Making investments into digitalisation

The manufacturer's perspective

INTERACT

THE ADVANCED SERVICES GROUP

MADE SMARTER INNOVATION

Key

- Needs more of
- Needs less of

Executive summary

The competitiveness of industry in the UK is dependent on the rapidly growing digitalisation of manufacturers. Digitalisation provides the opportunity to drive the efficiency and innovativeness of manufacturers, and forms the basis for creating new business models. Yet, manufacturers are lagging in their investments into digitalisation and risk missing out on capturing the opportunities digitalisation offers. This mini-guide outlines the specific challenges the manufacturing industry faces with making effective investments into digitalisation and identifies the key questions they should address to overcome them.

Digitalisation for manufacturers

Digitalisation offers significant opportunities for manufacturers. By leveraging digital technologies and data, manufacturers can generate substantial efficiency gains in their own processes, create new forms of value for their customers, and develop innovative business models. These digitalisation opportunities are critical to address the productivity and sustainability demands the manufacturing industry is facing.

The range of opportunities digitalisation offers to the manufacturing industry is widely recognised. Recent surveys suggest that 95% of manufacturers see digitalisation as essential for their company's future and estimate digitalisation will account for 14.50% of manufacturing growth (CAGR) from 2022 to 2032. 96% of decision-makers identify digitalisation as 'essential to sustainability' , and it is also expected to increase labour productivity by 15–30% due to reduction in machine downtime, improved forecasting, and reduction in inventory costs.

Bearing these expectations in mind, it is a concern that only 35% of surveyed firms have adopted digitalisation solutions at scale . One of the root causes of the lack of adoption in the UK is the lack of investment . According to the Manufacturing Digital Productivity Report from iBASEt, 94% of UK manufacturers believe their industry has already fallen behind the US because of a lack of investment into digitalisation, and more than half of UK manufacturers are losing sales as a result. It is even more worrying that 93% of respondents expect that this lack of investment into digitalisation will lead to many UK manufacturers going out of business in the next decade.

To help avoid this outcome, this mini-guide helps manufacturers better understand the core challenges of investing in digitalisation. It describes the diverse barriers manufacturers face when seeking to make investment decisions and highlights the important questions manufacturers need to ask. Our hope is that these insights will help manufacturers avoid the pitfalls and, instead, exploit the opportunities and become more successful as they undertake their own forays into digitalisation.

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[1] https://www.fictiv.com/ebooks/2021-state-of-manufacturing
[2] https://www.futuremarketinsights.com/reports/iot-in-manufacturing-market
[3] https://stories.ability.abb.com/better-decisions
[4] https://www.mckinsey.com/capabilities/operations/our-insights/capturing-the-true-value-of-industry-four-point-zero
[5] https://stories.ability.abb.com/better-decisions
[6] https://www.makeuk.org/-/media/files/insights/reports/infor-make-uk-innovation-monitor-report-final.pdf
[7] https://info.ibaset.com/hubfs/ibase_PDM_090522.pdf

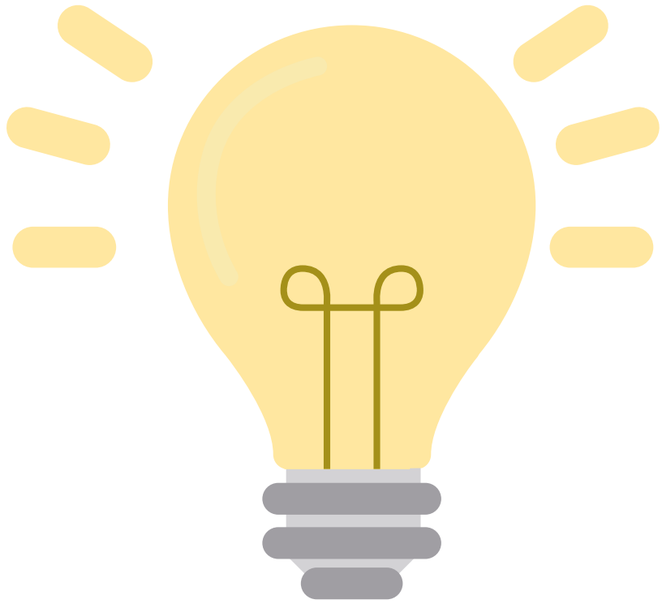
The challenges of investing in digitalisation

