Portugal, Türkiye, North Africa, the Balkans
Protected niche	Berry Amendment (military procurement)	PPE, medical and defence — fragmented across member states
Policy response	High tariffs; did not reshore	Regulation favouring quality, documentation and traceability
Net lesson	A cost-and-volume framing lost the industry	A value-and-commons framing can hold a position

Table 5 — The United States compared: what transfers to Europe and what differs. Source: Gherzi synthesis of the sources cited in this section.

Read this way the American case supports the study's central assessment. The United States lost its industry largely by treating the problem as one of cost and volume and by reaching for tariffs and a technological leap that could not bear the weight placed on them. Europe's opening is to make the opposite choice deliberately: to stop defending volume, to protect and upgrade its industrial commons, and to compete on the value that scale cannot cheaply reproduce.

6 Technology: what is ready, what is not, and what it would take

Key message. Four capabilities are mature or near-mature, available from European suppliers and directly saleable today: material-efficient cutting, AI-based vision and quality inspection, direct soling of rigid parts, and the digital layer that connects machines into a system. One step is not solved — the automated joining and handling of soft, variable materials. This report replaces the unsupported claim of a 40 per cent automation threshold with a transparent calculation: the share of manual labour content that must be removed to reach cost parity ranges from roughly half for premium small-batch work to more than nine tenths for commodity footwear. Five operating installations, set out in Section 6.7, mark the boundary of what is commercially proven; none of them closes the soft-joining step.

6.1 The map of readiness

The technology position is best read as a short list of steps that are ready to sell now, one step that is not yet solved, and a discipline that ties them together.

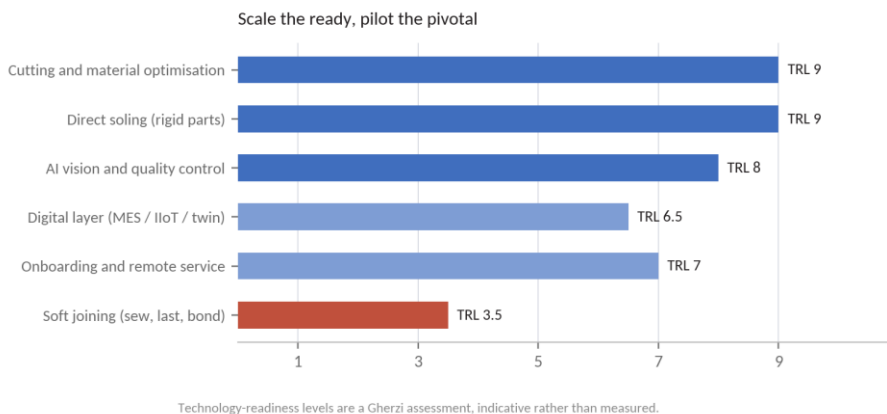


Figure 8 — Technology readiness of the core process steps. Technology-readiness levels are a Gherzi assessment, indicative rather than measured, and are intended to rank the steps against each other rather than to be quoted as absolute values.

Process step	Maturity	European suppliers and references	The right response
Cutting and material optimisation	Mature	Lectra, Zünd, Comelz, Atom, Teseo; BMW Dingolfing reference	Scale now; sell the measurable saving, not the machine

Process step	Maturity	European suppliers and references	The right response
Direct soling of rigid parts	Mature	DESMA with ABB; Main Group; Engelbert Strauss CI Factory	Scale; largely saturated for further gains
AI vision and quality control	Advancing	Fraunhofer institutes; inline inspection systems	Scale; the output doubles as compliance evidence
Digital layer (MES, IIoT, digital twin)	Available	Standard automation and software vendors	Standardise the interface; make it default
Onboarding, AR and remote service	Advancing	Supplier service platforms	Build the recurring service annuity
Soft joining: sewing, lasting, bonding	Low; laboratory validation	KSL, Pfaff, Dürkopp Adler; research institutes	Fund collective research; pilot semi-automated lasting

Table 6 — Core process steps: maturity, European capability and the appropriate response. Source: Gherzi assessment; references as cited in the text.

6.2 Ready now: cutting, vision and the digital layer

The most important single reference for material-efficient cutting is the BMW plant in Dingolfing, because it is quantified, running and documented. Since early 2022 a combined system of surface inspection, digital nesting and cutting has performed three steps in one operation and delivered about 15 per cent lower leather consumption and a reduction in wrongly cut parts of about three quarters.⁴⁰ Three qualifications belong with those numbers. They are manufacturer figures, published by BMW and not independently audited; the fact that the beneficiary confirms them is not corroboration. The installation is in the BMW Individual Manufaktur, which is small-series work rather than series interior cutting. And the scale difference to footwear and leather-goods production has to be stated when the case is used to argue transferability. With those three qualifications the case remains the best quantified evidence in this study.

What has been missing from the sales argument is the arithmetic that turns a material saving into a customer decision, and the study can only supply part of it. Labour

⁴⁰BMW Group PressClub, 8 March 2023, on AI-based leather inspection and nesting at the BMW Individual Manufaktur in Dingolfing, in operation since the beginning of 2022. The figures are manufacturer statements and have not been independently audited.

accounts for about 31 per cent of the cost of producing footwear in a high-wage economy, which is the one footwear-specific cost-share figure this study could verify.⁴¹ No comparable published figure for the material share of footwear or leather-goods manufacturing cost could be found, which means the payback calculation a salesperson needs — 15 per cent of a material share of X per cent gives Y per cent of unit cost, and therefore Z months of payback on a given investment — cannot yet be closed with sourced inputs. Establishing that material share, by product group and with a named source, is the single most commercially valuable data point the VDMA could add to this study.

AI-based vision and inline inspection is the field where progress has been fastest and the payback is clearest. It classifies surface flaws, controls colour and shade and monitors seam and bond quality at a consistency human inspectors cannot match. Its strategic value is not only fewer defects but the record: inspection generates an auditable quality history, which is what tightening regulation and demanding automotive customers now require. Vision therefore does double duty, raising yield and producing compliance evidence.

The digital layer — ERP, MES, industrial IoT and the digital twin — is where individual machines become a production system. The technology is proven; the constraint is adoption, because integration too often becomes a bespoke project rather than a standard feature. Standardised interfaces, common data semantics and a discipline of no new machine without a digital interface turn connectivity from a custom cost into a built-in capability. Section 9.3 sets out the legal constraint that now shapes how this can be monetised, and it is more urgent than the industry generally assumes.

6.3 The unsolved step: joining soft materials

The contrast between rigid and flexible handling is the defining technical fact of this sector. Where a component holds its shape — a sole, a shank, a last — robotics is industrially proven and commercially available. DESMA and ABB have built an installed base of more than 1,700 robots in shoe factories worldwide over a partnership of more than forty years.⁴² Against a world output of 24.6 billion pairs, that is a successful and technically mature niche rather than an industry standard, and describing it accurately makes the chapter's argument stronger rather than weaker: the contrast between rigid and flexible is not a matter of adoption lag, it is a matter of physics.

A limp, deformable piece of leather or textile does not present itself to a gripper in a repeatable way. It stretches, folds and shifts, and no fixed program can anticipate its state. Solving this requires adaptive gripping, two- and three-dimensional vision and

⁴¹US Bureau of Labor Statistics via FRED, “Labor Share for Manufacturing: Footwear Manufacturing (NAICS 31621), United States”, series IPUEN31621L030000000: 0.309 for 2023. For apparel, the US International Trade Commission puts labour at roughly 20 to 30 per cent of total garment cost and at about 50 per cent of production cost excluding materials (Publication 5543, 30 August 2024).

⁴²Vendor statements by DESMA and ABB. Cumulative over more than four decades, against world footwear output of 24.6 billion pairs a year, this is a mature niche rather than an industry standard, and the report describes it as such.

model- or data-based control in combination. The peer-reviewed literature is consistent on this point and is worth citing precisely, because it supports the study's thesis qualitatively without needing an unsourced percentage. Work on vision-based robotic path planning for adhesive spraying on lasted uppers and on tooling for the manipulation of flexible pieces identifies flexible-material handling as the central bottleneck;⁴³ the latter reports that after cutting, the silhouette of a cut piece is often indistinguishable to a vision system, that textile porosity constrains vacuum gripping, and that leather pieces are still sorted by hand in industry. That system reached laboratory validation, not production. The EU ROBOFOOT project identified six operations for robotisation and tested three prototypes; no productivity metrics were published.⁴⁴ And the closest published quantification of where the manual work sits is that more than 30 per cent of assembly manpower in shoe production goes into the bonding of soles (Kim et al., *Machines*, 2022).⁴⁵

The claim carried in earlier drafts that a real automation rate of 30 to 40 per cent has already been achieved in high-mix applications is an internal working hypothesis with no published basis, and its reference quantity — a share of what: operations, labour minutes, units, value added? — was never defined. It is withdrawn from the argument here. It is not needed: the qualitative finding is fully supported by the literature, and the quantitative question that actually matters is not the current automation rate but the threshold at which automation changes the location decision. That is derived in the next section.

6.4 What the tipping point actually requires

The entire scenario architecture of this study, its research recommendation and its recommendation to the VDMA rest on the proposition that pushing soft-joining automation past a threshold would move the competitive boundary between Asia and Europe. Earlier drafts set that threshold at about 40 per cent without deriving it. A threshold that is asserted rather than calculated cannot carry that much weight, so this report derives one.

The logic is straightforward. A European location becomes cost-competitive when its remaining manual labour cost, plus the capital service and maintenance charge for the automation that replaced the rest, no longer exceeds the Asian manufacturing cost plus the cost of getting the goods to Europe plus whatever the customer will pay for proximity, speed and flexibility. Writing that as an equation and solving for the share of manual labour content that automation must remove gives a threshold rather than an assertion. The inputs are: the labour share of footwear manufacturing

⁴³“Real-Time 3D Vision-Based Robotic Path Planning for Automated Adhesive Spraying on Lasted Uppers in Footwear Manufacturing”, *Applied Sciences* 2025, 15(11), 6365, DOI 10.3390/app15116365; F. J. Martínez-Peral, J. Borrell Méndez, J. V. Segura Heras and C. Perez-Vidal, “Development of a Tool to Manipulate Flexible Pieces in the Industry: Hardware and Software”, *Actuators* 2024, 13(4), 149, DOI 10.3390/act13040149.

⁴⁴ROBOFOOT — “Smart robotics for high added value footwear industry”, FP7 Factories of the Future, grant agreement 248366, 1 September 2010 to 28 February 2013. Total budget EUR 3,685,073, of which EUR 2,559,540 public funding; ten partners from three member states. EFFRA Innovation Portal and CORDIS.

⁴⁵M.-G. Kim, J. Kim, S. Y. Chung, M. Jin and M. J. Hwang, “Robot-Based Automation for Upper and Sole Manufacturing in Shoe Production”, *Machines* 2022, 10(4), 255, DOI 10.3390/machines10040255. The published wording is manpower, not work time, and is used here as published.

cost, at 31 per cent (BLS, 2023); the ratio of European to Asian labour cost, taken from Eurostat hourly labour costs for 2025 and from US International Trade Commission monthly wage data for the principal Asian producing countries;⁴⁶ a landed-cost premium for Asian sourcing covering freight, duty and inventory; the value the customer places on proximity and speed; and a capital-service charge for the automation. The full model, its parameter values and its sensitivities are in Annex A2.

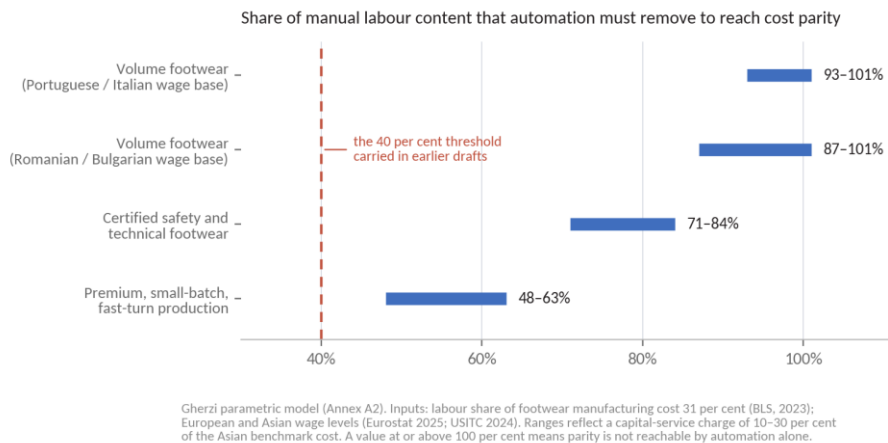


Figure 9 — Share of manual labour content that automation must remove for a European location to reach cost parity, by product type. Source: Gherzi parametric model (Annex A2). Ranges reflect a capital-service charge of 10 to 30 per cent of the Asian benchmark manufacturing cost. A value at or above 100 per cent means parity is not reachable by automation alone under those assumptions.

Three conclusions follow, and they change the study's recommendation in a way that makes it more useful rather than less.

First, there is no single threshold. The share of manual work that must be automated is a function of the product, because the customer's willingness to pay for proximity and the value of speed differ by an order of magnitude between a commodity sneaker and a certified safety boot. Presenting one number for the whole industry was the error in the earlier drafts.

Second, for commodity footwear the threshold is very high — above 90 per cent on any plausible parameter set, and above 100 per cent, meaning unreachable by automation alone, if the capital charge is at the upper end. This is a significant finding and it is consistent with the American evidence in Section 5.2: the Speedfactory did not fail because it automated too little.

Third, and this is the operative conclusion, for premium, small-batch, fast-turn production the threshold falls to roughly 50 to 60 per cent, and for certified safety and technical footwear to roughly 70 to 85 per cent. The lower of those is within reach of

⁴⁶Eurostat, “Hourly labour costs”, data year 2025, published 31 March 2026: EU average EUR 34.9 across the whole economy and EUR 37.5 in industry; Germany EUR 45.0 and EUR 49.2; Italy EUR 35.8 and EUR 39.1; Portugal EUR 22.5 and EUR 24.8; Romania EUR 13.6 and EUR 14.9; Bulgaria EUR 12.0 and EUR 13.2. US International Trade Commission, Publication 5543, 30 August 2024, Appendix E, for monthly wages in the principal Asian apparel and footwear producing countries. Neither series is specific to footwear manufacturing.

a directed European research effort within the scenario horizon. The research priority is therefore not "automate the shoe" but "automate soft joining far enough to close the gap in the product segments where the gap is smallest" — which are precisely the segments in which Europe already holds a position. That is a sharper and more fundable proposition than the one the study previously carried.

The model is a Gherzi derivation, not a measurement, and its weakest input is the European wage level: Eurostat publishes hourly labour costs for the whole economy and for industry as a whole, not for footwear manufacturing (NACE C15), which pays materially less. Pulling the C15 figures from Eurostat would tighten the ranges.

