ThoughtSpark

Digital Divisions

Digital Transformation: Where are the majority of manufacturers today?

A ThoughtSpark Research Insight: 2023/24

New research from analysts ThoughtSpark reveals that between 25% and 30% of European and North American manufacturers have now reached 'significant' adoption levels of digitalised technologies.

Research was conducted among over 1,200 manufacturing companies and tracked respondent views on 'significant' adoption of digital technologies – defined as implementing digital capabilities in at least half of a manufacturer's production environment.

Moderately good levels of return on investment are being experienced from digital investments, according to the research – in terms of performance, value, savings and sustainability gains. Nevertheless, there remains significant headroom for these to be improved.

Many studies of digitalisation in manufacturing to date have focused on large pioneer corporations, sometimes giving the misleading impression that adoption rates are higher than is truly the case.

However, the findings of this ThoughtSpark study should give encouragement to SME manufacturers. They still have time to invest in digital and gain concomitant commercial and competitive benefits – although the clock is ticking.

Similarly for digital solutions providers, there remains much headroom for sales growth across the rest of the decade.

To accelerate adoption – particularly among SME manufacturers – the authors of this paper suggest that the good foundations already set by government and trade bodies need to be amplified and extended, particularly:

- **POLICY**: Enhanced government incentives and tax breaks for digital transformation, plus official and industry support for interoperability standards

- **SUSTAINABILITY**: Greater official recognition of the intimate link between digital capabilities and sustainability gains, investing in and publicising data and evidence that underpins this interdependence

- **EXPERIENCE SHARING**: Greater government and trade body enablement of sharing (anonymised) data and case studies on successful digital transformation investments, along with a more open mindset from manufacturers to share such information for the good of the sector as a whole

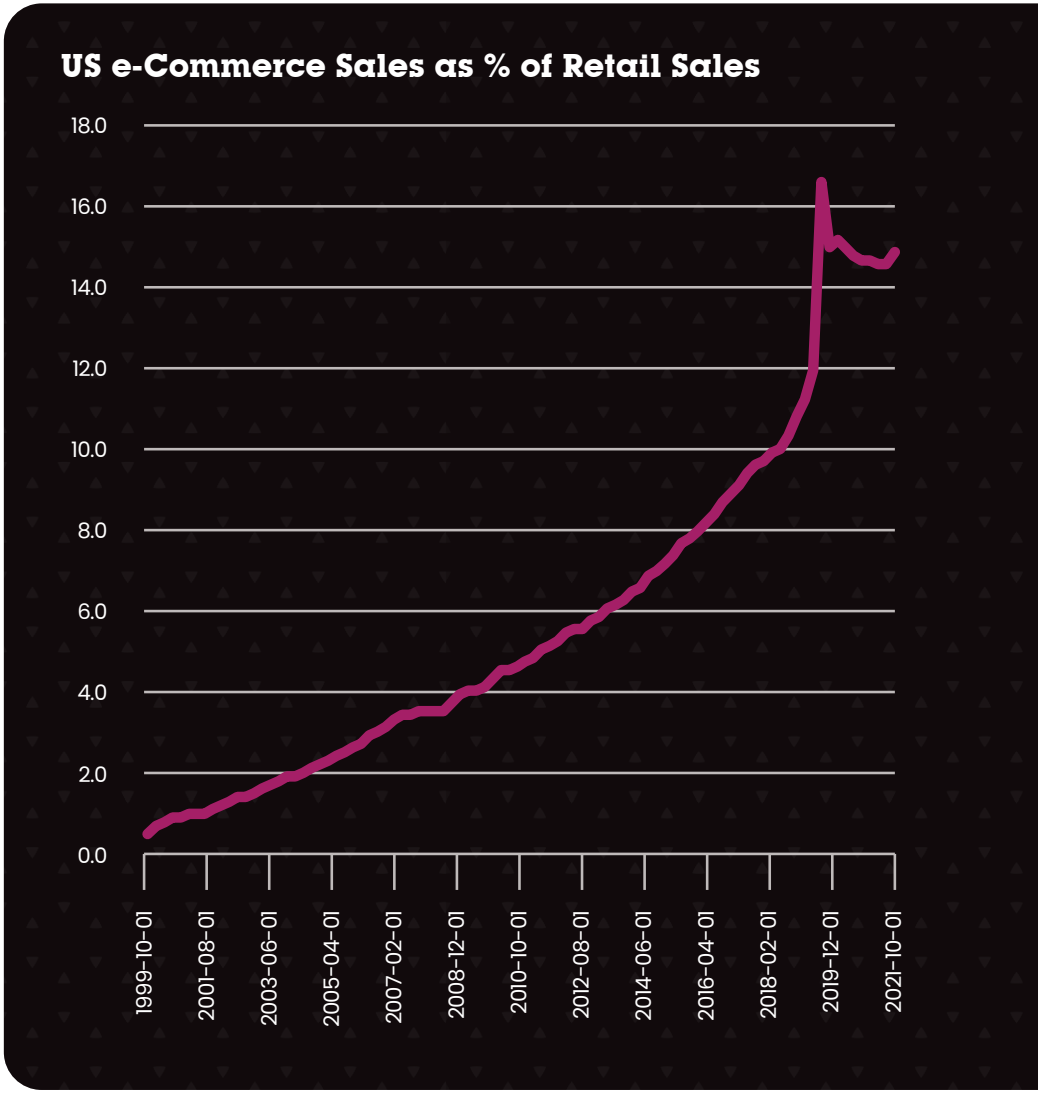
- **FINANCE**: Increased effort to improve SME access to flexible finance, for medium-sized and smaller manufacturers to acquire digital technologies in ways that are manageable within their cash-flow constraints