To invest effectively in digitalisation, it is important to understand the range of challenges manufacturers commonly face. Only then can the appropriate solutions be identified and put in place. Aston University used a systematic review method to study the challenges for manufacturers and identify critical questions. The results are summarised in Table 1.

Table 1. Challenges for manufacturers investing in digitalisation

Digitalisation goals	The lack of agreement on the goals of digitalisation encumbers the investment process.
	The lack of ambitions in the goals of digitalisation limits the leaders' ability to justify significant investments.
Investment process	Digitalisation integrates a wide scope of investment domains which makes it difficult to apply established processes to assess and prioritise investments.
	The metrics used to evaluate business cases for investment do not relate to the opportunities that are particular to digitalisation.
Digital technology attributes	The high cost of digitalisation and the high uncertainty of return make it difficult to justify investments.
	The rapid innovation (and obsolescence) of digital technology acts as a discouragement to making substantial investments.
People and their expertise	The lack of expertise on acquiring external funding for digitalisation creates an investment barrier.
	The lack of senior leaders with digitalisation expertise hampers investments into digitalisation.
Organisational culture	The difficulty of accepting investment uncertainties inhibits investments into digitalisation.
	The lack of openness and trust creates barriers to making effective investments into digitalisation.
Business network	The lack of digital readiness of the wider network limits investments into digitalisation.
	The lack of experienced or relevant finance partners reduces the opportunities for making investments into digitalisation.

Digitalisation goals



The research showed that it is not only a challenge to specify the goal of digitalisation but that this challenge also impacts the manufacturers' abilities to focus their investments.

The lack of a specific and widely agreed goal is a critical barrier to making investments into digitalisation. In manufacturing, digitalisation affects a wide range of stakeholders and they all feed into the development of the goals. For example, the R&D function may seek to focus digitalisation towards creating a better understanding of the product, while the marketing and service functions may seek to focus digitalisation towards understanding the customers and their support needs.

The lack of agreement on the goals of digitalisation encumbers the investment process.

A further goal-related challenge that affects investments into digitalisation is the lack of ambition in setting goals. Digitalisation offers manufacturers opportunities to significantly change how they operate, what kind of relationship they have with their customers, what products or services they offer and who they offer these to. Pursuing such high-value opportunities justifies making the substantial investments digitalisation requires and taking on these risks. However, many manufacturers restrict their goals to incremental changes and, therefore, struggle to justify making the necessary investments.

The lack of ambition in the goals of digitalisation limits leaders' abilities to justify significant investments.

Critical questions manufacturers should consider

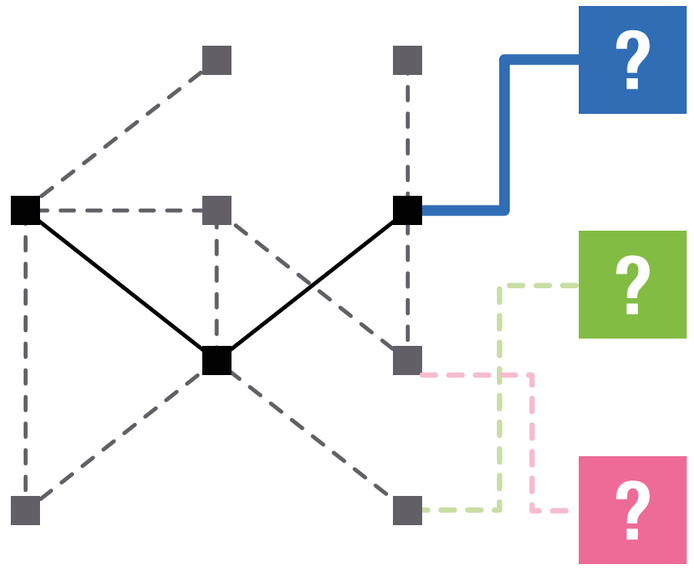
To make effective business cases for digitalisation that justify the required investments, manufacturers need to develop specific and ambitious goals. Core questions that manufacturers should ask to guide their goal development and investment include:

How will our industry and the industry of our customers change in the future?
For manufacturers, digitalisation is an investment in their future competitiveness. A clear understanding of the trends and future industry scenarios is critical to define the goals that will support their ability to create value for themselves and their customers.

What are the future business models our digitalisation journey will need to support?
New business models are required to monetise investments into digitalisation. A clear vision of future business models will help focus investments effectively.

How do we consolidate the different goals of digitalisation that exist within the organisation?
Digitalisation impacts the entire organisation, creates interdependencies, and requires financial and technical trade-offs. An effective prioritisation of the investments into digitalisation requires a careful process that consolidates these diverse goals.

Investment process



The investment process has been identified as another barrier to making effective investments into digitalisation. Although manufacturers have processes in place to ensure their investments provide them with the best return, these processes are better suited to prioritise investments in production technology than digitalisation.

The multi-dimensional nature of digitalisation challenges the traditional investment processes of manufacturers. Digitalisation cuts across established investment categories as it involves aspects of R&D, employee training, and education, as well as the acquisition and implementation of technology solutions. This requires both technology-enabled business processes and, potentially, a radical extension of organisational skill-sets.

Digitalisation integrates a wide scope of investment domains which makes it difficult to apply established processes to assess and prioritise investments.

Digitalisation also challenges the metrics that can be used to make and evaluate investment decisions. Manufacturers traditionally rely on internal rates of return or net present values to justify their investment decisions, and these are not well suited to the possibility of dynamically adjusting an investment after it has been initiated. With digitalisation opening future and potentially unknown opportunities, metrics are required that reflect the flexibility to adjust an investment, change a technology or even abandon it.

The metrics used to evaluate business cases for investment do not relate to the opportunities that are unique to digitalisation.

Critical questions manufacturers should consider

To identify critical investment opportunities and make effective business cases for digitalisation, manufacturers need to review their investment processes. Core questions such reviews should include are:

What metrics should we use to evaluate and track the performance of investments into digitalisation?
The choice of metrics is critical in identifying digital investment opportunities. While traditional metrics favour predictable linear value creation opportunities, digitalisation requires metrics that accommodate the emergence of future options.

How should we integrate the process for evaluating investments into digitalisation with the process for evaluating traditional investment projects?
Investment opportunities that are evaluated by different metrics are difficult to compare. As digitalisation decisions cut across a wide range of investment domains it is important to integrate them with other investment projects.

Digital technology attributes

Although digitalisation is more than the acquisition of technology, the ability to invest effectively in digitalisation is challenged by technological attributes.

The research identified the high costs of required technologies as a major reason that manufacturers do not carry out investments into digitalisation. The costs not only cover the acquisition of new technologies and changes to products to enhance connectivity but also intensive training. The cost of technology is particularly high to early adopters, before economies of scale are achieved. Furthermore, while digital solutions are highly scalable, the returns on investments are limited if scale is not achieved.

The high cost of digitalisation and the high uncertainty of return make it difficult to justify investments.

The rapid pace of the development of digital technology was identified as another barrier to investment into digitalisation. Although all production technologies are continuously improving, the pace at which digital technologies develop is unprecedented. Any technology manufacturers choose could become outdated rapidly and require updating, which increases costs. Manufacturers may, therefore, decide to wait for the next digital technology generation to become available or for further standards to emerge before making investments.