6.5 Two European automation cases and what separates them

The study cites two European automation cases that appear to contradict each other, and the contradiction is worth resolving explicitly because a critical reader will otherwise find it first.

The Engelbert Strauss CI Factory in Germany has produced more than 300,000 pairs since 2019 using five ABB robots in a direct-soling process, on about 6,000 square metres, changing shoe sizes within seconds.⁴⁷ Over roughly six and a half years that is an annual rate of about 45,000 to 50,000 pairs. The adidas Speedfactories had a nameplate capacity of about one million pairs a year and were judged a commercial failure. A factor of twenty separates them in the opposite direction to the verdicts.

Three differences explain it, and all three support this study's thesis rather than undermining it. The Strauss plant makes safety and children's footwear, which have predictable demand and long model cycles, against the Speedfactory's fashion product with seasonal volatility. It uses direct soling of rigid parts — precisely the step this report identifies as mature — rather than attempting the soft-joining step. And it produces for a vertically integrated own requirement rather than for an open market, so it never faces price competition at the factory gate. Stated that way, the Strauss case is not an anomaly but the best single European illustration of where automated footwear production works today: rigid-part processes, planned demand, captive offtake.

6.6 Skills, and the machine as a training platform

The skills shortage reframes what a machine is worth. As qualified operators become scarce across nearly every production location, including China, the value of a machine increasingly lies in how little skill it demands to run well and how effectively it transfers competence to the people running it. AI-assisted onboarding, guided setup and AR-supported maintenance turn the machine into a training and service plat-

⁴⁷Vendor and company statements (ABB, Engelbert Strauss). The cumulative figure corresponds to an annual rate of roughly 45,000 to 50,000 pairs; ABB separately describes a two-robot cell at DB Shoes in the United Kingdom producing about 300 pairs a day.

form. This is a commercial opportunity as much as a technical one: it creates a recurring relationship that a one-off machine sale does not, and it plays to a European strength, because proximity, support and application engineering are what a remote low-cost competitor struggles to provide.

6.7 Best practice: five cases that already work

The technology argument is easier to assess when it is tied to operating installations and observed business models. The five cases below are not a representative sample and none is a blueprint to copy. Each demonstrates one specific proposition that is relevant to the European footwear and leather machinery industry: material efficiency, viable automation under defined conditions, recurring revenue, robotics for stable parts, or a measurable cutting-room business case.

Material efficiency in a quantified application. BMW's Dingolfing plant has run a combined system of surface inspection, digital nesting and cutting in one operation since early 2022, with about 15 per cent lower leather consumption and roughly three quarters fewer wrongly cut parts. The figures are the manufacturer's own and the installation is small-series work, but it is the best-quantified reference in this study and it is the case a European cutting-room supplier should be able to reproduce in its own sales argument.

Automated production under favourable conditions. The Engelbert Strauss CI Factory has produced more than 300,000 pairs since 2019 with five ABB robots on about 6,000 square metres, changing sizes within seconds. It works because it makes safety and children's footwear with predictable demand, uses direct soling of rigid parts rather than soft joining, and produces for a captive own requirement. That combination — rigid-part processes, planned demand, captive offtake — is the profile of automated footwear production that works in Europe today.

A recurring-revenue model at scale. Lectra took EUR 506.7 million of revenue in 2025, EUR 380.1 million of it recurring, with software-as-a-service growing 14 per cent, through a year in which the underlying equipment market fell. The recommendation in Section 15 that the machine becomes the cost of entry and the recurring layer becomes the product is therefore not a proposition awaiting proof. Lectra is not a direct peer for every specialist machine builder, but it demonstrates that the model can be operated at industrial scale within the wider cutting and production-technology field.

Robotics where the part holds its shape. DESMA and ABB have built an installed base of more than 1,700 robots in shoe factories over a partnership of more than forty years. Measured against 24.6 billion pairs a year that is a niche, and saying so makes the point sharper: the contrast between rigid and flexible handling is physics, not an adoption lag. The case demonstrates that the barrier is not robotics in footwear as such; it is the handling and joining of soft, deformable materials.

Yield improvement in a single leather-furniture plant. In one leather-furniture operation, automated nesting and cutting raised leather yield from 73 to 78 per cent, cut

nesting time per hide from sixteen minutes to four, raised throughput by 40 per cent and reduced the skilled operators on the line from ten to two. It is single-plant evidence from 2013 and should be read as an order of magnitude, but it is the shape of the business case a purchasing manager will recognise.

Taken together, the five cases define the boundary of what is commercially proven today: cutting, nesting, inspection, direct soling, robotics for stable parts and the recurring service layer. None demonstrates an industrial solution to the automated handling and joining of soft, variable materials. That remains the central technology gap addressed in Section 6.4.



7 The competitive framework: subsidy, ownership and the limits of a price contest

Key message. The price contest with China is an industrial-policy question rather than an efficiency one, and the evidence for that should be stated precisely rather than strongly. OECD firm-level measurement finds Chinese firms receiving three to eight times the government support of OECD-based firms across fifteen industrial sectors over 2005 to 2024; none of those sectors is this one, so the figure describes the environment, not the segment. The contest is increasingly expressed through ownership, and the EU instruments that might review it do not reach targets of this size. Section 7.5 sets out the production locations beyond that contest — the Asian hubs beyond China, the European nearshore ring and the Americas — and what each of them requires of a European supplier.

7.1 The subsidy evidence, stated precisely

The OECD published its MAGIC database of industrial subsidies in June 2026, covering 525 of the world's largest manufacturing groups. Its central finding is that Chinese firms received on average three to eight times more government support than firms based in the OECD over the period 2005 to 2024, and considerably more than firms based in Brazil, India and Indonesia, whose support levels were comparable in relative terms to those of North American companies.⁴⁸ Total industrial subsidies reached USD 108 billion in 2024, the highest relative to revenue since the financial crisis, at about 1.3 per cent of firm revenue.⁴⁹

Two qualifications must travel with that figure, and earlier drafts omitted both. The fifteen sectors measured are aerospace and defence, aluminium, automobiles, cement, chemicals, fertilisers, glass and ceramics, heavy machinery, semiconductors, shipbuilding, solar photovoltaics, steel, telecommunications equipment, rolling stock and wind turbines. Footwear, leather and the machinery for them are not among them; heavy machinery is the closest adjacency. Any transfer of the multiple to this segment is an extrapolation and should be described as one. And Assomac itself cites the same OECD work in its own communication, so treating the OECD study and the Assomac statement as two independent confirmations would be circular.

⁴⁸OECD, "OECD MAGIC Database of Industrial Subsidies", 1 June 2026, DOI 10.1787/ce94f33b-en, covering 525 of the world's largest manufacturing groups across fifteen industrial sectors. Instruments measured are government grants, tax concessions and below-market borrowings.

⁴⁹OECD, as above, and the accompanying press release, "Industrial subsidies reach highest levels since the global financial crisis", 1 June 2026.

Stated correctly, the finding still carries the argument, because the argument does not need a segment-specific multiple. The point is that the competitive gap in this sector is the product of industrial policy rather than of a productivity differential a European firm could close by working harder, and a cross-sector finding of that magnitude establishes it. What is specific to this segment is the outcome: China has moved from a marginal supplier of footwear and leather machinery to the world's largest exporter of it within two decades.

7.2 From exports to ownership

The competition is increasingly expressed through ownership as much as through exports, and the sequence is consistent.

Year	Target	Acquirer	Type	Segment
2005	Dürkopp Adler (DE)	ShangGong Group	Chinese group	Industrial sewing
2013	Pfaff Industrial and KSL (DE)	ShangGong Group	Chinese group	Sewing, robotic joining
2023	Sonotronic (DE)	ShangGong Group	Chinese group	Ultrasonic joining
2025	DESMA Schuhmaschinen (DE)	NAME & MAWI Partners	European group (DE/FR)	Direct soling
2026	Comelz (IT)	Jack Technology, about EUR 140 m	Chinese group	CNC leather cutting and software
2026	Klöckner DESMA Elastomertechnik (DE)	NAME & MAWI Partners	European group (DE/FR)	Elastomer injection moulding
2026	schoen + sandt punching assets (DE)	Ring Group	German family group	Punching and cutting

Table 7 — Ownership changes among European footwear and leather machinery builders, 2005 to 2026. Sources: company histories; ShangGong Group; Salzgitter AG press releases (30 July 2025; 3 August 2026); Il Sole 24 Ore (26 June 2026). The pattern in the Chinese acquisitions is the purchase of technology, software and integration capability rather than of capacity. The Ring transaction is the counter-case: punching assets that stayed in European family ownership.

The Comelz transaction is the clearest recent case and the most instructive on scale. Jack Technology, the Chinese industrial sewing leader, signed on 21 April 2026 and

completed on 23 July 2026, at an enterprise value of about EUR 140 million, against a preliminary purchase price of about EUR 116 million, for a company with about 190 employees and two plants in Vigevano. Comelz turned over EUR 53.6 million in 2024, down from EUR 81.4 million in 2023 — a fall that is at least as informative as the price, because it shows the acquisition was of technology and position rather than of earnings momentum.⁵⁰

7.3 What the EU instruments do and do not reach

Two European instruments are relevant to this consolidation trend and worth tracking on members' behalf. The Foreign Subsidies Regulation (EU) 2022/2560 can require notification of concentrations involving foreign state support. The new Foreign Investment Screening Regulation (EU) 2026/1386, in force since 16 July 2026, sets a common EU minimum standard for national screening and applies from 17 January 2028.⁵¹

The qualification matters more than the instruments. The Foreign Subsidies Regulation notification threshold requires the target to have at least EUR 500 million of EU turnover, together with more than EUR 50 million of foreign financial contributions.⁵² Typical targets in this sector are one order of magnitude below that: Comelz turned over EUR 53.6 million. Transactions of that size are reached only through the Commission's own call-in power for below-threshold concentrations, or through national screening regimes, which differ between member states. The instruments therefore do not structurally cover the next wave of ownership change in this sector, because the targets are too small. That is an evidenced policy point rather than an observation, and it is exactly the kind of finding an association commissions a study to obtain. It is carried into the recommendations in Section 15.

7.4 The two customer camps

The European supplier faces not one market but two, and they reward opposite behaviours. At one end are luxury houses and mid-sized manufacturers, who buy on service, proximity, on-site trials and the trust of a long local relationship. At the other are large accounts and OEMs, increasingly in automotive, who buy integrated systems and require ERP and production-planning integration, standardised interfaces and end-to-end data.

This segmentation comes from the project peer team meeting of 1 July 2026 and is an internal source. It is therefore used as a working assessment rather than as a measured description of market structure. The narrow and uneven membership base does

⁵⁰Il Sole 24 Ore, June 2026, and BeBeez, 7 August 2026. Profit fell from EUR 13.7 million to EUR 6.7 million over the same period.

⁵¹Regulation (EU) 2026/1386 of 17 June 2026 on the screening of foreign investments in the Union, Official Journal of 26 June 2026, repealing Regulation (EU) 2019/452.

⁵²Regulation (EU) 2022/2560 on foreign subsidies distorting the internal market, Article 20. Below-threshold concentrations can be reached only through the Commission's own call-in power or through national investment-screening regimes, which differ between member states.

not permit a representative or publishable survey-based validation. The recommendation itself is robust to the exact split: a high-touch application-engineering model suits luxury and mid-market customers, while large accounts and OEMs require systems integration, standardised interfaces and end-to-end data. The recommendation itself is robust to the detail: a high-touch application-engineering model for the luxury and mid-market segment, and a systems-integration, platform-and-financing model for the large-account and OEM segment. A single product strategy serves neither well.

7.5 Beyond Europe and China: where the other markets sit

Reducing the industry to a contest between Europe and China misses the production locations where incremental capacity, regional sourcing and future machinery demand are also developing. These markets do not form one bloc. They play different roles in the value chain and require different offers from European suppliers.

Asian production hubs beyond China. India produced 3.0 billion pairs in 2025 and Vietnam 1.7 billion; Vietnam alone supplied 11.2 per cent of world export volume. Indonesia and Bangladesh are further large producing locations. These countries are the principal production bases beyond China and therefore the most likely sources of incremental demand for footwear machinery. In standard, high-volume segments, purchasing is strongly price-sensitive. A European supplier is unlikely to win on acquisition price alone. Its position is strongest where material yield, quality assurance, certification, process integration and reliable service are written into the purchasing specification.

The European nearshore ring. Türkiye is a distinct case: it combines a substantial footwear and leather base with customs-union access to the EU and short overland delivery times to Central Europe. Selected North African and South-East European locations offer further near-market options, but they differ substantially by country, buyer network and product segment. The relevant opportunity is not a return of European mass production. It is modular, upgradeable equipment for shorter runs, faster changeovers and multi-product lines serving European brands and regional supply chains. Portugal belongs to the established European production base rather than to this external low-cost ring.

The Americas. The United States remains principally a consumption market supplied by imports; its footwear manufacturing base is too small to be a broad machine market. Mexico and Brazil are the principal production markets in the region: Mexico through North American supply-chain integration, Brazil through its domestic footwear, leather and tanning base. The Chinese experience suggests that, as national supply industries mature, European machinery is most likely to retain a position in specialised, high-specification applications. That is a possible pattern, not a universal rule.

The implication is practical. Volume demand remains in Asia, near-market demand is concentrated in flexible and responsive production systems, and the European offer in every geography must be defined by qualification, application capability, documentation and service rather than catalogue breadth or the lowest acquisition price.

The industry interview supports the report's distinction between mass reshoring and selective nearshoring. The realistic opportunity is not to bring back the volume base that left Europe over decades, but to rebuild regional supply chains for quality-sensitive, specialised, short-run and fast-response production.



8 Adjacent markets: the same competence, worth more elsewhere

Key message. The competence built for footwear — precise, documented processing of flexible materials — is demanded well beyond the shoe: in automotive interiors, aviation, upholstered furniture, technical textiles and protective equipment. The downstream markets are very large; the machine markets inside them are not, and the distinction has to be made honestly. On a disclosed derivation, the addressable machine and system market across those fields is on the order of USD 1.2 to 3.2 billion a year, against an existing core market of USD 2.2 to 3.3 billion that already includes footwear, leather goods and tanning. Diversification can add up to about as much again as the sector's present market. That is a serious case, and it is not the tenfold case the material figures suggest.

8.1 Automotive interiors

Automotive interiors are the anchor and the best-documented path. The market for automotive interior leather — a category that covers both genuine hide and synthetic PU and PVC materials — is put at about USD 44.9 billion in 2025, growing to about USD 78.7 billion by 2033, a compound rate of about 7.3 per cent over that window; the 7.4 per cent the publisher quotes applies to 2026 to 2033 from a 2026 base of USD 47.6 billion.⁵³ Two precisions matter, and both correct earlier drafts. The base year, end year and growth rate now come from the same edition, which the previous combination did not. And the material split runs the other way from the one the study previously reported: synthetic materials account for 62.4 per cent of the market in 2025 and genuine leather 37.6 per cent, with synthetic the faster-growing share.⁵⁴

That reversal strengthens rather than weakens the argument. Both streams are flexible sheet materials that must be scanned, nested, cut, handled and joined, so the addressable machine market grows regardless of the material mix — and if synthetic already holds the majority and is growing faster, the point is not merely correct but urgent. What the figure does not indicate is a hide or tannery market, and it should never be quoted as one.