The nature of adoption studies to date

Look at any study of internet and e-commerce adoption since the 1990s and one clear trend emerges – that take-up was over-estimated in the early stages, but its inexorable and accelerating growth was under-estimated in the longer-term. Moreover, even now that growth has accelerated, the possibility for future colonisation of our buying habits – both in consumer and in business-to-business, still has huge potential. Data from the US FED on e-commerce sales as a proportion of all retail sales[1] – graphically illustrates this phenomenon.

Why is this relevant to a discussion of digital transformation in **industry**? Because today, a similar pattern is emerging for the digital transformation of the manufacturing sector. Many (but not all) studies of the adoption of digital technologies in manufacturing to date have tended to give an exaggerated impression of progress in this regard. This is not to impugn the quality of those studies – they offer immensely valuable insights into pioneering best practice, early adoption lessons, return-on-investment methodologies, and potential sequencing for successful, digital technology adoption journeys that deliver real business benefits. However, there is a strong feeling in the manufacturing industry that these studies only address adoption rates in a very select community. That selectiveness has followed three clear paths:

- Research cohorts have tended to focus on large manufacturers with deep pockets
- Research has also largely concentrated on pioneers – laudably seeking to describe and articulate leading best practice
- Finally, research studies have frequently interviewed industries where high levels of automation already exist – such as automotive, aerospace, electronics, and so on



As a result, the world may have been given the impression that adoption rates for digital technologies in the manufacturing industry are substantially higher than is, in fact, the case. In the course of researching this short study, anecdotal inputs from respondents frequently bemoaned this bias in many currently available studies, concluding that for the majority of manufacturers, the overall impression was "not helpful", "insufficiently encouraging", "not representative", "not about firms like ours", and "difficult to identify with."

> For small and medium-sized manufacturers, digital transformation can seem like an especially harrowing task. But smaller organizations can be uniquely positioned for success in implementing firmwide digital strategies[2]
>
> **National Association of Manufacturers (US)**

Research: adoption rates for all manufacturing companies

In order to redress the current – possibly exaggerated – perceptions of digital technology adoption in the manufacturing industries, ThoughtSpark commissioned MindMetre Research to conduct a wide-ranging independent survey of manufacturers, manufacturing technology providers and expert commentators. Covering over 1,200 participants across Europe and North America,[3] we asked respondents to estimate the proportion of **all** manufacturers (large, medium and small) that have currently made 'significant adoption' of digital technologies and platforms. 'Significant adoption' was defined as 'The implementation of transformative digital technologies into at least half of their production environment.' Respondents were free to range across the various segments of digital transformation, including sensor-based production control, predictive diagnostics, digital twins, remote maintenance, remote productivity optimisation, human-machine interface, virtual reality applications, and more. Survey participants were asked to estimate adoption rates by choosing from incremental 5% bands.