The rapid innovation (and obsolescence) of digital technology discourages manufacturers from making substantial investments.

Critical questions manufacturers should consider

To ensure effective investment decisions are made, manufacturers need to consider how the economics of digital technology differ from those of more traditional investments.

How should we determine the total cost of ownership of these technologies?

Manufacturers generally have a good understanding of the total cost of owning and operating their critical production equipment. It is important to develop a similar understanding of digital technologies to become confident in setting budgets and making investment decisions.

When do we invest in a new technology (and when do we wait)?

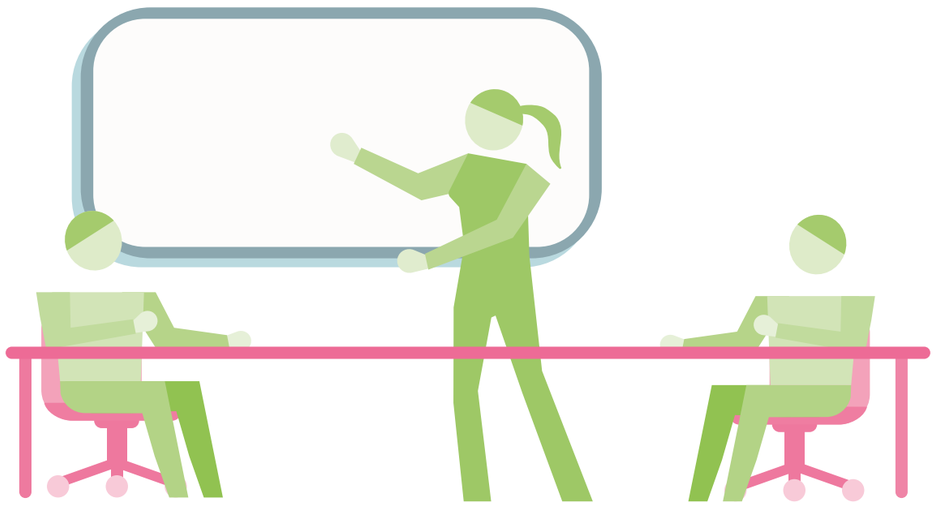
The rapid progress of technology and the uncertainty of standards make it difficult to decide when to invest and when to wait. Developing a good understanding of the trajectory of digital technologies is critical for manufacturers to effectively time their investments.

People and their expertise

Another important challenge relates to the expertise of the leaders making decisions regarding digitalisation.

A core concern is the lack of expertise in making effective digital investment decisions. A combination of significant domain expertise and strategic foresight is required to take the long-term development of the digital architecture of the company into account. Importantly, to make significant investments requires manufacturers to raise external finance; but manufacturers often lack the expertise to raise external finance for investments into digitalisation, which significantly differs from raising finance for investments into capital equipment: it requires different funders, business case details and preparations.

The lack of expertise on acquiring external funding for digitalisation creates an investment barrier.



It is also important to recognise how investments into digitalisation are affected by the established decision-making structures. Decisions on investments in production machinery are often made at the plant level, and are aligned with responsibilities for performance and quality. As digitalisation affects the direction of manufacturers, with implications for their customers and wider networks, identifying the right locus of decision-making is critical for making effective investments. It requires a senior leader with the authority and expertise to make such wide-reaching decisions.

The lack of relevant expertise among senior leaders hampers investments into digitalisation.

