



HOW TO CREATE A DIGITALISATION STRATEGY THAT WORKS

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Pitch-In
Connecting Capabilities
for the Internet of Things



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01

INTRODUCTION

The convergence of new technologies such as smart sensors, Internet of Things (IoT), digital twins, blockchain, data analytics and AI is driving change at an unprecedented rate. Sometimes referred to as Industry 4.0, it has the potential to transform every aspect of the way a company does business.

As such, digitalisation represents both a threat and an opportunity. Firms are constantly told that if they fail to digitalise, they will fail full stop. But, given the potential scale of transformation required, and the need to take decisions in a constantly shifting landscape, deciding what to do and how to do it is hugely challenging.

And since each firm is different, there is no 'one-size-fits-all' solution when it comes to digital strategy formulation. Every firm must follow its own path. In order to benefit from technologies such as IoT, therefore, it needs to know how to formulate a digitalisation strategy that works for it.

For those companies that do make the right decisions, the rewards are significant, whether through incremental improvements (better products and services and lower costs) or through a complete reinvention of their business model to create new value for themselves and their customers.

THE SECRETS OF SUCCESSFUL DIGITAL STRATEGY FORMULATION

Taking an interdisciplinary approach which draws from research into strategy, service, marketing and technology, we set out to explore how manufacturing firms are approaching digital transformation and to develop a blueprint that will help firms formulate successful digitalisation strategies.

Of course, the mechanics of strategy formulation – the tools and processes – will look very different in a large global company compared to an early-stage entrepreneurial venture. But the way they approach the task can be characterised using a common framework.

In this report, we share some of our findings about the progress manufacturers are making with their digitalisation strategies. We look at how they are going about the task and we identify a number of critical success factors in order to show how executives can improve their strategising processes and business performance.

Our findings demonstrate that it's not just what's in your strategy that matters: *how* you formulate the strategy is equally important.

02

A MIXED PICTURE: DIGITAL TRANSFORMATION TODAY

We carried out in-depth interviews with 20 manufacturing companies and surveyed a further 290, ranging from some of the world's largest multinationals with up to 80,000 employees to firms with fewer than 50 members of staff. The majority (just over 70 per cent) are based in the UK, the rest in the US. Some have been operating for more than 100 years, others for fewer than 10. Some are pioneering digitalisation, others are still at the planning stage, some are making incremental changes and others embarking on radical innovation. They cover a wide range of sectors, including aerospace, chemicals, food and drink, machine and equipment manufacturing and pharmaceuticals.

We categorised the firms according to where they are in their digital transformation journey: planning, introducing, transforming or operating.

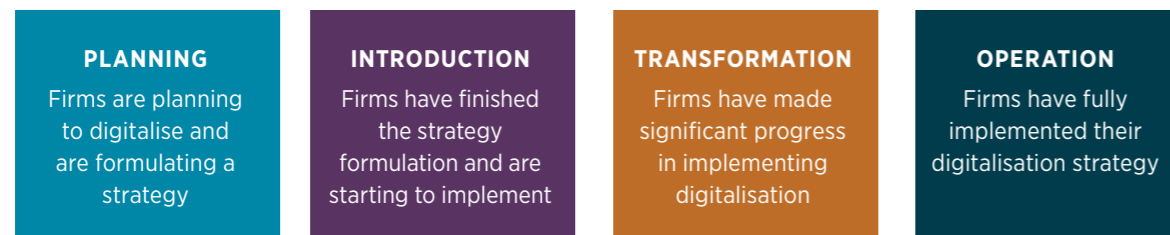


Figure 1: **The four phases of digitalisation**

Just over half (see Figure 2) of the firms we surveyed are either in the transformation or operation phase. In other words, they are in the process of implementing their strategy or have already done so. However, a significant 35 per cent are still at the foothills, either planning to implement or just starting the process. In our sample, the US companies are further ahead than those based in the UK. Nearly a quarter of the US companies we surveyed are in the operational phase, in contrast to just 13 per cent of their UK counterparts.

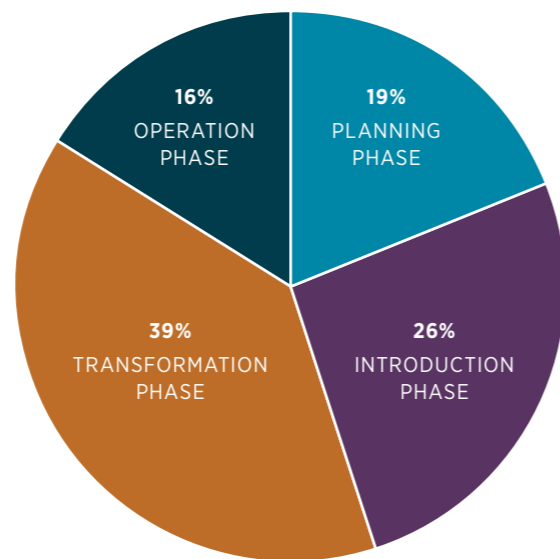


Figure 2: **Where firms are in the digitalisation process**

Interestingly, while the largest companies (those with more than 1,000 employees) are most likely to be in the transformation stage, in our sample it is the medium-sized companies (those with between 51 and 250 employees) that are leading the way with 39 per cent already in the operational phase. At first glance, this might seem counter-intuitive: multinational companies with vast resources at their disposal should surely be ahead of the curve. However, we know that mid-sized companies are often well-placed to exploit new technologies. They have more resources at their disposal than early-stage ventures but they also have more agility than global organisations which often struggle with the complexity of decision-making across geographical and functional structures.