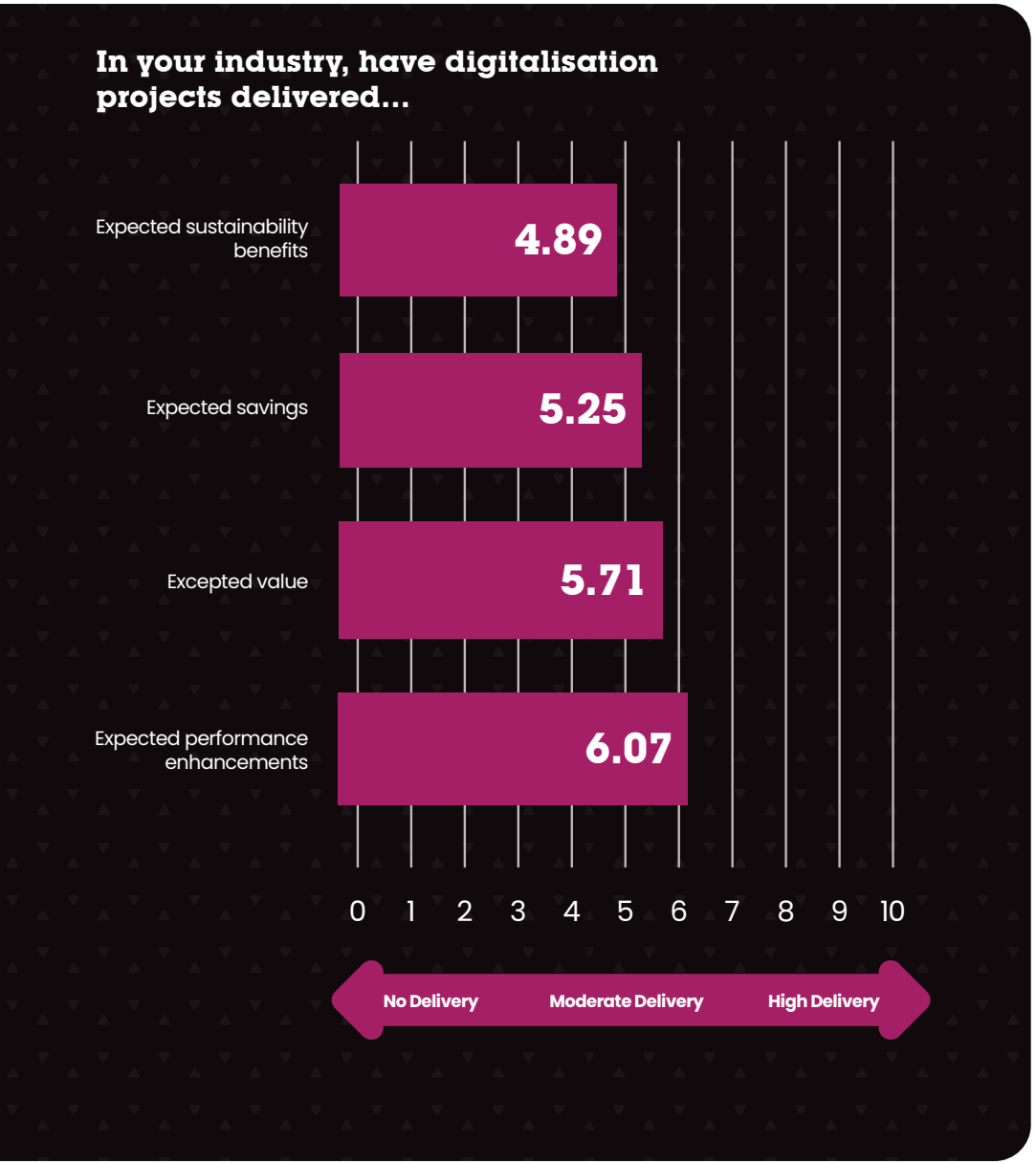
Our research shows that just 25-30% of manufacturers in Europe and the US have 'significantly' adopted digital technologies (defined as adoption within more than half of their production environment)