The customer base is a concentrated set of Tier-1 seat and interior suppliers — Forvia, Lear, Adient, Toyota Boshoku, Yanfeng, Grammer — which is an advantage for a machine builder, because the market is reached through a handful of sophisticated

⁵³Grand View Research, “Automotive Interior Leather Market Size, Share and Trends Analysis Report, 2026–2033”, August 2026 edition. Scope: leather materials used in vehicle cabin interiors — seating, door panels, dashboards, headliners and upholstery — across passenger cars and commercial vehicles, and covering synthetic PU and PVC materials as well as genuine hide. It is a cabin surface-material market, not a hide or tannery market.

⁵⁴Grand View Research, as above. The genuine-leather segment is put at USD 16.9 billion in 2025, growing to USD 28.8 billion by 2033. Earlier drafts of this study reported the split the other way round.

buyers rather than a fragmented base. Leather is increasingly captive inside those Tier-1s; Lear owns Eagle Ottawa, the largest automotive-leather supplier, so the cutting room sits inside the seat-cover supply chain.

Traceability is entering automotive as it entered luxury footwear, and faster. BMW joined the Leather Working Group in January 2022 as the second carmaker to do so, after Bentley; Jaguar Land Rover and Maserati joined in January 2025.⁵⁵ Certified, traceable hide is shifting from a marketing claim to a contractual purchasing condition, which raises the value of digital hide-scanning, grading and nesting systems that log which hide went into which part.

The state of automation mirrors the footwear problem exactly. Hide inspection, nesting and cutting are highly automated. Decorative topstitching on rigid three-dimensional panels is automated by vision-guided robotic cells. But the assembly sewing of three-dimensional seat covers — joining limp, stretchable, multi-panel leather-and-foam laminates around complex curvature — remains a skilled-labour bottleneck. It is the same soft-joining gap, in a higher-value industry, which is one reason a collective research effort on that step has a wider payoff than footwear alone.

On volume, realism is required: EU passenger-car production was essentially flat in 2024 and 2025 at about 11.4 to 11.5 million units, about a third below the 2017 level of 17.0 million.⁵⁶ The point for a machine builder is not the unit count but its character. Interior content is designed into each vehicle platform over a multi-year lifecycle, so even a flat and below-peak market delivers planned, predictable volumes of cut-and-sewn parts — the opposite of fashion's seasonal volatility. The cost pressure at the OEMs is itself what drives adoption of material-saving automated cutting.

8.2 Aviation interiors

Aviation interiors are a high-value, highly certified niche with unusual demand visibility, and this report is more cautious about its size than earlier drafts were. A figure of USD 6.2 billion in 2024 for “leather for aviation”, growing to USD 8.3 billion by 2031, is published by The Insight Partners and was carried in earlier versions.⁵⁷ It does not survive a plausibility check: the entire aircraft cabin interior market — seats, in-flight entertainment, lighting, galleys, lavatories, panels and stowage together — is put at about USD 26.9 billion in 2024, and the dedicated aircraft seat upholstery market at about USD 1.13 billion in 2025.⁵⁸ A covering-material market of

⁵⁵BMW Group PressClub, 27 January 2022, which describes BMW as the second vehicle manufacturer worldwide to join the Leather Working Group. Earlier drafts of this study described BMW as the first.

⁵⁶ACEA Economic and Market Report: 11.41 million units in 2024 and 11.47 million in 2025. The 2017 comparator is not published by ACEA in the same series; on OICA figures for the EU-27 the decline is about 26 per cent, and on a wider European definition about 30 per cent. The range is stated for that reason.

⁵⁷The Insight Partners, “Leather for Aviation Application Market”, press release of 3 July 2025: USD 6.20 bn in 2024 rising to USD 8.28 bn by 2031 at 4.4 per cent.

⁵⁸Grand View Research, “Aircraft Cabin Interior Market Report”, March 2025: USD 26.88 bn in 2024. Fortune Business Insights, “Aircraft Seat Upholstery Market”, 27 July 2026: USD 1.13 bn in 2025.

USD 6.2 billion would be roughly a quarter of all cabin hardware value and more than five times the entire upholstery market. The figure is therefore not used in this report.

The machine-relevant figure is the seat upholstery market: about USD 1.13 billion in 2025 growing to about USD 2.12 billion by 2034, a rate of about 7 per cent over that window; the publisher quotes 7.1 per cent for 2026 to 2034. Fabric is the largest material segment and vinyl the fastest-growing at 8.6 per cent; leather is the premium alternative rather than the bulk of it.⁵⁹ That matters for precision and not for the argument, since cutting and sewing apply to all three.

The attraction of aviation is not size but certainty and barrier height. Interior materials must meet strict flammability and wear standards, which raises the entry barrier and rewards precise, low-waste, documented processing. The cut-and-sew work sits overwhelmingly in Europe: Safran Seats in France has more than a million seats in service and about 5,000 employees across five countries; RECARO Aircraft Seating in Schwäbisch Hall produced some 120,000 passenger seats in 2025 against an order backlog of roughly EUR 3 billion; Thompson Aero Seating in Northern Ireland grew revenue 47 per cent in its 2024 financial year; Elevate Aircraft Seating, formerly Adient Aerospace, manufactures in Kaiserslautern as well as California; and Geven produces seating and interiors near Naples.⁶⁰ The material side is European too, and it is instructive. Muirhead, part of the Scottish Leather Group at Bridge of Weir, supplies aviation, passenger transport and luxury interiors and exports to more than sixty countries. ELeather in Peterborough produces an engineered leather made by locking reclaimed leather fibres into a composite core by hydroentanglement, supplying airlines and rail operators in more than forty countries. BOXMARK Leather in Styria supplies upholstery leather and, importantly, finished cut-and-sewn seat covers and leather-wrapped components to automotive, aviation, marine, rail, contract and furniture customers from one competence base.⁶¹ BOXMARK is the clearest single illustration of this report's central argument about transferable competence: the same operation serves five industries because the processing step, not the end product, is what it sells.

And the demand horizon is unlike anything in fashion: Airbus and Boeing delivered 793 and 600 aircraft respectively in 2025 against a combined order backlog of more than 15,400 at the end of 2025 — roughly eleven years of contracted output. After-market demand adds to it, because cabins are refreshed on their own rhythm rather than with the airframe, though no official or association statistic exists for the size of the cabin retrofit market and the commonly quoted figures are syndicated with un-

⁵⁹Fortune Business Insights, "Aircraft Seat Upholstery Market Size, Share and Industry Analysis, Forecast 2026–2034", 27 July 2026. The publisher does not disclose a share by material, so no percentage split is quoted here.

⁶⁰Safran Seats company profile; RECARO Group results for 2025 as reported by [airliners.de](https://www.airliners.de), 19 March 2026 — the revenue figure of EUR 723 million is for RECARO Holding rather than the aircraft seating division alone; Thompson Aero Seating financial year 2024 as reported by Aircraft Interiors International, 4 June 2025; Elevate Aircraft Seating company information, noting the rebrand from Adient Aerospace. No published market-share figures for aircraft seating could be verified; all circulating shares come from syndicated research with undisclosed method, and none is used here.

⁶¹Company information: Muirhead (Scottish Leather Group), ELeather Group and BOXMARK Leather. None of the three publishes revenue or capacity figures.

disclosed definitions; a retrofit interval of roughly five to seven years for cabin products is the only indication this study could source, and seat covers are replaced considerably more often than that.^{62 63}

8.3 Furniture and upholstery

Upholstered furniture is the adjacent field with the closest technical fit and the weakest documentation, and both halves of that sentence matter. It shares footwear's core problem exactly: cutting defect-mapped hides at maximum yield, then sewing three-dimensional covers from limp material.

The market is substantial. World consumption of upholstered furniture was about USD 77 billion in 2025, and the European market — the EU together with the United Kingdom, Norway and Switzerland — about EUR 18 billion, having grown more than a fifth in value since 2019 while remaining flat in volume. The world and European figures come from two separate CSIL reports with different perimeters and should not be read as one series.⁶⁴ Upholstered furniture takes about 13 per cent of European leather, almost exactly as much as automotive interiors.

Two qualifications are owed. The first is that leather is a minority and declining share of that covering: CSIL reports fabric as the dominant covering material worldwide and gaining share in Europe and North America over the past five years, but publishes no leather-versus-fabric percentage outside its paid reports, so this study states the direction and not a number.⁶⁵ The second is that the European industry is under real pressure. Natuzzi turned over EUR 308.2 million in 2025, down 3.3 per cent; Roche Bobois EUR 402.5 million, down 2.8 per cent; and himolla, one of the largest German upholstered furniture makers with group revenue around EUR 190 million and more than two thousand employees, entered a protective-shield restructuring in June 2026, citing weak European consumer demand and price-aggressive competition from low-wage countries.⁶⁶ Extra-EU imports of upholstered furniture ran at about EUR 4.8 billion in 2025, of which China supplied EUR 3.75 billion, against extra-EU exports of about EUR 1.8 billion.

What makes the field worth pursuing despite that is the transfer, and here the evidence is unusually direct. Lectra runs a dedicated furniture business with a leather cutting room built on the same platform as its footwear and automotive offering, and states, on its own account and without independent corroboration, that seventy per cent of the fifty largest upholstered furniture manufacturers use its systems; Zünd

⁶²Retrofit interval indication from aviation trade media, April 2026; treated here as indicative and not as an industry standard. Establishing the dress-cover replacement interval would require a direct approach to an airline engineering department or a cabin modification specialist.

⁶³Manufacturer delivery statements for 2025 and order-backlog reporting (Airbus 8,754 and Boeing 6,130, totalling 14,884). Earlier drafts stated “more than 15,000”, which the figures do not support.

⁶⁴CSIL Milan, *The World Upholstered Furniture Industry*, 24th edition, July 2026, and *The European Market for Upholstered Furniture*, 24th edition, May 2026. CSIL is paid research and is the accepted industry reference; the figures are consumption values, not production values.

⁶⁵CSIL, as above. No split is published; the only quantified European datapoint remains the COTANCE end-use share of 13.3 per cent of European leather going to upholstered furniture, which measures leather demand rather than furniture output.

⁶⁶Natuzzi S.p.A. fourth-quarter and full-year 2025 results, 15 May 2026; Roche Bobois full-year 2025 results as reported 11 February 2026; himolla Polstermöbel protective-shield filing of 26 June 2026 as reported by INDat, 29 June 2026. Revenues for Poltrona Frau, De Sede, Rolf Benz and Koinor are not publicly filed in accessible form.

addresses footwear, leather goods, furniture and car seats within a single leather-cutting offering.⁶⁷ That is the transferability thesis of this chapter demonstrated by the suppliers themselves rather than asserted by the authors. The drivers are also the same two as everywhere else: hide-cost yield optimisation, and a shortage of skilled hand-cutters that a shrinking, restructuring industry will not solve by hiring.

8.4 Technical textiles

Technical textiles are the largest adjacent market by a wide margin — about USD 215.6 billion globally in 2025, growing at about 4.9 per cent⁶⁸ — but the transfer is selective and the headline figure is misleading if used whole. Fabric formation (weaving, knitting, nonwovens) is a different machinery class and not this industry's competence. The transfer point is downstream conversion and making-up: cutting to shape, laser and ultrasonic cutting of coated fabrics, and the welding, bonding and sewing of membranes, laminates, filtration media, airbags and geotextiles. For the purpose of sizing the addressable machine market, only that converting share of the value is treated as relevant, at an assumed 20 to 30 per cent (Annex A1). Technical textiles are best read not as a single market to enter but as a large reservoir of specific converting applications for the same core technology.

8.5 Protective, medical and orthopaedic footwear

Personal protective equipment, and safety footwear in particular, is the most direct adjacency and one of the few structurally protected from low-cost competition. The global personal protective equipment market is put at about USD 90.4 billion in 2025 growing at about 7.4 per cent, with protective footwear an explicit sub-segment whose share the publisher does not disclose.⁶⁹ What makes the field defensible is regulation: PPE sits under Regulation (EU) 2016/425 with mandatory CE marking, notified-body type examination and harmonised standards, which blocks uncertified low-cost imports and rewards traceable, controlled manufacturing.⁷⁰ The machine base is conventional footwear equipment plus toe-cap and midsole insertion.

Medical and orthopaedic footwear is smaller but structurally attractive: prescription-based and reimbursed, certified, and inherently local, because an individual last, fitting and aftercare cannot be offshored. Its machine relevance sits at the leading edge of mass customisation — three-dimensional foot scanning, CNC last milling, digital

⁶⁷Lectra furniture business pages, including the Versalis Furniture leather cutting room; Zünd leather applications page. These are vendor statements, cited as evidence that the same machine platform is sold into all four fields rather than as market-share claims.

⁶⁸Grand View Research, "Technical Textiles Market", June 2026 edition: USD 215.6 bn in 2025 rising to USD 315.8 bn by 2033 at 4.9 per cent; Asia-Pacific 47.6 per cent of the market in 2025. Scope: engineered textiles for durability, strength, protection, filtration, thermal resistance and light weight across automotive, healthcare, construction, agriculture, industry, defence, packaging and transport.

⁶⁹Grand View Research, "Personal Protective Equipment Market", June 2026 edition: USD 90.4 bn in 2025 rising to USD 159.8 bn by 2033. Scope covers nine product categories including protective footwear, across construction, manufacturing, oil and gas, chemicals, food, pharmaceuticals, healthcare, transport and mining.

⁷⁰Regulation (EU) 2016/425 on personal protective equipment. Safety footwear is covered by the harmonised standard EN ISO 20345.

cutting and small-batch individualised production. It is also, per the derivation in Section 6.4, one of the product types where the automation threshold is lowest.

8.6 Who the European players are in these fields

Naming the participants matters here for a practical reason: a machine builder deciding to enter an adjacent field is deciding whom to sell to, and in each of these fields the buyer is European or has European manufacturing. The table below lists the firms that appear in the evidence for this study. It is not a supplier recommendation and it is not exhaustive; where a figure is not published, the table says so rather than estimating.