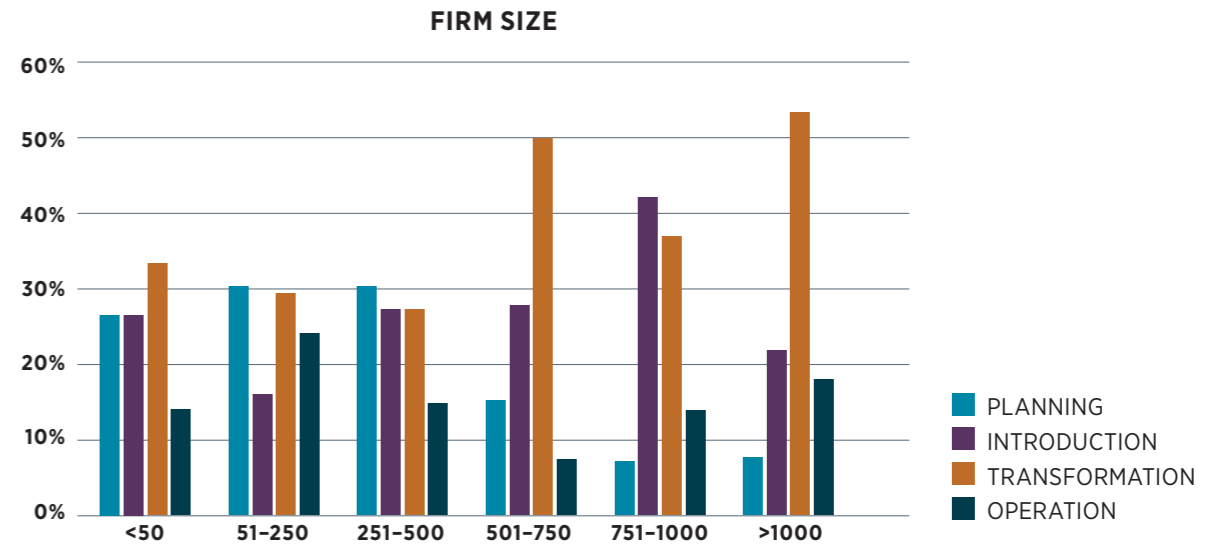


Figure 3: **Where firms are in the digitalisation process according to size (number of employees)**

Conventional wisdom is also that large, well-established companies often find it more difficult to achieve digital transformation than those that are digitally native. We looked at the age of the firms involved and found that, in fact, those firms that were started less than 10 years ago are most likely to still be at the planning stage. It is firms that are between 21 and 30 years old that are leading the way, with nearly 75 per cent of them already at the transformation or operational stages.