The overall finding from this first survey question was that 25-30% of the totality of manufacturers have made such 'significant' adoption of digital technologies. When asked to differentiate between European adoption and US adoption rates, respondents placed European manufacturers just falling into the 20-25% band, compared with US firms creeping into the 30-35% range.

This finding aligns with an interesting study published in 2019 by Siemens Financial Services (SFS).[4] The SFS research found that manufacturers worldwide expected 50% of larger companies to have reached the point of 'significant' adoption by 2026, compared with SME manufacturers not reaching this same 'tipping point' until 2030.

Some national manufacturing associations have also started to explore the subject on a pan-manufacturing basis. One good example is MakeUK, whose published research from 2022 complements this latest ThoughtSpark/MindMetre report. The MakeUK survey[5] found that almost 80% of manufacturers have increased their spending on digital technologies in the past two years, with a similar number planning to do so in the next two. These investments are bringing major benefits to companies' operations with two-fifths (40%) saying it has already improved productivity, a quarter (27%) saying it has brought better profitability and, three in ten (31%) brought greater labour efficiency.

Offering practical guidance to our survey insights, Germany's VDMA has published practical guidance, for instance addressing SMEs looking to harness the economies of retrofit, and upgrade their existing machines to digitalised capabilities. As the association notes, "Economically, an Industrie 4.0 retrofit often proves to be the most sensible measure. A wide variety of technologies, protocols and products are now available for this purpose. Small and medium-sized enterprises (SMEs) in particular often find it difficult to determine the right solution.... This guideline offers SMEs a simple