Field	European integrators and manufacturers	Material and cover specialists	Machine-relevant note
Automotive interiors	Forvia, Lear, Adient, Toyota Boshoku, Yanfeng, Grammer — a concentrated Tier-1 base	Eagle Ottawa (Lear); BOXMARK; Rino Mastrotto	Hide scanning, nesting and cutting highly automated; three-dimensional cover sewing still manual
Aviation interiors	Safran Seats (FR); RECARO Aircraft Seating (DE); Thompson Aero Seating (UK); Elevate Aircraft Seating (DE/US); Geven (IT)	Muirhead / Scottish Leather Group (UK); ELeather (UK); BOXMARK (AT)	Certification is the barrier and the moat; low volumes, high unit values, long qualification
Upholstered furniture	Natuzzi (IT); Roche Bobois (FR); Poltrona Frau (IT); himolla (DE); De Sede (CH); Rolf Benz (DE)	BOXMARK; Italian and Turkish upholstery tanneries	Same cutting and nesting platform as footwear; Lectra and Zünd sell into both
Leather goods	Hermès, LVMH, Richemont, Prada, Tod's and their Italian and French supply base	Nuti Ivo (LVMH); Conceria Superior and Tannerie Limoges (Prada); Rino Mastrotto	Part of the core market, not an adjacent one; strongest European position
Protective footwear and PPE	UVEX, ELTEN, Cofra, Base Protection, Sievi, Bata Industries	Conventional footwear materials plus toe-cap and midsole components	Regulation 2016/425 and EN ISO 20345 block uncertified imports

Table 8 — European players in the adjacent leather-processing industries. Sources: company information and the references cited in Sections 8.1 to 8.5. Revenues are given in the text where published; several of the privately held furniture and material specialists publish none. The table is illustrative of market structure and is not a supplier recommendation.

8.7 How much machine market is actually addressable

The single most serious content gap in the earlier drafts was that every adjacent market was sized by its material value and none by the machine and system market inside it. A comparison of material markets tells the reader only that a downstream industry is larger than an equipment industry, which is true of every equipment industry and carries no strategic information. The number that decides whether diversification is a growth strategy or an evasion is the addressable machine market, and this section derives one.

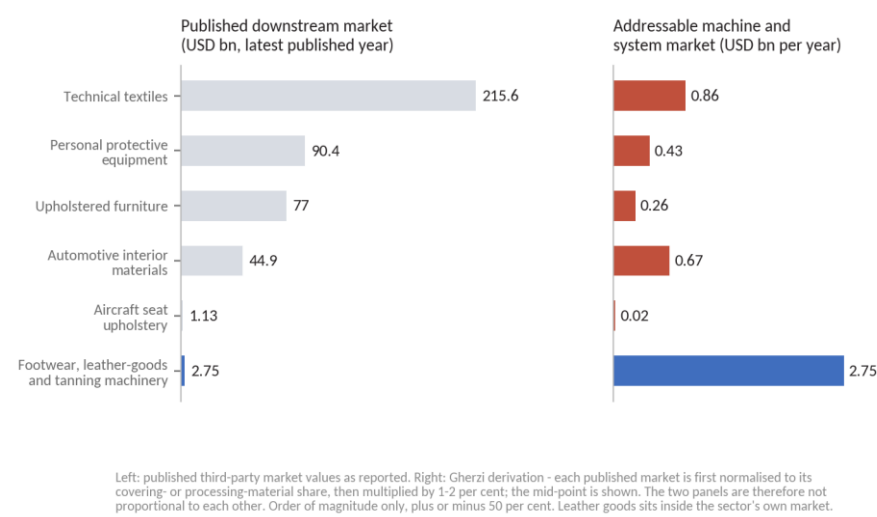


Figure 10 — Published downstream markets and the addressable machine and system market derived from them. Left panel: third-party market values as published. Right panel: the Gherzi derivation, in which each published market is first normalised to its covering- or processing-material share and then multiplied by 1 to 2 per cent, shown at the mid-point; the two panels are therefore not proportional to one another. Order of magnitude only; see Annex A1. Leather goods does not appear because it sits inside the sector's own market rather than beside it.

The method is deliberately simple, because a complicated method would imply a precision the inputs do not support. From the sector's own figures, the world market for footwear, leather-goods and tanning machinery is EUR 2 to 3 billion a year against a processed-material base of roughly USD 170 to 200 billion, which implies annual machinery spend of roughly 1 to 2 per cent of the value of the material processed. That ratio is then applied to each adjacent field.

One methodological correction has been made against the earlier version of this table, and it lowers the result. The published markets are not all of the same kind: automotive interior materials and technical textiles are material markets, whereas protective equipment and upholstered furniture are product markets whose value includes components this industry does not process — frames, foam, moulded shells,

logistics. Applying a material-value ratio to a product value overstates the machine market. Each product market is therefore normalised to its covering- or processing-material share before the ratio is applied, and every share used is an assumption stated in Table 2 and in Annex A1.

Field	Published market, USD bn	Base used, and why	Addressable machine and system market, USD bn per year
Technical textiles	215.6 (2025)	20 to 30 per cent — only downstream converting and making-up transfers; fabric formation is a different machinery class	0.43 to 1.29
Personal protective equipment	90.4 (2025)	25 to 35 per cent — product market; the balance is components and assembly this industry does not process	0.23 to 0.63
Upholstered furniture	77.0 (2025)	15 to 25 per cent — product market; frames, foam and logistics are outside the covering step	0.12 to 0.39
Automotive interior materials	44.9 (2025)	Full value — already a material market covering genuine and synthetic	0.45 to 0.90
Aircraft seat upholstery	1.13 (2025)	Full value — already a covering market; small but high-barrier	0.01 to 0.02
Total adjacent	—	—	1.2 to 3.2
Memorandum: existing world market for footwear, leather-goods and tanning machinery — including leather goods	—	Derived from Assomac trade shares (Annex A1)	2.2 to 3.3 (EUR 2 to 3 bn)

Table 9 — Addressable machine and system market in the adjacent fields, order of magnitude. Source: Gherzi derivation (Annex A1) applied to the published market values cited in Sections 8.1 to 8.5. Currency converted at approximately USD 1.10 to the euro. The uncertainty on each range is at least plus or minus 50 per cent and the ranges are not additive with any precision. Leather goods is excluded because it is already inside the memorandum line.

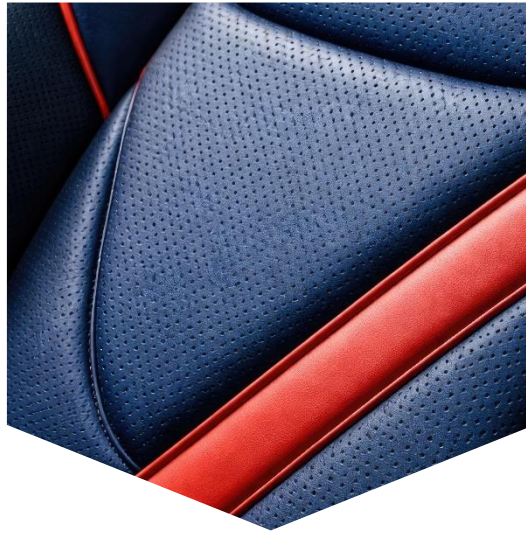
The conclusion is useful precisely because it is bounded. On these assumptions the adjacent fields together are worth roughly USD 1.2 to 3.2 billion of machine and system demand a year, against an existing core market of USD 2.2 to 3.3 billion that already includes footwear, leather goods and tanning. Diversification can therefore add up to about as much again as the sector's present world market, and on the lower bound about half as much. It is a serious growth strategy and not a rescue, and it should be resourced as such: as a deliberate extension into two or three named fields where the firm can build a qualification history, rather than as a general widening of the catalogue. It is also, as Section 14 sets out, the one strategic move that improves the European position under every scenario and does not depend on solving the soft-joining gap.

Two boundaries of this estimate should be stated plainly. It is a derivation from three assumptions and one observed ratio, not a measurement, and a reader who disagrees with the covering-share assumptions in Table 2 can substitute their own and follow the arithmetic in Annex A1. And it deliberately excludes leather goods, because leather goods is not a new market to enter — it is part of the core the sector already serves, and the place where the European position is strongest.

8.8 The limits of the transfer

Expert input for this study added a qualification that belongs in the analysis rather than in a footnote. The transfer between these fields is strongest at the level of capturing requirements and translating them into production parameters, and weaker at the level of physical manufacture. A vehicle seat carries crash, fire and durability requirements; an aircraft seat carries long certification cycles and strict weight limits; a garment requires pattern construction and drape. Each field needs its own production and approval stack, and in the most regulated segments the realistic near-term value is not full individualisation but digital ergonomics, variable padding components and automated adjustment within an approved product architecture.

The common thread is therefore not one machine that makes everything. It is the ability to capture individual requirements in a structured way and translate them into controlled production parameters — which is a systems and software competence as much as a mechanical one, and which is what the digital layer of Section 6.2 exists to deliver.



9 Regulation: demand on one side, obligation on the other

Key message. Regulation reaches this industry twice: through the customer, whose documentation and take-back obligations create demand for machines that generate data as a standard output; and through the machine builder itself, as a manufacturer of connected equipment. The record of 2025 and 2026 runs in both directions — extended producer responsibility for footwear is now mandatory and precisely dated, while the EUDR has been postponed and its leather scope is being narrowed, and footwear was left out of the first ESPR working plan. The durable half of the regulatory demand argument is physical, not legal.

9.1 Rules that reach the customer

This section consolidates material that was previously spread across three chapters with inconsistent dates. Every entry has been re-verified against the primary legal text at the editorial cut-off of 17 August 2026.

Instrument	Status at 17 August 2026	Consequence for machine demand
Extended producer responsibility for textiles and footwear — Directive (EU) 2025/1892 of 10 September 2025 amending the Waste Framework Directive	In force 16 October 2025. Transposition by 17 June 2027 ; EPR schemes operational by 17 April 2028 ; extended to enterprises under 10 persons from 17 April 2029. Footwear is expressly named in Article 22a in conjunction with Annex IVc.	The most robust regulatory demand driver in this study. Eco-modulated fees per item reward durability and recyclability, which are built in on the production line; the placer's documentation duty pulls a data requirement upstream to its suppliers and their machines.
ESPR ban on destroying unsold goods — Regulation (EU) 2024/1781, Articles 24 and 25, Annex VII	Applies to large enterprises from 19 July 2026 ; medium-sized from 19 July 2030; small and micro exempt. Annex VII covers apparel, clothing accessories and footwear, not textiles generally. Delegated Regulation (EU) 2026/296 of 9 February 2026 sets the exemptions and Implementing Regulation (EU) 2026/2 the disclosure format.	Rewards make-to-order, on-demand configuration and high material utilisation; penalises overproduction.

Instrument	Status at 17 August 2026	Consequence for machine demand
ESPR and the Digital Product Passport	First working plan COM(2025) 187 of 16 April 2025. Footwear is expressly not a priority group ; a separate footwear study is to be completed by the end of 2027 . Textiles and apparel are prioritised, with a delegated act indicatively in 2027 and no draft adopted at the cut-off.	Machines that capture material provenance, process parameters and quality data become the natural source of the eventual passport record. This remains a build-ahead-of-the-mandate move, not a response to an imminent deadline, and should be sold as such.
Deforestation Regulation (EUDR) — Regulation (EU) 2023/1115	Postponed by Regulation (EU) 2025/2650 of 19 December 2025 (OJ 23.12.2025) to 30 December 2026 for large and medium operators and 30 June 2027 for micro and small ones. A delegated act (C(2026) 4920 of 13 July 2026) would remove cattle hides, skins and leather (ex 4101, ex 4104, ex 4107) and vehicle seats from the Annex I product list; at the cut-off it was adopted but still in the two-month scrutiny period, not published in the Official Journal and not in force .	Traceability capability retains its value; the compliance focus shifts if the act enters into force. Leather should not yet be described as out of scope. Note that finished leather was in scope from the outset, contrary to a widespread industry belief.
Packaging and Packaging Waste Regulation — Regulation (EU) 2025/40	In force 11 February 2025; general application from 12 August 2026 . The 50 per cent empty-space cap under Article 24 applies from 1 January 2030 or three years after the relevant implementing acts, whichever is later, and not from 2026. Binding 40 per cent reuse target from 1 January 2030; the 70 per cent by 2040 figure is a "make every effort" objective. Article 29(4)(d) exempts packaging in the form of cardboard boxes from the reuse targets — directly relevant, since shoe boxes and e-commerce cartons fall under it — but cardboard is not exempt generally.	From August 2026 only the general minimisation duty applies. The machine-demand pull toward right-sizing, on-demand box-making and mono-material lines is a 2029–2030 investment logic, not a 2026 one.

Instrument	Status at 17 August 2026	Consequence for machine demand
Corporate Sustainability Due Diligence — Directive (EU) 2026/470 of 24 February 2026	Thresholds raised to more than 5,000 employees and more than EUR 1.5 bn net worldwide turnover. Transposition 26 July 2028, application 26 July 2029 as a single date; the staggered introduction was abolished.	Supply-chain traceability demand from very large customers, reaching this sector indirectly through their tenders.
REACH — universal PFAS restriction	Proposed in 2023 by five member states covering more than ten thousand substances. RAC opinion final and supportive on 2 March 2026; SEAC draft opinion of 26 March 2026 consulted on until 25 May 2026, final opinion expected at the end of 2026; a binding Annex XVII restriction is realistically a 2027-or-later prospect with sector derogations. Not adopted law.	Favours cleaner finishing and reformulation-compatible equipment ahead of any restriction; no fixed date to plan against.
CBAM	Definitive regime since 1 January 2026; covers metals, cement, fertilisers, electricity and hydrogen, together with a small number of downstream articles such as screws and bolts. A Commission proposal of December 2025 would add some 180 further downstream products from 2028; it is not yet adopted.	No direct effect on leather, footwear or this machinery. A watch item.

Table 10 — EU instruments reaching the customer, status at 17 August 2026. Sources: EUR-Lex and the Official Journal for each act; European Commission (Environment); ECHA. Full references in Section 18. Legal status is distinguished throughout between law in force, adopted law with a later application date, delegated acts under scrutiny, and proposals.

France is the working precedent for footwear EPR: a scheme created in law in 2007 and operational since 2009, now run by Refashion. Its 2026 schedule sets base fees per pair ranging from about EUR 0.046 for a baby shoe to about EUR 0.214 for men's boots, before eco-modulation.⁷¹ The per-pair amounts look small, but at the volumes

⁷¹Refashion, 2026 Eco-Fee Guide: baby shoe EUR 0.0456, indoor shoe EUR 0.0553, children's shoe EUR 0.0626, women's boot EUR 0.1908, men's boot EUR 0.2138. These are base rates before eco-modulation for durability and recyclability.

a large discount retailer or platform places on the market they aggregate into a material cost — and because the fee is modulated by durability and recyclability, it links directly to how the product was designed and made.