Critical questions manufacturers should consider

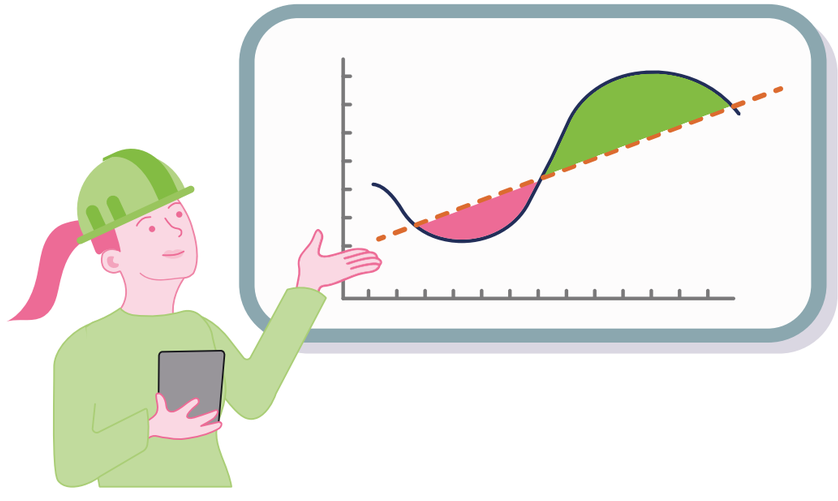
To ensure effective investment decisions are made, manufacturers need to focus on their people's expertise.

What expertise is required to make effective investment decisions about digitalisation?
Digitalisation requires new ways of thinking and new processes for making investments. People who have made investment decisions in more predictable environments may not have the expertise to make investment decisions in the digital domain.

Who should make decisions about investing in digitalisation?
The wide scope and long-term horizon of digitalisation requires these decisions to be made by the senior leadership team. While in some manufacturers the Chief Information Officer (CIO) leads these initiatives, others create the role of Chief Digital Officer (CDO) to ensure digitalisation is not dominated by the operational considerations that often dominate the CIO role.

How do we prepare a business case to obtain external funding for digitalisation?
External funding is a critical requirement for most major capital investment initiatives and manufacturers have established processes and relationships for these. However, manufacturers often lack experience in preparing a business case for obtaining funding for a digitalisation initiative.

Organisational culture



Another important challenge for making effective investment decisions relates to the manufacturer's organisational culture.

Digitalisation implies a significant range of uncertainties, and investments are less certain than investments into established technologies or infrastructure. Creating value with digital technologies requires product and process experimentation following test-learn-tweak cycles. Organisations need to develop a 'tolerance for uncertainty' to make effective investment decisions within this context. For manufacturers with limited R&D activities, dealing with these uncertainties is particularly difficult.

The difficulty of accepting investment uncertainties inhibits investments into digitalisation.

Trust is another important aspect of organisational culture that affects investments into digitalisation. Although digitalisation will require changes in organisational roles and processes, the creativity and imagination of staff members across the organisation need to be drawn on to capture the opportunities presented. It is critical to ensure that digitalisation is not perceived as a cost-cutting exercise aiming to create redundancies to ensure the widespread support and effectiveness of investments.

The lack of openness and trust creates barriers to making effective investments into digitalisation.

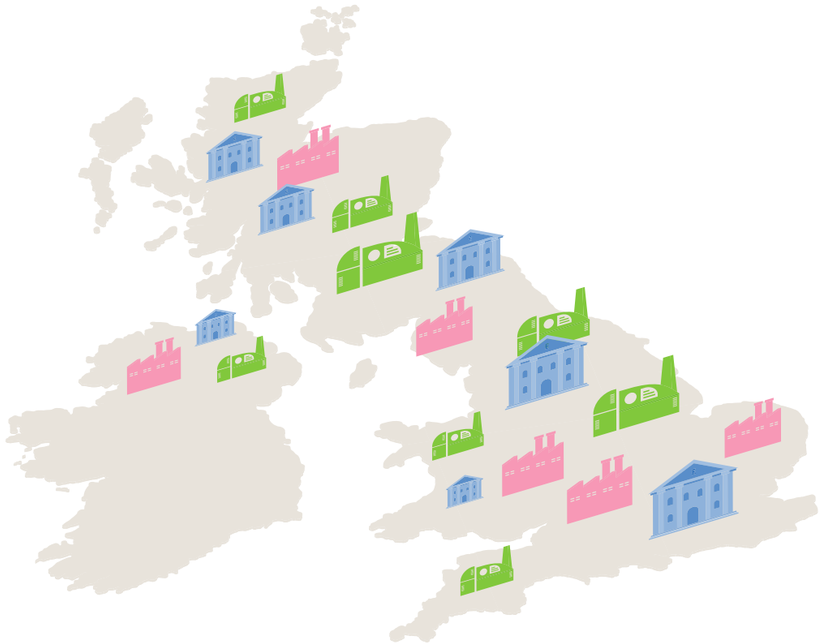
Critical questions manufacturers should consider