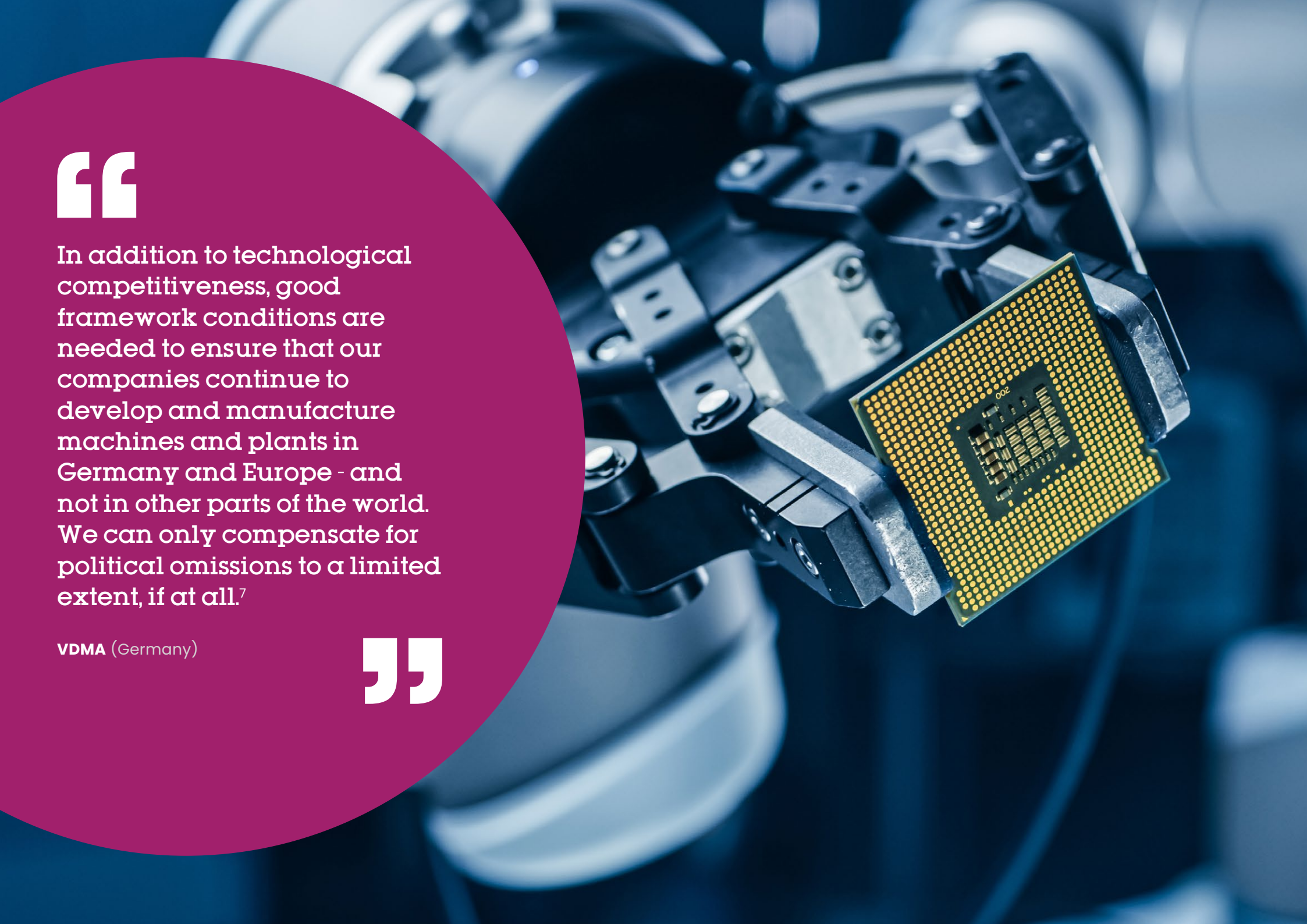


introduction to the topic of Industrie 4.0 retrofit."[6]

Our research project also asked participants to grade the business results achieved through their digital transformation projects on a scale of 1-10.

Clearly, manufacturers of all sizes in Europe and North America feel that they and their peers are obtaining a reasonable (but not yet optimal) level of commercial return from digital transformation investments, particularly in terms of production performance gains, but also from value (the price paid for those performance gains) and actual financial savings achieved through digital platforms and technology.

Sustainability gains from digital platforms showed a weaker delivery level, but this should be seen in the light of anecdotal comments made by respondents when answering this question. A chorus of responses concurred that sustainability strategies have become a more recent strategic priority compared to digital transformation strategies, and are therefore not necessarily aligned with one another. Comments include: "our original digitalisation plans did not have formal sustainability targets"; "we didn't set sustainability KPIs for digitalisation but we have found they emerged anyway"; "we haven't got measurements in place to directly track sustainability gains back to digital capabilities, yet there's no question about the intimate connection between the two"; and "without digital capabilities, there's no way we could implement and track environmental, energy-efficiency and other sustainable initiatives." Across the four outcomes from digital transformation, this study shows clear commercial benefits, but also underlines the room for improvement in return-on-investment as manufacturers learn from their early experiences and accelerate their digital journeys.



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In addition to technological competitiveness, good framework conditions are needed to ensure that our companies continue to develop and manufacture machines and plants in Germany and Europe - and not in other parts of the world. We can only compensate for political omissions to a limited extent, if at all.[7]

VDMA (Germany)

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This short research note has established that 'significant' Western World adoption of digital technologies has been achieved to a level by 25-30% of manufacturers across the size range – small, medium and large. Moreover, **moderately** good commercial benefits are being experienced by those investing in digital platforms.

These findings provide positive encouragement for manufacturers only now getting momentum into their digital journey. There is still plenty of opportunity to get in step with the pioneer investors in digital and the commercial benefits seem robust.

Equally, suppliers of digitalised manufacturing technology can take heart. The market is gaining pace all the time, especially since digital tech is closely linked to sustainability and climate goals. Moreover, while adoption rates among the largest manufacturers may be approaching the 'tipping point' the opportunity for sales to SME manufacturers still holds huge potential. From both perspectives then – manufacturer and technology supplier – how can adoption rates be accelerated further? We suggest four key areas which could, and should, inject even more momentum into digital transformation.