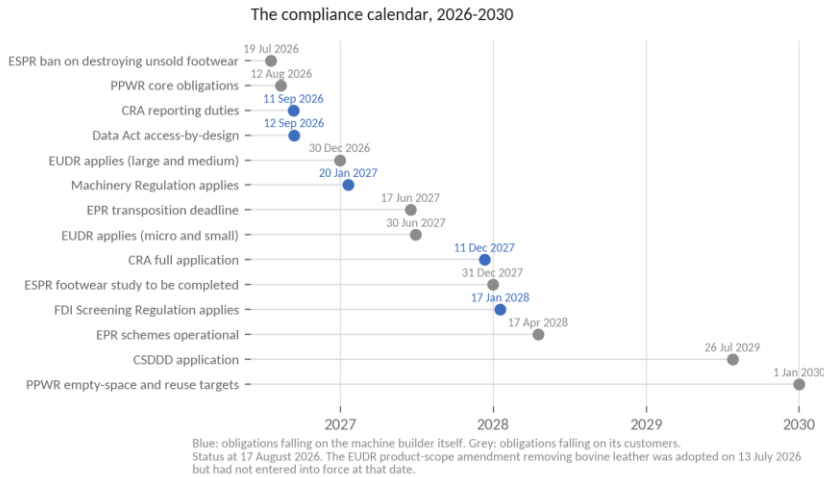


Figure 11 — The compliance calendar, 2026 to 2030, distinguishing obligations that fall on the machine builder from those that fall on its customers. Sources: as in Tables 10 and 11. Status at 17 August 2026.

The practical industry concern is not regulation in itself but its cumulative burden and its enforceability across the market. An interviewee for this study stressed that requirements on traceability, environmental performance and substances will support European capability only if imported products are subject to equivalent effective controls.



9.2 Rules that reach the machine builder

The regulatory wave is not only about what machines must help customers document. It reaches machine builders directly, as manufacturers of connected, networked equipment, and this dimension was largely absent from the earlier drafts. It should be treated as a compliance roadmap in its own right.

Instrument	Key dates	What it requires of the machine builder
Data Act — Regulation (EU) 2023/2854	Applies since 12 September 2025 , including to machines already in the field to the extent data is readily available. Access-by-design under Article 3(1) for connected products placed on the market from 12 September 2026 . Article 13 unfair-terms control reaches pre-existing B2B contracts from 12 September 2027, but only those of indefinite duration or expiring at least ten years from 11 January 2024.	Readily available machine data must be made available to the customer and, at the customer's request, to third parties the customer nominates — including a competitor's MES provider. Data derived or inferred from it is excluded. See Section 9.3 for the revenue-model consequence.
Cyber Resilience Act — Regulation (EU) 2024/2847	Partial application since 11 June 2026 (notification of conformity assessment bodies); reporting duties from 11 September 2026 ; full application, including CE marking, from 11 December 2027 .	Vulnerability handling, reporting of actively exploited vulnerabilities and severe incidents, and product security requirements for connected machinery.
Machinery Regulation — Regulation (EU) 2023/1230, consolidated version of 27 July 2026	Applies from 20 January 2027 , replacing Directive 2006/42/EC. The transitional provisions of Article 52 allow machines lawfully placed on the market before that date to continue to be made available, and EC type-examination certificates remain valid until expiry. There is no dual-compliance phase.	A full conformity transition, including the digital documentation and cybersecurity-adjacent essential requirements.

Instrument	Key dates	What it requires of the machine builder
AI Act — Regulation (EU) 2024/1689 as amended by Regulation (EU) 2026/1744 of 8 July 2026 (in force 27 July 2026)	The amendment moves the Machinery Regulation from Annex I Section A to Section B and narrows the definition of a safety component.	Favourable, and a sales argument. AI used solely for non-safety purposes — quality control, performance or process optimisation, operator assistance — is not a safety component and therefore not a high-risk system; conformity is assessed once, under the Machinery Regulation. The same camera in a protective function still falls under the Machinery Regulation's mandatory third-party assessment. The practically decisive compliance step is therefore a documented safety-relevance classification for every AI function.
NIS2 — Directive (EU) 2022/2555	Transposition deadline was 17 October 2024; national implementation varies.	Manufacture of machinery and equipment (NACE division 28) is listed in Annex II as an important entity, from medium-sized enterprise level upward — 50 or more staff, or turnover and balance-sheet total both above EUR 10 million. Smaller members fall outside the direct obligation but will meet supply-chain security and incident-reporting requirements through customer tenders in any case.

Table 11 — EU instruments reaching the machine builder directly, status at 17 August 2026. Sources: EUR-Lex and the Official Journal for each act. The Machinery Regulation's transitional provisions are set out in Article 52 (Official Journal L 165 of 29 June 2023).

On the digital-product-passport standards, the position is now concrete enough to plan against. Six horizontal standards were published by CEN-CENELEC JTC 24 on 27 May 2026 — EN 18216 (data exchange protocols), EN 18219 (unique identifiers), EN 18220 (data carriers), EN 18221 (data storage and persistence), EN 18222 (APIs and lifecycle management) and EN 18223 (system interoperability) — and were cited as harmonised standards under the ESPR by Commission Implementing Decision

(EU) 2026/1736 of 14 July 2026.⁷² Two further standards, on access-rights management and on data authentication, closed their formal vote on 16 July 2026 and were awaiting publication and citation in the Official Journal at the cut-off, expected in September 2026; CEN-CENELEC already refers to a family of eight standards, six of them cited. Earlier drafts placed a commercial platform's "multi-identifier model" alongside these standards as if the two were equivalent; they are not, and the reference has been removed.

9.3 The Data Act and the revenue model

One design rule follows from the Data Act, and it is more urgent than the headline date suggests. The user's entitlement is already in force: since 12 September 2025 the readily available data a connected machine generates must be made available to the customer and, at the customer's request, to third parties the customer nominates — and that applies to machines already in the field, not only to new ones. What changes on 12 September 2026 is the engineering obligation: connected products newly placed on the market from that date must be designed so the data is accessible by default.

Two consequences follow. There is no lead time left on the entitlement, so every machine already installed is in scope to the extent its data is readily available. And because the entitlement covers product and service data but not data derived or inferred from it, a recurring revenue stream cannot rest on controlling access to the raw data stream. It has to sit in the derived layer — analytics, benchmarking, models, process optimisation, availability commitments. That is not only the commercially sound position; it is the one the regulation leaves open. For a sector being advised to build recurring, data-based value streams, this is the single most practically important compliance statement in the report.

9.4 What is durable and what is rented

It is tempting to present regulation as a structural demand driver for European machinery, and there is a real argument there. It should be stated with its limits, because the record of the last eighteen months cuts both ways and a member who plans on the optimistic reading will be exposed.

The durable half of the argument is physical rather than legal. The work behind the compliance obligations — collection, sorting, disassembly, cleaning, recycling — must largely happen inside Europe, because used material is heavy, low in value per tonne and uneconomic to ship. A worn shoe cannot be sent to Asia to be resoled. That logic does not depend on any particular directive surviving in its current form, and it

⁷²CEN-CENELEC JTC 24, standards published 27 May 2026, cited by Commission Implementing Decision (EU) 2026/1736 of 14 July 2026. Two further standards, on access-rights management and data authentication, were at draft stage at the editorial cut-off.

is one of the few places where a machine builder can build a position from nothing rather than defend an eroding one.

The volatile half is the legislative timetable itself, and 2025 and 2026 have run toward easing rather than tightening in several of the dossiers that matter here. The EUDR was postponed and its product scope is being narrowed. Footwear was left out of the first ESPR working plan and will not be reassessed before the end of 2027. The Digital Omnibus has lightened the conformity load on artificial intelligence in machinery. The CSDDD thresholds were raised by a factor of five in employees and more than three in turnover, taking most of this sector's customers out of direct scope.

The conclusion is not that regulation should be discounted but that it should be used rather than relied upon. A position resting on regulation alone is rented, not owned. The sound approach is to let regulatory demand fund the building of capability that would be defensible anyway — process knowledge, installed base, service relationships, data infrastructure — rather than to treat it as a substitute for that capability.



10 Demand: decoupling, resale and the repair layer

Key message. European consumers have not stopped buying; what has fallen is the share of their demand met by European production and the value captured per unit. Resale has moved from niche to structural and is concentrated in exactly the durable, high-value categories where Europe is strongest, which makes it a genuine headwind on new-production volume rather than a distant one. The larger opportunity is the industrial layer resale requires and does not yet have: cleaning, refurbishment, resoling and authentication — decentralised, near-market and non-offshorable. Section 10.5 separates that layer from end-of-life processing, which is a research and pilot field on a longer horizon rather than a market that can be entered today.

10.1 Has demand peaked?

The question deserves a direct answer, because it determines how a machine builder should size its future. Three indicators point to a genuine ceiling on the European side of the chain: the European textile and apparel industry is in its third consecutive year of declining production, turnover and employment; volume has decoupled from value in world footwear trade, with export volume rising faster than export value and the average price per pair falling; and the mid-market retail channel that historically carried European-made goods is failing, with a wave of insolvencies across German and European fashion retail since 2023.

Against that, the simple "peak consumption" claim does not survive the data. EU textile consumption per person reached a record 19 kilograms in 2022, up from 17 kilograms in 2019 — a rise of about 12 per cent.⁷³ Footwear output rebounded strongly in 2024 before flattening in 2025. And the clearest evidence that Europeans have not stopped buying is the growth of ultra-cheap direct imports: low-value parcels under EUR 150 entering the EU tripled from 1.4 billion in 2022 to 4.6 billion in 2024, 91 per cent of them from China.⁷⁴

One honest qualification: the consumption evidence is from 2022 while the decline evidence is from 2025. A four-year-old consumption figure cannot by itself support a statement about 2026 demand, and the conclusion below is therefore stated with that limitation attached. An updated European Environment Agency survey would settle it.

⁷³European Environment Agency, consumption of clothing, footwear and household textiles per person. The most recent survey year available at the editorial cut-off is 2022; the limitation is stated in the text.

⁷⁴European Parliament briefing, 2025, on low-value consignments entering the EU customs territory.

The synthesis is not a peak but a decoupling. European demand for physical units is flat to rising on the most recent available evidence; what has fallen is the share met by European production and the value captured per unit. Volume is redirecting toward ultra-cheap direct imports and toward second-hand, while European factories run below capacity.

10.2 Resale

Resale has passed the point where it can be treated as marginal. The global secondhand apparel market is projected to reach about USD 393 billion by 2030, growing roughly twice as fast as the overall apparel market; the European market is put at about EUR 15.9 billion in 2024 rising to about EUR 26 billion by 2030.⁷⁵ A frequently quoted claim that resale will reach about a tenth of all apparel spending by 2030 could not be isolated as a verbatim statement in the underlying report and is not used here as a sourced figure.

Resale matters more to this industry than to apparel generally, because its natural home is the durable, high-value, authenticable and repairable product — the sneaker and the leather bag. These are the same categories in which Europe holds its strongest position in new production. Earlier drafts followed that observation with a reassurance, that much resold volume displaces low-margin fast fashion rather than premium European output. The two statements are in tension and the reassurance is not supported by data the study holds. The honest formulation is that the substitution is probably larger by value in the premium segment and larger by volume in the low-price segment, and that the split between the two has not been measured here. Establishing it would be a useful piece of follow-up work, because it is the difference between a manageable headwind and a structural one in the exact segment Europe depends on.

The quantitative link that both earlier chapters lacked is simple enough to state: newly produced units equal total demand, minus units substituted by resale, minus units avoided through longer use. If unit demand is flat and resale grows at 8 per cent a year, new production falls — and new production, not consumption, is what drives machine demand. This is the number the roadmap in Section 16 is ultimately sized against, and it is not currently measured for footwear.

10.3 The repair and refurbishment layer

The more consequential opportunity is what resale requires but does not yet have. Against a resale market growing at high single to double digits, the formal repair trade is small and barely industrialised: shoe repair alone is put at about USD 1.4 billion globally, growing at about 2.4 per cent, while the wider clothing-and-footwear repair

⁷⁵ThredUp with GlobalData, 14th Annual Resale Report, published 2 April 2026, based on a market model, a survey of 3,268 US consumers and inputs from 50 fashion brands. European figures: KPMG with the Circular Fashion Federation, 2025, implying growth of about 8.5 per cent a year.

market is about USD 3.8 billion in 2026.⁷⁶ Earlier drafts used the larger figure as if it were footwear repair, which overstated the segment by roughly a factor of 2.7.

One qualification sharpens rather than weakens the point. These figures measure the recorded, formal market. A substantial part of repair is informal, artisanal, or performed inside brands as a cost centre — Nike Refurbished, Patagonia Worn Wear and similar programmes generate no market revenue. The gap between resale and repair is therefore somewhat smaller than the raw numbers imply, and the recommendation should be made on the structural argument rather than on the ratio.

That structural argument is strong. The equipment resale needs is not greenfield production capacity but a decentralised layer: cleaning and deodorising cells, resoling and re-crafting stations that redeploy the lasting, bonding, stitching and edge-finishing competences European builders already own, and machine-vision systems for grading and authentication. This layer is inherently near-market, structurally European and non-offshorable, and it feeds directly into the sorting and disassembly obligations that extended producer responsibility will create from 2028.

10.4 What it means for machine builders

There will be no volume-led recovery of European production to invest behind. A machine builder that sizes its future to a return of mass European manufacturing is planning against the data. The addressable base is the high-value, high-mix, near-market work that survives the decoupling: premium footwear and leather goods, the adjacent industrial markets of Section 8, refurbishment and repair, and compliance-driven demand. The machines that sell are those built for smaller batches, faster changeovers, higher value per unit and — increasingly — for tying production to real demand rather than to a forecast made months ahead.

That last point deserves emphasis, because it came out of the expert interview conducted for this study and it reframes the technology question. A highly automated line can still efficiently produce the wrong product. As long as the decision about what to make rests on a forecast, overproduction rather than under-capacity is the larger waste — and the ESPR destruction ban now attaches a legal and financial cost to it. Demand integration, meaning the technology that ties real orders, body data and usage feedback to production planning, therefore belongs in the technology portfolio as a category in its own right, not as a marketing feature.

10.5 The circular economy as a machine market in its own right

The repair and refurbishment layer is one part of a larger circular-economy field. The other is the industrial treatment of end-of-life products. Both create demand for

⁷⁶Fact.MR, “Shoe Repair Market”, 16 September 2025: USD 1.4 bn in 2025 rising to USD 1.8 bn by 2035. Business Research Insights, “Clothing and Footwear Repair Market”, 27 July 2026: USD 3.81 bn in 2026, covering clothing and footwear repair together. Earlier drafts of this study used the larger figure as if it were footwear repair alone.

equipment, but they are at different stages of maturity and should not be treated as one market.

The near-term opportunity is repair, inspection and refurbishment. Resale at scale requires more than a marketplace. Products must be collected, cleaned, graded, authenticated, repaired where economic and routed either to resale, component recovery or material treatment. The relevant equipment is decentralised and near-market: cleaning and deodorising systems, machine-vision grading, authentication support, resoling and re-crafting stations, and digital records that make a product's condition and repair history usable. These processes draw directly on competences already present in European footwear and leather machinery: inspection, cutting, stitching, bonding, surface treatment and quality control.