To ensure the critical investment decisions are made effectively, core questions focusing on organisational culture in manufacturers should include:

What kind of digitalisation culture should we adopt?
Manufacturers often build their culture around developing high-quality products and creating effective customer support. Digitalisation needs to build on these strengths, not undermine them.

How do we integrate agile principles into our organisation?
Digitalisation provides opportunities to create quick feedback mechanisms that allow organisations to respond with changes to products and services and constant iteration and experimentation. The challenge is to integrate the exploitation of these opportunities in manufacturers that traditionally focus on finishing the product before releasing it to customers.

Business network



Another important challenge relates to the wider network and how it affects the manufacturers' abilities to invest in digitalisation.

Digital technologies have the potential to better integrate manufacturers with their customers and wider network. It is, therefore, not only their own investment into digitalisation but also that of their customer and wider network that is critical to making an effective business case. Ultimately, value is co-created by the customer and the wider network, and if these parties do not make investments into digitalisation themselves then the manufacturer's chances of deriving a return from their investments are reduced. A lack of investment by these other parties might change the manufacturer's focus to supporting the customer with its own digitalisation investment decisions and value capture activities.

The lack of digital readiness of the wider network inhibits investments into digitalisation.

Making investments into digitalisation also puts a focus on the external finance partner as a member of the network. Finance partners are often overlooked in industrial value networks, but in a digitalisation context their role is critical. This is because these partners are not just financing a machine but also a business process or business development, which requires a much closer relationship.

The lack of experienced or relevant finance partners reduces the opportunities for making investments into digitalisation.

Critical questions manufacturers should consider

To ensure investments in digitalisation are effective manufacturers need to consider the wider network:

How do we build the required relationships with our network partners to create the most value from digitalisation?

While manufacturers rely heavily on their network for their supply of critical components, digitalisation allows them to run experiments and pilots to identify shared opportunities to collaborate even more closely and generate shared value. Learning how to build such close collaborative relationships with their network partners is critical.

How do we help our customers identify opportunities to invest in their own digitalisation?

Creating value from digitalisation requires an understanding of the opportunities for the customer as well as for the manufacturer. On-boarding the customer with shared opportunities is critical to make effective investment decisions.

Conclusion

Making effective investments into digitalisation is a critical challenge for manufacturers. These investments not only determine the success of current digitalisation initiatives but also affect the viability of future digitalisation journeys. It is today's investments into digitalisation that enable the future competitiveness of the manufacturing industry. Manufacturers need to rethink their established investment processes and organisational practices as many of them stand in the way of making effective investment decisions into digitalisation.

This mini-guide identifies the key challenges manufacturers will encounter in their investment process and provides critical questions upon which to focus. Decision-makers should carefully study these challenges and explore how they may apply to their organisation. The questions should be used to help identify solutions and opportunities that apply to the specific context of the manufacturer.

The mini-guide was developed as part of the InterAct Network+ project which investigates the human side of digitalisation in manufacturers. The InterAct Network+ provides a platform for manufacturers to discuss their challenges with digitalisation and jointly explore solutions. For more details on the InterAct Network+, how to get involved and how to access guiding material, please visit **https://interact-hub.org/**

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As part of the InterAct Network Plus a team from Aston University has investigated the range of barriers to investing into digitalisation of manufacturing and how these could be overcome

The full report and other resources to support manufacturers with their digitalisation journey can be found at **interact-hub.org**

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