> The SME digital lag arises from a range of factors and barriers, including SME lack of information and awareness, skills gaps, insufficient capital or missing complementary assets such as organisational practices or digital technology itself.[8]
>
> **OECD**

01. POLICY

In 2022, the United States government introduced the National Strategy for Advanced Manufacturing.[9] Its main impetus was concern over the disruption experienced during the recent pandemic. It notes that, "To strengthen the manufacturing supply chain, small and medium size manufacturers (SMMs)… will require assistance from the United States Government and their larger customers and suppliers. It is, therefore, imperative for the United States to develop and implement strategies to regain American leadership through investments in advanced manufacturing." The strategy also overtly highlights the need to accelerate the transition of digital manufacturing, in order to: "Enable the application of advanced sensing, control technologies, and machine learning across the manufacturing sector. Advance smart manufacturing by pursuing digital twins. Develop standards for data compatibility to enable seamless integration of smart manufacturing."

In Europe, a €750 billion EU investment plan was agreed (named Next-Generation EU) - a move also designed to kick-start pandemic recovery. Within this scheme 20% of investment is to be targeted at digital transformation in order to improve the competitiveness and (supply chain) resilience of European business. The EU 2020 Industrial Strategy[10] also embodies actions to support the green and digital transitions of EU industry, including: "a coherent regulatory framework to achieve the objectives of Europe's Digital Decade[11] and the 'Fit for 55' ambitions; providing SMEs with Sustainability Advisors and supporting data-driven business models to make the most out of the green and digital transitions; investing to upskill and reskill to support the twin transitions."

Yet even when these strong initiatives are all taken into account, our research findings would suggest that policy support for digital transformation in manufacturing – while present[12] – has not yet been successful enough in driving widespread adoption, especially among SME players. Policymakers may therefore want to consider further incentives in terms of tax breaks or subsidies, and special development zones. In addition, smart governments can also devote more effort to public information initiatives that guide best practice, help companies build their investment business case, and set expectations for return-on-investment from digitalisation 'sprints'.

Example initiatives worthy of wider imitation include Germany's *Mittelstand – Digital* – a programme to support digital transformation in SMEs. The German government finances 26 competence centres nationally, offering free consultation on subjects such as artificial intelligence, blockchain, IT-security, digital processes so on.[13] On another theme for manufacturers in Europe and the United States, technical standards initiatives to ensure interoperability of digitalised solutions and components would benefit from more focused attention by governments and trade bodies.[14] Various commentators have also called for a general simplification of standards and processes to help enable digital transformation.[15]

When it comes to access to funding support, our Innovation Monitor found that 76% of manufacturers aren't aware of Industrial Strategy Challenge Fund and 78% are not aware of Horizon 2020. The Government funding schemes are often not easy to understand for a busy CEO of a SME and its applications processes are too grand for them to swallow. We need to make them simpler.[16]

MakeUK

02. SUSTAINABILITY

Policymakers and industrial commentators also clearly see digital transformation and sustainability/climate goals as deeply intertwined and interdependent.[17] It is hard to see how widespread sustainability improvements can be achieved without transition to digitalised platforms, both virtual and physical. Despite this recognition, digitalisation adoption rates still need to accelerate if climate targets are to be met.[18] As one Ernst Young study puts it, "progress remains too slow to deliver the emissions curbs the world needs."[19]

A recent literature review study summarises the dilemma: "Digital transformation has increased the sustainability of businesses in various ways but still has a long way to promote the overall sustainability of the environment and existing communities. Furthermore, the high costs of installing industry 4.0 plants that can encourage more sustainability are still critical challenges that deter many manufacturers from adopting sustainable manufacturing plants. Nevertheless, the involvement of government bodies in advocating for sustainability has made it necessary for various manufacturers throughout the world to embrace this new manufacturing model for their overall success and compliance with existing regulatory policies."[20]

In other words, policy interventions are driving investment in digital transformation, but there needs to be more effort to research and share compelling evidence of the connection between specific digital technologies/implementations and the sustainability goals they enable. This evidence will inspire investment confidence, as well as education about financing methods that help make that investment affordable and cash-flow friendly.