End-of-life processing is a longer-term systems opportunity. Footwear and leather goods are complex, multi-material assemblies designed for durability rather than disassembly. Recovering usable fractions requires controlled opening, sorting, separation, cleaning and preparation. Vision-based grading and material identification are commercially closer than automated disassembly. A broadly applicable, material-preserving disassembly cell for bonded footwear does not yet exist as a mature product category; it is a research and pilot field. The relevant near-term task is therefore to develop process chains for selected, sufficiently homogeneous product streams rather than to promise universal shoe-to-shoe recycling.

The strategic opportunity is regional processing capability. For low-value, bulky post-consumer material, collection, initial sorting and many preparation steps are likely to remain regional because transport and handling costs limit long-distance flows. Regulation can accelerate this development, but the durable rationale is economic and physical: repair, sorting and recovery are local service and process activities. European machine builders can build positions by supplying the equipment, data layer and process know-how that make these activities reliable and scalable.

The conclusion is deliberately bounded. Circularity is not a replacement for the lost volume market in new footwear machinery. It is a developing field in which repair and refurbishment are commercially accessible now, while high-quality separation and material recovery are longer-term technology opportunities.

11 Cost: labour, energy and why the machine is the alternative to relocation

Key message. The monthly wage is not the cost. Employer on-costs, line efficiency and duty access separate sourcing locations, and on that fully loaded measure the low-cost bloc has converged. Inside the EU the labour arbitrage has largely gone: the lowest-cost member states are rising at 9 to 13 per cent a year against 2 to 3 per cent in the core. Only North Africa and Türkiye still undercut the EU materially, and they are converging upward too. Relocation is a one-off step down; automation gets cheaper every year.

11.1 What an hour actually costs

Comparing monthly wages across sourcing locations is misleading in three ways: employer statutory on-costs differ by a large multiple between the cheapest Asian locations and the Chinese coast, line efficiency — the share of standard allowed minutes converted into output — differs materially between a well-run Vietnamese or Chinese plant and a typical lower-cost-bloc plant, and duty access changes the landed cost independently of both. Correcting for these does not change the ranking of sourcing countries, but it compresses the distances between them appreciably. The magnitudes here are a Gherzi assessment from project work rather than a published series, and they are stated as such.⁷⁷

Inside the European Union the arbitrage that once existed has largely closed. Average hourly labour costs reached EUR 34.9 across the whole economy in 2025 and EUR 37.5 in industry, with Germany at EUR 45.0 and EUR 49.2 respectively.⁷⁸ The lowest-cost member states are rising fast: Bulgaria at about EUR 12.0 an hour, with the eastern member states growing their labour costs at high single-digit to low double-digit rates against 2 to 3 per cent in Germany and France.⁷⁹ At those rates the low-cost EU tier doubles its labour bill in roughly six to eight years. One caveat travels with all of these figures: Eurostat publishes them for the whole economy and for industry as a whole, not for footwear manufacturing, which pays materially less; the sector-specific series should be obtained before the numbers are used in a member-facing calculation.

Outside the Union, the Maghreb and Türkiye remain the only near-market locations with a material cost advantage, and they are converging upward as well. The same

⁷⁷Gherzi assessment. The quantified versions of these three effects carried in earlier drafts — a sixfold spread in on-costs, twenty percentage points of line efficiency, and a 20 to 30 per cent compression of the distances — could not be traced to a citable source and are therefore not repeated as figures.

⁷⁸Eurostat, “Hourly labour costs”, data year 2025, published 31 March 2026. Enterprises with ten or more employees; whole economy and total industry, not footwear manufacturing.

⁷⁹Eurostat, “Hourly labour costs”, data year 2025, published 31 March 2026, and the accompanying growth-rate table. The individual national growth rates should be taken from the Eurostat release rather than from this report before use in a member-facing calculation.

convergence is visible at the origin of the cost gap: average annual manufacturing wages in Chinese urban units reached CNY 113,594 in 2025, 5.2 per cent above the previous year.⁸⁰ Türkiye's customs-union access and three-day truck delivery to Central Europe make it a distinct case: the advantage there is as much logistical as it is a wage difference.

The conclusion for a machine builder is the one that matters commercially. Relocation delivers a one-off step down in cost, after which the destination converges upward. Automation delivers a cost that falls every year — the price of a general industrial robot is put at roughly three quarters below its 2010 level by 2025. That series is an ARK Invest projection of 2019 rather than a measurement, and it is used here as a direction of travel and not as a quoted figure.⁸¹ Framed that way, the machine is not a productivity upgrade; it is the alternative to relocation, and it should be sold as such.

11.2 Energy and the system gap

Energy illustrates the same mindset. In a representative European tannery, natural gas accounts for the large majority of energy use, isolated efficient machines deliver only low single-digit savings, and coordinated optimisation across the whole line reaches materially more. These proportions are a Gherzi estimate rather than a published statistic, and they are flagged as such:⁸² a named reference tannery or a CO-TANCE or UNIC energy statistic would put them on firmer ground. The structural point does not depend on the exact figures. The gap between the component and the system is itself the business opportunity, and selling the system rather than the component is the recurring theme of this report.

⁸⁰National Bureau of Statistics of China, average annual wage in manufacturing, urban units: CNY 113,594 in 2025 against CNY 107,987 in 2024. A footwear-specific Chinese wage series is not published. The statement about Maghreb minimum-wage increases carried in earlier drafts could not be sourced and has been removed.

⁸¹Widely reported order of magnitude for general industrial robot prices over the period; the report uses it as a directional statement rather than as a measured series.

⁸²Gherzi assessment from project work. The figures carried in earlier drafts — natural gas at roughly three quarters of tannery energy use and 20 to 30 per cent from system optimisation — are not repeated as numbers here because no published source could be found for them.

12 What actually protects the business

Key message. A firm earns margin not because its product is good but because its customer cannot easily buy the same thing elsewhere. Three factors decide that — input, transformation and access — and they multiply rather than add, so one weak factor undermines the position. Applied to this sector the verdict is uncomfortable and useful: input sovereignty is weak and largely outside the firm's control, transformation sovereignty is real but eroding, and access is the only factor a firm fully controls. The 2025 accounts already ran the test.

12.1 The three questions

The framework comes from a Gherzi position paper prepared alongside this study, and its value is that it reduces a strategy discussion to three answerable questions.

Factor	The question	If the answer is bad
Input	Can my competitor buy the same materials, energy and labour at the same price as I can?	I have no cost position; someone else sets my cost base
Transformation	How long would it take a well-funded copier to be accepted by my customer as an alternative?	I have no technical protection; my lead is a delay, not a barrier
Access	If my customer wanted to switch supplier tomorrow, what would it actually cost them?	I have no hold on demand; I am a line item in a price comparison

Table 12 — The three factors that decide whether a customer can buy elsewhere. Source: Gherzi, *Value-Stream Sovereignty* (2026).

Each factor is scored present, fragile or absent. The crudeness is deliberate: if one factor is absent, the business model does not close, and the conclusion is to build that factor or leave the segment.

12.2 The framework applied to this sector

Factor	What it looks like here	Realistic verdict
Input	Steel, castings, drives, controls and electronics bought on world markets; rising European energy and labour costs against a subsidised competitor	Weak, and largely outside the firm's control. Do not build a strategy here.

Factor	What it looks like here	Realistic verdict
Transformation	Process know-how, machine control, application engineering, chemical and mechanical recipe knowledge	Real but eroding. Strongest where the process is hard to observe from outside the plant.
Access	Installed base, spare parts, service network, position in the customer's specification, compliance data, take-back and retrofit	The only factor the firm fully controls — and the one 2025 proved still holds.

Table 13 — The three factors applied to a European footwear and leather machinery builder. Source: Gherzi, Value-Stream Sovereignty (2026).

The sector's own 2025 accounts ran this test without meaning to. Every new-machine segment fell; spare parts and service held. New-machine sales are a transformation play; parts and service are an access play. One survived the year, the other did not. The strategic translation is uncomfortable but clear: the machine is becoming the cost of entry to the relationship rather than the product, and the product is what runs on top of it — parts, uptime, process guarantees, compliance data, retrofit.

12.3 The one place all three factors can be built at once

There is a single field in which a European machine builder can build input, transformation and access sovereignty simultaneously, and it is the collection, sorting, separation, disassembly and recycling of post-consumer footwear and textiles. Input sovereignty exists because the feedstock is physically stuck in Europe: used material is heavy, low in value per tonne and uneconomic to ship. Transformation sovereignty exists because the processes are immature and genuinely hard — a shoe combines a large number of bonded, mixed-material components, and clean separation is a machine problem before it is a policy problem. Access sovereignty exists because the obligation is legal and the operators are local.

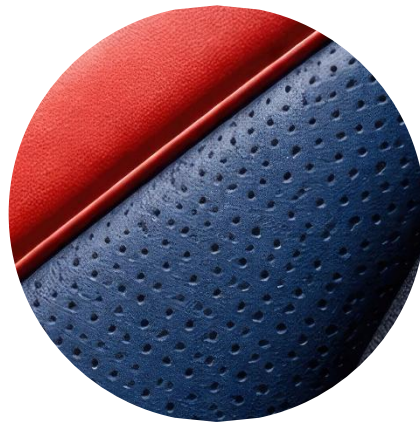
Two cautions apply. The timing is regulatory, so it is slower and less certain than a commercial market, and a position built on regulation alone is rented rather than owned (Section 9.4). And Chinese builders read the same regulations, so the advantage lies in proximity to the plant and the process, not in exclusivity.

12.4 The demand problem no single machine solves

Underneath the competitive question sits a structural one. European machine builders sell to European tanneries, footwear plants and textile mills, and that customer base has been shrinking for two decades. A shrinking customer base cannot be repaired with a better machine, because transformation competence has nothing to attach to if the customer is not there.

Read through the access lens, this is also where demand integration belongs. The sector concentrates on making an already-defined product more efficiently and pays too little attention to how the decision about what to produce is taken. Tying real orders, body data and usage feedback to production is an access play: it puts the supplier inside the customer's demand decision rather than downstream of it.

This is the point at which firm strategy runs out and association strategy has to begin. It is why the VDMA's role, set out in Section 15, is a structural necessity for machine builders rather than a courtesy to the wider industry.



13 Findings

The findings below are the study's answers to the mandate. Each states the finding, the evidence it rests on, the assessment the authors draw from that evidence, the principal risk or limitation, and the action that follows. The separation is deliberate: a reader who disagrees with an assessment can still use the evidence, and a reader who accepts the evidence can see exactly where judgement enters.

Finding 1 — The volume business has moved, and the base that remains is stronger for its size

Evidence. World production is 24.6 billion pairs, 88.7 per cent of it in Asia and 55.6 per cent in China alone; Europe's production share is low single digits. Italian sector machinery production fell to about EUR 512 million in 2025 after three years of decline, and Italy's share of world trade in this equipment halved between 2005 and 2025 while China's reached 49 per cent. The sector nevertheless continued to invest through the downturn.

Assessment. The volume position is not contestable on price. The value position is. The consolidation left fewer and financially sounder firms, though the specific equity ratios circulated internally are unpublished and should not be quoted externally without their method.

Risk. The financial-health claim rests on an internal analysis, not a published series.

Action. Stop defending volume. Defend value, and take the investment capacity the consolidation created as the means to do it.

Finding 2 — Competitiveness now rests on the installed base and the service on it, not on the new machine

Evidence. In 2025 every new-equipment segment fell — tanning machinery by 24.5 per cent, leather-goods machinery by 9.8 per cent, footwear machinery by 4.1 per cent — while spare parts and maintenance held broadly stable.

Assessment. Selling a new machine puts European engineering against a subsidised price on a specification the customer wrote. Selling parts, uptime and service into an installed base is a position the customer cannot leave without replacing the machine. This is the study's single most robust empirical finding, because it is the sector's own accounts rather than a projection.

Risk. An access position built on parts alone erodes as machines age out; it has to be renewed through retrofit, software and compliance capability.

Action. Treat the machine as the cost of entry to a relationship and the service layer as the product. Price on outcomes — material saved, uptime, defects avoided, compliance delivered.

Finding 3 — The same competence serves several markets, and diversification roughly doubles the addressable market

Evidence. The precise processing of flexible materials is required across automotive interiors, aviation seating, upholstered furniture, technical-textile conversion and protective equipment; European leather itself divides roughly 38 per cent to footwear, 22 per cent to leather goods, 13 per cent to automotive interiors and 13 per cent to upholstered furniture. On a disclosed derivation the addressable machine and system market across the adjacent fields is USD 1.2 to 3.2 billion a year, against an existing core market of USD 2.2 to 3.3 billion that already includes footwear, leather goods and tanning. Suppliers demonstrate the transfer themselves: Lectra and Zünd sell the same leather cutting platform into footwear, leather goods, furniture and automotive.

Assessment. Diversification is a no-regret move that improves the European position under every scenario and does not depend on solving the soft-joining gap. It can add up to about as much again as the present market rather than transforming it, and should be resourced accordingly: two or three named fields with a real qualification path, rather than a general widening of the catalogue.

Risk. The derivation carries an uncertainty of at least plus or minus 50 per cent. The transfer is strong at the level of requirements capture and weaker at physical manufacture, because each field has its own certification stack.

Action. Choose the adjacent fields deliberately, invest in the qualification path, and sell the shared flexible-material competence rather than a shared machine.

Finding 4 — One technology gap separates a good outcome from a decisive one, and its threshold is product-specific

Evidence. Peer-reviewed work consistently identifies flexible-material handling as the principal automation bottleneck; the best documented systems remain at laboratory validation, and more than 30 per cent of assembly manpower in shoe production goes into sole bonding alone. A parametric model built on the labour share of footwear manufacturing cost, European and Asian wage levels and a capital-service charge puts the automation share required for cost parity at roughly 50 to 60 per cent for premium small-batch work, 70 to 85 per cent for certified safety and technical footwear, and above 90 per cent for commodity footwear.

Assessment. Soft joining is the single pivot between the study's scenarios, but the earlier framing of a universal 40 per cent threshold is withdrawn. The research target

should be the product segments where the threshold is lowest — which are the segments Europe already holds.

Risk. The model is a derivation, not a measurement, and its weakest input is the European wage level, which is not published for footwear manufacturing specifically.

Action. Concentrate collective research on soft joining, scoped to high-value, high-mix products rather than to commodity footwear; obtain the sector-specific wage data to tighten the model.

Finding 5 — Regulation is a source of European demand, but a position built on it is rented

Evidence. Extended producer responsibility for footwear is mandatory and dated: transposition by 17 June 2027, schemes operational by 17 April 2028, with footwear expressly named. Against that, the EUDR was postponed to 30 December 2026 and a delegated act adopted on 13 July 2026 would remove bovine leather from scope; footwear is expressly not a priority group in the first ESPR working plan and will not be reassessed before the end of 2027; the CSDDD thresholds were raised fivefold; and the AI Act conformity load on machinery has been lightened.