> Nous avons la chance d'avoir face à nous une révolution écologique et numérique à mettre en œuvre. Cette transformation profonde est une chance pour l'industrie pour apporter des solutions concrètes pour décarboner notre économie. Nous n'y arriverons toutefois que si nous relevons trois défis : la compétitivité de notre industrie, la simplification des normes et l'enjeu du recrutement.[21]
>
> **France Industrie**

03. ADOPTION JOURNEY GUIDANCE AND EXPERIENCE SHARING

Convincing the manufacturing sector – especially SME manufacturers – to invest in digital transformation, requires compelling examples, clear, evidence-based guidance and business cases.

The Manufacturing Leadership Council in the United States, as well as European national associations such as MakeUK, Germany's VDMA and ZVEI, and France Industrie, have all issued member guidance to assist their digital transformation journey. Yet, however good this support material is, it would appear that more is needed to encourage faster take-up of digital platforms and digitalised production technology.

Anyone attending industry conferences on a regular basis in the US and Europe will recognise the constant call for more real-life examples that manufacturers can refer to when building investment business cases. An overwhelming body of shared experience is likely to be the most effective encouragement to identify, evaluate, invest in, and measure the benefits of digital transformation. Many industry groups are also calling for insight into digital projects where challenges have been encountered along the journey. Many commentators relate that project failures (and the lessons they teach) are as instructive as the better publicised successes.[22]

Industry associations and governments cannot achieve this objective, cannot build this repository of shared experience, on their own. It needs to be a collective effort by every player in the manufacturing community as a whole. And it is the contention of this paper that this requires a new mindset from manufacturers that puts aside competitive sensitivities in order to achieve faster digital transformation of the industry ecosystem, with better informed and managed return-on-investment. There are a number of past examples of industries that have clubbed together to share data or experience that enables every player to enhance their efficiency, effectiveness and/or competitiveness.[23] Safeguarding anonymity is easily managed, to make companies comfortable sharing their stories, and these anonymising processes are probably best handled through the independent efforts of established trade associations.

If such collective, sharing efforts over digital transformation are not achieved across manufacturing industry, the sector's ability to meet mandatory sustainability and climate goals will also be severely impaired, we suggest.

04. ACCESS TO FINANCE

Ambitious digitalisation targets (and their associated sustainability goals) have to be made affordable in practice. And to do so, there is general consensus that greater use of third party capital will be needed to enable wholesale transformation.[24] Global commentators have noted the hesitancy of manufacturing companies to commit their own accumulated capital to equipment and technology investments. As a result, smart, third-party financing is playing a critical role in enabling the technology, machinery and software upgrades that make digitalised, sustainable manufacturing a reality.

There are four key ways in which specialist finance enables digitalisation and sustainability improvements.

- Finance helps CFOs in industry to deploy third party capital through a wider use of flexible financing structures. As a result, they have been able to invest in digital transformation initiatives (often bringing sustainability benefits) in ways that are financially sustainable, aligning payments with the expected rate of benefit gained. By extending financing periods, more powerful digital solutions can be made affordable.
- Cash flow benefits come from individualised financing packages. Arrangements can flex over time – low-start, seasonal variations, pay as you earn. It is these specialised finance packages which really help accelerate the move to digital platforms.
- Finance tools also help technology vendors to manage their own cash flow, offering their clients an easier path to investment as well as managing their own cash flows as they build those client solutions.
- Finally, moving from one production environment to another can be financially onerous. Flexible finance can embrace all the cost of transition to digitalised systems – equipment, software, maintenance & service, installation, testing, training, even skilled people where required. This makes the transition financially sustainable.

This research paper is designed to be as widely available as possible. Please feel free to distribute to any of your contacts that might be interested.

If you would like to talk to ThoughtSpark, please email
info@thoughtsparkinternational.com

Footnotes

1. https://fred.stlouisfed.org/series/ECOMPCTSA
2. https://www.nam.org/small-manufacturers-win-big-with-digital-transformation-22679/?stream=business-operations
3. The survey covered 1,228 manufacturing respondents,surveyed between March 2023 and January 2024. Interviews were conducted in person, by telephone and by email. Respondents were asked to give their estimate of digital adoption among manufacturers of all sizes, large, medium and small. They were also asked about the benefits gained from such digital investments.
4. https://www.assetfinanceinternational.com/index.php/people/thought-leaders/thought-leaders/18513-countdown-to-the-tipping-point-of-industry-4-0
5. https://www.infor.com/en-gb/news/manufacturers-accelerating-digital-investments-make-uk-infor-survey
6. https://www.vdma.org/documents/34570/15610928/Leitfaden_I40_Retrofit_EN_FINAL.pdf/c0b01116-d995-fd0d-117f-d37446697b19?t=16197758951
7. https://www.vdma.org/viewer/-/v2article/render/81295396
8. https://goingdigital.oecd.org/data/notes/No15_ToolkitNote_DigitalSMEs.pdf
9. https://www.whitehouse.gov/wp-content/uploads/2022/10/National-Strategy-for-Advanced-Manufacturing-10072022.pdf
10. https://ec.europa.eu/commission/presscorner/detail/en/ip_21_1884
11. https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/europe-fit-digital-age/europes-digital-decade-digital-targets-2030_en
12. For instance, https://www.theindustry.fashion/made-smarter-boosted-by-6-1m-government-funding-to-accelerate-manufacturers-digitalisation/
13. https://www.oecd.org/sti/policy-options-to-support-digitalization-of-business-models-during-covid-19-annex.pdf
14. https://www.smartindustry.com/benefits-of-transformation/business-transformation/article/21437753/the-digital-factory-framework-an-international-standard-for-semantic-interoperability; https://www.brookings.edu/articles/data-portability-and-interoperability-a-primer-on-two-policy-tools-for-regulation-of-digitized-industries-2/
15. https://www.ladepeche.fr/2023/07/03/alexandre-saubot-france-industrie-les-solutions-de-lindustrie-permettront-de-decarboner-notre-economie-11317677.php; https://www.makeuk.org/insights/blogs/where-are-we-with-the-digitalisation-of-uk-manufacturing
16. https://www.makeuk.org/insights/blogs/where-are-we-with-the-digitalisation-of-uk-manufacturing
17. https://www.rifs-potsdam.de/en/blog/2021/05/making-digital-transformation-deliver-sustainability; https://www.ey.com/en_vn/consulting/digital-transformation-the-key-to-sustainable-development; https://www.ibm.com/blog/digital-transformation-sustainability/; https://www.researchgate.net/publication/368365637_Digital_Transformation_and_Its_Influence_on_Sustainable_Manufacturing_and_Business_Practices
18. https://www.smartcitiesdive.com/news/climate-progress-in-6-sectors-too-slow-to-limit-global-warming-report/589338/
19. https://www.ey.com/en_gl/sustainability/how-can-slowing-climate-change-accelerate-your-financial-performance
20. https://www.mdpi.com/2071-1050/15/4/3010
21. https://www.ladepeche.fr/2023/07/03/alexandre-saubot-france-industrie-les-solutions-de-lindustrie-permettront-de-decarboner-notre-economie-11317677.php
22. For instance: https://www.forbes.com/sites/blakemorgan/2019/09/30/companies-that-failed-at-digital-transformation-and-what-we-can-learn-from-them/; https://www.raconteur.net/digital/digital-transformation-failure/; https://industry40.co.in/why-digital-transformation-takes-place-very-slowly-or-sometimes-fails/
23. Such as lenders sharing anonymised-source customer data to prevent over-indebtedness and fraud; or examples in https://innovation-entrepreneurship.springeropen.com/articles/10.1186/s13731-022-00259-8
24. See, for instance, https://www.oecd.org/about/secretary-general/private-finance-for-sustainable-development-conference-paris-january-2020.htm

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