Assessment. The durable half of the argument is physical: collection, sorting, disassembly and recycling must largely happen in Europe because used material is heavy and cheap per tonne. The volatile half is the legislative timetable, and in 2025 and 2026 it eased rather than tightened.

Risk. A business case built on a specific deadline is exposed to that deadline moving, which it repeatedly has.

Action. Build compliance capability into the machine as a standard output, sell it as a build-ahead-of-the-mandate capability rather than against a legal date, and use regulatory demand to fund durable capability rather than to substitute for it.

Finding 6 — Capability is European; control increasingly is not, and the screening instruments do not reach this sector

Evidence. Three of the four German machine niches with world-class positions sit outside purely German industrial ownership, the fourth having returned to German family ownership in 2026; Dürkopp Adler, Pfaff and KSL have been Chinese-owned for a decade or more; Comelz was acquired by Jack Technology in 2026 for about EUR 140 million. The Foreign Subsidies Regulation notification threshold requires EUR 500 million of EU turnover at the target; Comelz turned over EUR 53.6 million.

Assessment. The instruments intended to review foreign state-backed acquisition do not structurally cover this sector, because its targets are an order of magnitude too small. That is a gap, not an oversight, and it will apply equally to the next wave.

Risk. Framing this as opposition to foreign capital would be both wrong and counter-productive; foreign owners bring market access and investment the sector needs.

Action. Raise the threshold gap in the regulatory dialogue as a specific, evidenced request, and decide deliberately — through standards, data semantics and value capture — where control remains European.

Finding 7 — The binding constraint on the compliance business is data lead time, not the legal deadline

Evidence. The passport, packaging and take-back instruments together require a structured product record that originates along the supply chain rather than in the brand's office. Six horizontal DPP standards were published in May 2026 and cited as harmonised in July 2026, giving the data model a concrete shape for the first time.

Assessment. Building a reliable multi-tier data pipeline takes considerably longer than the remaining time to most of the deadlines, which makes lead time the binding constraint. The estimates of about eighty data points per product and eighteen to thirty-six months of build time that circulated in earlier drafts are Gherzi estimates and are labelled as such; the standards family now provides a citable basis for a firmer figure.

Risk. Quantifying the data requirement precisely requires reading the published standards against a real product, which this study has not done.

Action. Start the data pipeline now, and sell the machine as the point at which the record originates.

Finding 8 — The circular economy is a machine market in its own right, and it runs on two clocks

Evidence. Shoe repair is put at about USD 1.4 billion globally, growing at about 2.4 per cent, against a secondhand apparel market projected to reach about USD 393 billion by 2030 and growing roughly twice as fast as the apparel market overall. Extended producer responsibility for footwear is dated: transposition by 17 June 2027, schemes operational by 17 April 2028. The equipment the repair layer requires — cleaning and deodorising cells, machine-vision grading and authentication, resoling and re-crafting stations — draws on lasting, bonding, stitching and edge-finishing competences European builders already hold. A broadly applicable, material-preserving disassembly cell for bonded footwear does not exist as a mature product category.

Assessment. The near-term market is repair, inspection and refurbishment, and it is reachable with competences already in the building. End-of-life separation is a research and pilot field on a longer horizon, and the two should not be sold as one proposition. Because used material is heavy and low in value per tonne, collection, sorting

and preparation remain regional, which makes this the one field in which a European builder can build input, transformation and access sovereignty simultaneously (Section 12.3). It does not replace the lost volume market in new machinery.

Risk. The repair figures measure the recorded formal market and understate informal and brand-internal repair, so the gap to resale is narrower than the published numbers imply. The timing of the end-of-life half is regulatory, and a position resting on a legal date is rented rather than owned (Section 9.4).

Action. Treat repair and refurbishment equipment as one of the named diversification fields rather than as a sustainability theme, and specify it against the 2028 obligations rather than against a recycling ambition.

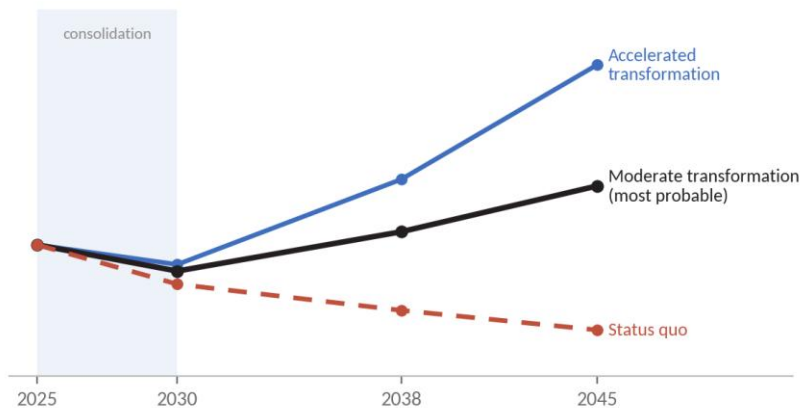
14 Scenarios to 2045

The scenarios are development spaces, not forecasts. They share a common three-stage path that emerges consistently from the evidence — continued shrinkage and consolidation to around 2030; a phase to roughly 2038 in which competition is decided over complete systems rather than single machines; and a smaller but financially stable European base to 2045. They diverge on a single variable: whether the automation of soft, flexible joining is pushed past the product-specific threshold derived in Section 6.4. Because they turn on one pivot rather than a dozen independent variables, concentrating collective research there has an unusually high strategic return.

Dimension	Status quo	Moderate transformation (most probable)	Accelerated transformation
Soft-joining automation	Stays at today's level; no directed collective effort	Advances materially; crosses the threshold in premium and certified segments only	Crosses the threshold across a widening range of products
European base	Shrinks to a small core of specialists	Stabilises as a systems and service supplier across a broadened customer base	Grows; the competitive boundary is reshaped
Basis of competition	Niche survival	Quality, compliance, systems, service	Cost-competitive high-wage production in selected segments
Volume	Stays in Asia	Stays in Asia	Partly contestable in Europe and the nearshore ring
What it requires	Incremental investment only	Disciplined execution of what is already technically ready	Sustained collective research on soft joining

Table 14 — The three scenarios compared, described directionally against a common 2025 starting point. Source: Gherzi/VDMA scenario framing (internal short study 25205-005). The scenario descriptions are assumptions, not measurements; the thresholds are those derived in Section 6.4 and Annex A2.

Three development spaces for the European position, indexed value and profitability (2025 = 100)



Directional scenario assumptions, not a forecast and not a volume index. Source: Gherzi/VDMA scenario framing (DOC 25205-005).

Figure 12 — Three development spaces for the European position to 2045. The index is directional and refers to value and profitability, not to volume. Source: Gherzi/VDMA scenario framing.

In the **status quo** the joining gap stays unsolved and the industry continues on its present trajectory: consolidation proceeds, the base shrinks toward a smaller core, and the volume advantage stays in Asia. This is not a collapse scenario — surviving firms remain sound and hold their niches — but it is managed decline in scale, and it resembles in outline where the United States arrived: a durable residue of protected and premium niches rather than a broad industry.

In **moderate transformation**, European suppliers execute the achievable moves — scaling material-efficient cutting and AI inspection, building the digital and service layers, differentiating the sales model by customer type, and diversifying into automotive and other adjacent fields — while soft joining advances and crosses the threshold only in the premium and certified segments. The base stabilises as a high-value systems-and-service supplier. Volume does not return, but value and profitability are secured on a durable basis.

In **accelerated transformation**, soft joining is substantially solved across a wider product range, and when viable production no longer depends on the cheapest labour the location advantage weakens for a widening set of products. This is the least certain path, because it depends on sustained advance rather than a single leap, but it is not fantasy: the building blocks — adaptive grippers, vision, learning-based control — exist and are improving.

Why moderate transformation is assessed as the most probable path. Three grounds, stated so that the judgement can be checked. It requires no technology that is not already at commercial readiness. None of the four indicators listed below is currently in evidence. And its mechanism is already visible in the sector's accounts rather than being projected onto them: through 2025 the installed-base business held while every new-machine segment fell, which is precisely what a shift toward systems and service looks like in a profit-and-loss statement.

What would change this assessment. The central judgement would need to be revisited if any of the following occurred: a verified breakthrough in soft-joining automation outside Europe that is rapidly licensed or replicated; a material shift in EU industrial policy that directly offsets Chinese state support rather than only regulating market access; a sustained rise in labour costs in China's competing production base sufficient to narrow the price gap independently of European action; or a continued retreat of the European documentation and due-diligence obligations, of the kind already seen in the EUDR postponement and the exclusion of footwear from the first ESPR working plan, far enough to remove the regulatory component of European demand described in Finding 5. None is currently in evidence at the editorial cut-off. This is a monitoring list and a working assumption, not an exhaustive risk register.

The preferred and realistic path is moderate transformation executed with the accelerated outcome as a deliberate ambition. The decisions that determine which scenario unfolds are due at the start of the period, not at the end, because the shrinkage-and-consolidation phase is already under way and the firms that position for systems leadership during it will define the stable European base on the other side.

14.1 The picture in 2045, stated as a picture

The following is a strategic picture of the European industry in 2045 on the moderate-transformation path. It is not a forecast. It describes the position that becomes plausible if the sector scales the technologies already available, builds common digital foundations and advances soft joining selectively in the product segments where automation can change the economics.

Europe has not recovered volume production. Standard footwear and standard leather-goods machinery remain concentrated in the Asian production clusters. The European base is smaller than it was, but it is stable where yield, traceability, qualification, uptime and rapid changeover matter more than the lowest acquisition price. Its customers are premium footwear and leather goods, certified safety and orthopaedic products, automotive and aviation interiors, furniture and selected technical-textile applications.

The offer is a production capability, not a stand-alone machine. European builders sell configured systems with documented outcomes: material saved, defects avoided, energy per unit, availability and compliance evidence. Hardware remains essential, but it is increasingly the entry point to a longer relationship built on software, application engineering, remote support, maintenance, optimisation and training.

Small-batch and high-mix production are economically viable in selected segments. Digital cutting rooms, AI-assisted quality control, semi-automated joining cells and connected production planning make proximity valuable where lead time, individualisation, certification or service matter. This does not mean that the whole shoe returns to Europe. It means that the difficult, variable and fast-turn product can

be made closer to the customer when the commercial value of speed and control exceeds the remaining labour-cost gap.

Quality, traceability and circularity use the same data foundation. Vision systems record defects, materials and process conditions; that information improves nesting and process control, supports maintenance and provides the evidence required by customers and regulators. In the same way, collection, repair, refurbishment and, where technically viable, material separation become operational extensions of the production system rather than a separate compliance burden.

The sector operates as an interoperable specialist ecosystem. Cutting, joining, vision, software, components and integration remain specialised fields, but common interfaces and data semantics allow them to work as a system. That shared foundation is the reason the association's work on OPC UA, umati, reference architectures and common data models is strategic: no individual medium-sized supplier can create the European system layer alone.

An industry interview conducted for this study reaches the same conclusion from the processor's perspective: traceability is becoming more than an administrative requirement. It connects material origin, substances, process history, environmental information, supplier digitisation and the ability to substantiate claims to customers, authorities and consumers. In that sense, it changes how firms buy, produce and compete.

15 Recommendations

The recommendations follow from the findings and are prioritised. Horizons are short term (0 to 6 months), medium term (6 to 24 months) and long term (more than 24 months). Quick wins are moves that pay back inside the horizon without a strategic commitment; strategic decisions change the shape of the business; items marked for further examination require a commercial or technical proof that does not yet exist in this sector.

15.1 For machine builders

The table overleaf sets out the recommendations for machine builders. It is presented on a landscape page so that the reasoning, the expected effect and the preconditions can be read alongside each recommendation rather than compressed.

#	Recommendation	Why it follows	Expected effect	Owner	Horizon	Preconditions and risks
1	Reprice the offer on measurable outcomes — material saved, uptime, defects avoided, energy reduced, compliance delivered — rather than on machine throughput. Quick win.	Finding 2: the access position, not the transformation position, survived 2025	Recurring revenue; a sales argument that a subsidised price cannot answer	Commercial management	Short	Requires a defensible baseline measurement at the customer; the material-cost share needed to close the payback calculation is not yet sourced
2	Adopt the discipline of no new machine without a digital interface, on common VDMA-anchored data semantics starting from OPC UA and umati. Strategic.	Findings 2 and 7; Section 6.2	Connectivity becomes a built-in capability rather than a project; integration risk falls for the customer	Engineering and product management	Short to medium	Needs the companion specification in 15.2; retrofitting the installed base is a separate cost
3	Place recurring revenue in the derived-data layer — analytics, benchmarking, models, process optimisation, availability commitments — not in access to the raw data stream. Strategic.	Section 9.3: the Data Act entitlement is already in force and covers machines in the field	Protects the recurring-revenue model against a legal challenge that would otherwise arrive with the first customer request	Product management and legal	Short	Requires contract review; Article 13 term control reaches some pre-existing contracts from September 2027
4	Scale the mature technologies now: material-efficient cutting and nesting,	Section 6.1: these are at commercial readiness and	Immediate, quantifiable customer savings; the inspection output doubles as	Sales and application engineering	Short	None material; the constraint

#	Recommendation	Why it follows	Expected effect	Owner	Horizon	Preconditions and risks
	AI vision and inspection, the digital layer. Quick win.	available from European suppliers	compliance evidence			is sales capacity, not technology
5	Build the service and training annuity — AI-assisted onboarding, guided setup, AR-supported maintenance, remote service. Quick win.	Section 6.6: the skills shortage is now the binding constraint at the customer, including in Asia	A recurring relationship a low-cost competitor cannot easily replicate	Service organisation	Medium	Requires service coverage in the customer's region
6	Diversify deliberately into two or three named adjacent fields with a real qualification path, and treat repair, inspection and refurbishment equipment as one of the candidates. Strategic.	Findings 3 and 8: roughly doubles the addressable market and improves the position under every scenario; the repair layer is near-market and non-offshorable	A second, structurally growing customer base	Executive management	Medium to long	Each field has its own certification stack; a general widening of the catalogue will not work
7	Answer Chinese financing with financing and integration rather than with price — export-credit insurance, KfW and EIB-backed instruments, vendor leasing and pay-per-use. Strategic.	Section 7.1: the price contest is against a state, not a company	Removes the up-front investment hurdle without matching a subsidised price	Finance and commercial management	Medium	Utilisation risk, performance measurement and data ownership must be settled explicitly in equipment-as-a-service models
8	Build compliance in as a standard output, positioned as a build-ahead-of-the-mandate capability. Strategic.	Findings 5 and 7; Section 9	The customer meets EPR, passport and due-diligence duties automatically, whatever the final rules	Product management	Medium	Footwear has no ESPR delegated act before 2028; do not sell against a legal deadline
9	Run the machine builder's own compliance roadmap — Data Act, Cyber Resilience Act, Machinery Regulation, AI Act classification, NIS2 where in scope. Strategic.	Section 9.2	Avoids a conformity gap at the 2027 Machinery Regulation changeover; the AI Act amendment is a sales argument	Compliance and engineering	Short to medium	The AI safety-relevance classification of every function must be documented; the same camera in a protective function is treated differently
10	Add demand integration to the technology portfolio as a category, not a feature. Further examination.	Section 10.4 and 12.4	Moves the supplier inside the customer's demand decision	Strategy and product management	Long	The commercial model is unproven in this sector; start with soft-

#	Recommendation	Why it follows	Expected effect	Owner	Horizon	Preconditions and risks
						ware on an existing range before committing hardware

Table 15 — Recommendations for machine builders, prioritised. Source: Gherzi analysis. Priority order reflects the strength of the evidence behind each recommendation and the speed at which it can be executed. Horizons: short term 0 to 6 months, medium term 6 to 24 months, long term more than 24 months.

15.2 For the VDMA

The association can do what individual members cannot, and that capacity is itself one of this study's central conclusions. Four roles stand out, and each has a named first deliverable so that progress can be checked.

#	Recommendation	Why it follows	First deliverable	Horizon
1	Coordinate multi-member pilots and publish the results as reusable reference architectures	Finding 4 and Section 12.4: no single firm can carry the pivotal research, and integration risk is what deters mid-sized firms from investing	Four constituted consortia: semi-automated lasting on the soft-joining frontier; a smart cutting room transferring the automotive material-efficiency model into leather goods and footwear; a traceability-and-quality layer turning inspection data into compliance-ready evidence; and a repair-and-refurbishment cell specified against the 2028 extended-producer-responsibility obligations	Short to medium
2	Build the common standards and interfaces that turn a collection of machines into an interoperable European system	Recommendation 2 for machine builders cannot be executed firm by firm	An OPC UA companion specification for footwear and leather machinery under the umati initiative, hooked into the Manufacturing-X data space; working group convened within twelve months, version 1.0 within twenty-four	Short to medium
3	Represent the industry in the regulatory process, on two fronts	Findings 5 and 6	A position paper pressing for capability-based, digitally satisfiable compliance that applies equally to imported and European products; and a	Short

			specific, evidenced submission on the Foreign Subsidies Regulation threshold gap, which leaves acquisitions of this sector's typical target size outside review	
4	Convene the ecosystem — machine builders, software providers, customers, research institutes and the sister associations	Section 12.4: the European customer base is itself shrinking, and defending it is a direct supplier interest	A standing forum with CO-TANCE, CEC, Assomac and the research institutes, and a shared position on the European customer base as a supplier interest	Medium

Table 16 — Recommendations for the VDMA. Source: Gherzi analysis.

One legal note belongs with Recommendation 1. Pre-competitive collaborative research of this kind can generally be structured to fall within Commission Regulation (EU) 2023/1066 on research and development agreements and the accompanying Horizontal Guidelines (OJ C 259, 21 July 2023), provided the pilots stop short of jointly commercialising a common product. That boundary should be drawn explicitly at the outset rather than tested later.

16 Roadmap 2026 to 2030

The roadmap converts the recommendations into a sequence with checkable milestones. The horizon is deliberately near-term, because the decisions that determine the 2045 position fall at the start of the period.

Horizon	Machine builders	VDMA	Milestone that proves it happened
0 to 12 months	Launch systems-and-service offers priced on outcomes; adopt no machine without a digital interface; scale cutting and AI-inspection products; complete the AI safety-relevance classification and the Data Act contract review	Convene the three pilot consortia; agree common data semantics; open the regulatory dialogue on capability-based compliance and on the screening threshold gap	Pilot consortia constituted with at least five members each; companion-specification working group convened; first outcome-priced contracts signed
12 to 24 months	Run the smart-cutting-room and semi-automated-lasting pilots; launch AI-onboarding and remote-service products; complete the Machinery Regulation conformity transition ahead of 20 January 2027	Publish the first reference architectures; establish the traceability-and-quality layer as a shared asset	First reference architecture published; OPC UA companion specification version 1.0 released; Machinery Regulation conformity documented across the range
24 to 36 months	Embed compliance as a standard output across the range; execute the deliberate expansion into two or three named adjacent fields	Sustain collective soft-joining research; represent the sector through the EPR implementation phase and the ESPR footwear study	Compliance-as-output standard across the range; funded soft-joining pilot running with published interim results; first qualification achieved in a named adjacent field
36 months to 2030	Consolidate the systems-and-service model; hold the installed base and the service on it	Orchestrate the ecosystem; defend the European customer base and European value capture	A majority of new machines shipped with a digital interface and an outcome-based service contract

Table 17 — Prioritised roadmap 2026 to 2030. Roadmap sequencing is a Gherzi and VDMA recommendation and not a commitment on behalf of any member.

17 Conclusion

The conclusion of this study can be stated without either alarm or reassurance.

The European footwear and leather machinery industry is unlikely to reclaim volume. There is no technology leap on the horizon that resets the game in Europe's favour, and no single European firm or policy acting alone is positioned to match Chinese scale and state support on the same terms. Those two conditions are boundary conditions, not conclusions, and every recommendation in this report is written inside them.

Dominance in volume is not dominance everywhere. Europe holds defensible positions in the value-critical process steps, in the adjacent industrial markets where the same competence is worth more, in the near-market processing and refurbishment work that cannot economically be offshored, and in the compliance capability that regulation is turning into a purchasing condition. The 2025 accounts already showed which of those positions holds under pressure: the installed base and the service on it survived a year in which every new-machine segment fell.

What this consolidation adds to the earlier drafts is a sharper sense of proportion. The market is smaller than the study previously implied — a world market of EUR 2 to 3 billion, not the tens of billions that syndicated research reports assert. The adjacent markets roughly double it rather than transforming it. And the automation threshold that separates a good outcome from a decisive one is not a single number but a range that depends on the product, with the reachable end of that range sitting precisely in the premium, certified and small-batch segments where Europe is already strong. Each of those corrections makes the strategy more executable, because each of them narrows what has to be done.

It is worth naming what the sector brings to that position, because the argument is not that Europe should make the best of a bad situation. A European builder supplies approximately half of the world's direct-soling machines. A European firm in this industry already earns three quarters of half a billion euro of revenue on a recurring basis. European equipment measurably raises leather yield by several percentage points and removes skilled hand-cutting work that its customers can no longer staff. European standards, testing institutes and application engineering sit beside the customer in a way a distant supplier cannot replicate. None of that is a consolation prize. It is a set of positions that a competitor cannot buy cheaply, cannot reproduce quickly and cannot reach without first winning the customer relationship.

On a different basis than in the past, and on the evidence assembled here, a smaller, more specialised and more service-driven European industry can be profitable and defensible — provided the decisions that set that position are taken now, at the start of the period, rather than at its end.

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- Figure 3 — Italian sector machinery, change by segment in 2025 (Section 4.2)
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Annex A Derivations

This annex sets out the two derivations on which several of the report's conclusions rest. Both are Gherzi calculations from stated inputs, not measurements, and both are presented so that a reader can vary the assumptions and see the result move.

A1 The size of the machine market and the addressable adjacent market

Step 1 — world trade. Italian exports of footwear, leather-goods and tanning machinery were EUR 338 million in 2025 and Italy accounted for 27 per cent of world trade in this equipment. Dividing gives world trade of approximately EUR 1.25 billion. The same calculation on the Chinese share (49 per cent) is not independent, since both shares come from the same source. The export figure itself is the weakest input in this annex, and its sensitivity should be read with the result: on the only published Assomac export value, about EUR 290 million for 2024, world trade would be about EUR 1.07 billion and the world market EUR 1.7 to 2.4 billion rather than EUR 2 to 3 billion, while Italian apparent domestic consumption and therefore the European market below would rise to EUR 440 to 670 million. The direction of the argument does not change; the range moves by roughly a seventh.

Step 2 — world market including non-traded supply. Italy's own ratio of exports to production was 0.66 in 2025. China, with a very large domestic customer base, will have a materially lower ratio. Taking a world trade-to-production ratio of 0.45 to 0.65 gives world production of EUR 1.9 to 2.8 billion. The report uses EUR 2 to 3 billion.

Step 3 — cross-check. Bilateral trade flows in footwear machinery at subheading level run in single-digit millions of euro for major country pairs, which is consistent with a heading total in the low billions and inconsistent by roughly a factor of twenty with syndicated estimates of USD 23.3 billion for this market.

Step 4 — the machine-intensity ratio. The processed-material base served by this machinery — footwear, leather goods and automotive interior materials together — is on the order of USD 170 to 200 billion a year, derived from world footwear production of 24.6 billion pairs at an ex-factory value of approximately USD 10 per pair with a material share of 40 to 50 per cent, plus the automotive interior materials market of USD 44.9 billion and an allowance for leather goods. Dividing the machine market of USD 2.2 to 3.3 billion by that base gives an annual machinery spend of roughly 1 to 2 per cent of processed-material value.

Step 5 — application to the adjacent fields. The ratio is applied to the published markets in Sections 8.1 to 8.5, after normalising each to the covering- or processing-material share, producing Table 9. Automotive interior materials and aircraft seat upholstery are already material or covering markets and enter at full value. Technical textiles enter at an assumed converting share of 20 to 30 per cent, protective equipment at an assumed material share of 25 to 35 per cent, and upholstered furniture at an assumed covering share of 15 to 25 per cent. Leather goods is not treated as an adjacent field at all: it is one of the three segments inside the sector's own market and is therefore already counted in the memorandum line.

Input	Value	Source or assumption
Italian sector exports 2025	EUR 338 m	Arsutoria Studio (2026); not corroborated by a published Assomac release
Italy's share of world trade 2025	27 per cent	Assomac, 2026 General Assembly
Italian sector production 2025	EUR 512 m	Assomac, 2026 General Assembly
World trade-to-production ratio	0.45 to 0.65	Assumption, bounded above by Italy's own 0.66
World footwear production 2025	24.6 bn pairs	World Footwear Yearbook 2026
Ex-factory value per pair	About USD 10	Assumption, anchored on a world average export price of USD 11.65
Material share of manufacturing cost	40 to 50 per cent	Assumption. Not sourced

Input	Value	Source or assumption
Technical-textile converting share	20 to 30 per cent	Assumption
Protective-equipment material share	25 to 35 per cent	Assumption. Not sourced
Upholstered-furniture covering share	15 to 25 per cent	Assumption. Not sourced
World upholstered furniture consumption 2025	USD 77 bn	CSIL, The World Upholstered Furniture Industry, 24th edition, July 2026
Currency	USD 1.10 to the euro	Rounded working rate

Table 18 — Inputs to the machine-market derivation. Two inputs are assumptions rather than sourced values and are the principal source of uncertainty. The overall uncertainty on the result is at least plus or minus 50 per cent.

European market. Italian apparent domestic consumption is production minus exports, or EUR 174 million in 2025, before imports. Italy is estimated to account for a third to a half of European consumption of this equipment, given the concentration of tanning, leather goods and machinery there, which gives a European market of roughly EUR 350 to 550 million a year. This is the weakest figure in the annex and should be replaced by a Eurostat PRODCOM and Comext measurement.

A2 The automation threshold

The question. At what share of manual labour content removed does a European production location reach cost parity with Asian supply landed in Europe?

The model. Set the Asian manufacturing cost at 100 units, of which the labour share is s . European non-labour cost is set slightly above the Asian level to reflect higher energy costs. European labour cost at zero automation is $s \times 100 \times r$, where r is the ratio of European to Asian labour cost. Automation removes a fraction a of that manual labour content and adds a capital-service and maintenance charge k . The Asian benchmark is landed in Europe at $100 + t$, where t covers freight, duty and inventory, and the customer will pay a further w for proximity, speed, flexibility and lower mark-down risk. Parity requires:

$$\text{European non-labour cost} + s \times 100 \times r \times (1 - a) + k \leq 100 + t + w$$

Solving for a gives the required automation share.

Parameter	Volume footwear (PT/IT wage base)	Volume footwear (RO/BG wage base)	Certified safety and technical footwear	Premium, small batch, fast turn
Labour share of manufacturing cost, s	0.30	0.30	0.25	0.22
European-to-Asian labour cost ratio, r	8	5	6	6
European non-labour cost index	105	103	103	103
Landed-cost premium on Asian supply, t	12	12	12	12
Willingness to pay for proximity and speed, w	20	20	45	70
Capital-service and maintenance charge, k	10 to 30	10 to 30	10 to 30	10 to 30
Required automation share (a)	93 to 101 per cent	87 to 101 per cent	71 to 84 per cent	48 to 63 per cent

Table 19 — Parameters and results of the automation-threshold model. Sourced inputs: labour share of footwear manufacturing cost 30.9 per cent (BLS, NAICS 31621, 2023); European hourly labour costs (Eurostat, 2025); Asian monthly manufacturing wages (USITC Publication 5543, 2024). The wage ratio, the landed-cost premium, the willingness to pay and the capital charge are assumptions. A result at or above 100 per cent means parity is not reachable by automation alone under those assumptions.

Reference quantity. The automation share α is defined as the fraction of manual direct labour content — labour minutes, not operations and not units — that automation removes. Earlier drafts left this undefined, which made the 40 per cent figure uninterpretable even in principle.

Sensitivity and limitations. The result is most sensitive to w , the value the customer places on proximity and speed, and to r , the wage ratio. It is least sensitive to t . The weakest input is r , because Eurostat does not publish hourly labour costs for footwear manufacturing specifically and the whole-economy figures used here overstate the sector's wage level; correcting that would lower the required automation share somewhat in every column, without changing the ranking or the conclusion that the threshold is product-specific rather than universal.

Interpretation. The model does not say that automating soft joining is not worth doing. It says that the pay-off from doing so appears first in premium, certified and small-batch production, and only much later, if at all, in commodity footwear — and that the research effort should therefore be scoped to the former.

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Basis of the analysis. The findings rest on publicly available sources, on internal Gherzi and VDMA working papers, and on one expert interview conducted for the study, each identified at the point of use. Every externally sourced figure carries a footnote naming the publisher, the document and the date. Statements have been re-verified against their primary sources up to the editorial cut-off of 17 August 2026. Legal and regulatory statements reflect the position at that date; the legislative process in several of the instruments discussed was still in motion, and each such case is marked in the text.

Limits of accuracy. Category definitions in this sector differ materially between publishers, and market sizes are frequently single-analyst estimates. Where that is the case the report states it and gives the scope of the definition. Two central quantities — the size of the addressable machine market and the automation threshold — are

derived by the authors from stated inputs rather than measured; the derivations, their assumptions and their sensitivities are set out in Annex A, and the assumptions are listed together in Section 3.4. The uncertainty attaching to those derivations is at least plus or minus fifty per cent and is stated wherever the results are used.

Forward-looking statements. The scenarios in Section 14 are development spaces, not forecasts. They describe how the European position could evolve under stated conditions and are expressly not predictions of volume, revenue or company performance. Actual developments will depend on decisions, technologies, policy choices and market events that cannot be foreseen at the date of this report.

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