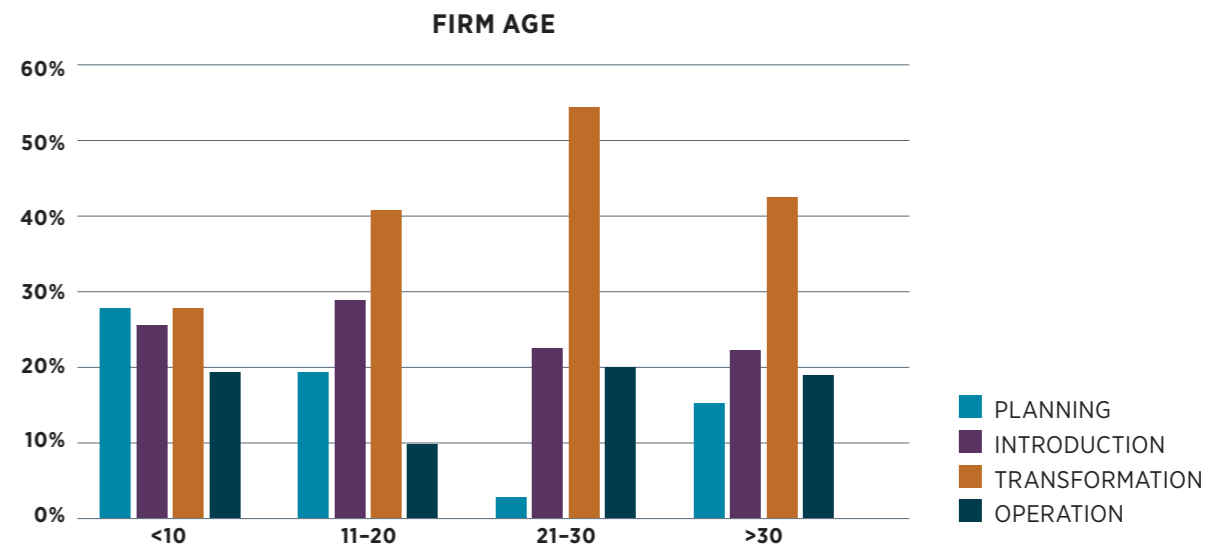


Figure 4: **Where firms are in the digitalisation process according to age**

ATTITUDE TO RISK

Firms take very different approaches to digitalisation with some eager to exploit new technologies to achieve 'first mover' advantage where others prefer to minimise their risk by taking a more incremental approach. We categorised the firms into four distinct types based on their strategic stance:

- **PROSPECTOR:** you want to be 'first in' with new products and market areas even if not all of these efforts have proven to be highly profitable. You try to respond rapidly to early signals concerning areas of opportunity, and these responses have often led you to a new round of competitive actions.
- **ANALYSER:** you try to maintain a stable, limited line of products or services, while at the same time trying to act on a carefully selected set of the more promising new developments in the industry. You are seldom 'first in' with new products or services but by closely monitoring the actions of major competitors in areas compatible with our stable product-market base you try to be 'second in' with a more cost-efficient product or service.
- **DEFENDER:** you try to find and maintain a secure niche in a relatively stable product or service area. You try to offer a more limited range of products or services than your competitors and you try to protect your domain by offering higher quality and superior service. You may not be at the forefront of developments in the industry but you concentrate on doing the best job possible in your market.

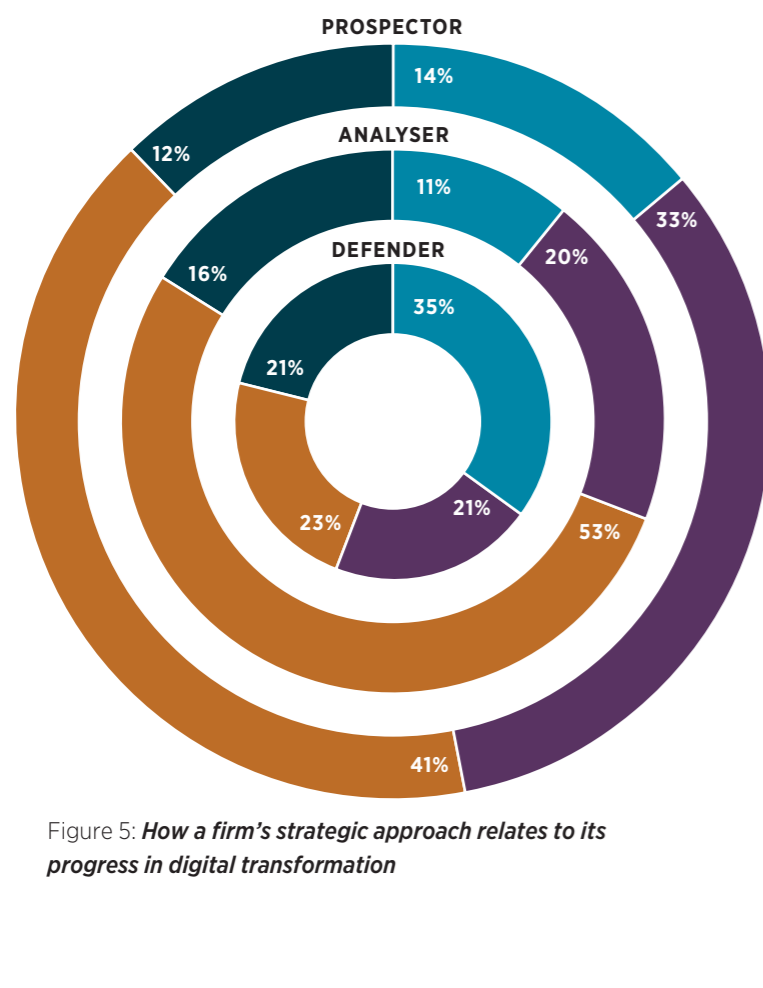


Figure 5: How a firm's strategic approach relates to its progress in digital transformation

Our analysis suggests that progress in digitalisation is associated with a firm's strategic posture. While the 43 per cent of firms that describe themselves as defenders are at different stages of the digitalisation process, prospectors and analysers are most likely to be in the transformation phase.

- PLANNING
- INTRODUCTION
- TRANSFORMATION
- OPERATION

03

HOW TO DEVELOP A SUCCESSFUL DIGITALISATION STRATEGY: THE PROCESS

Our framework¹ shows how key dimensions of strategy formulation affect the strategising process, which in turn affects the content of the strategy, and, ultimately, a firm's performance.

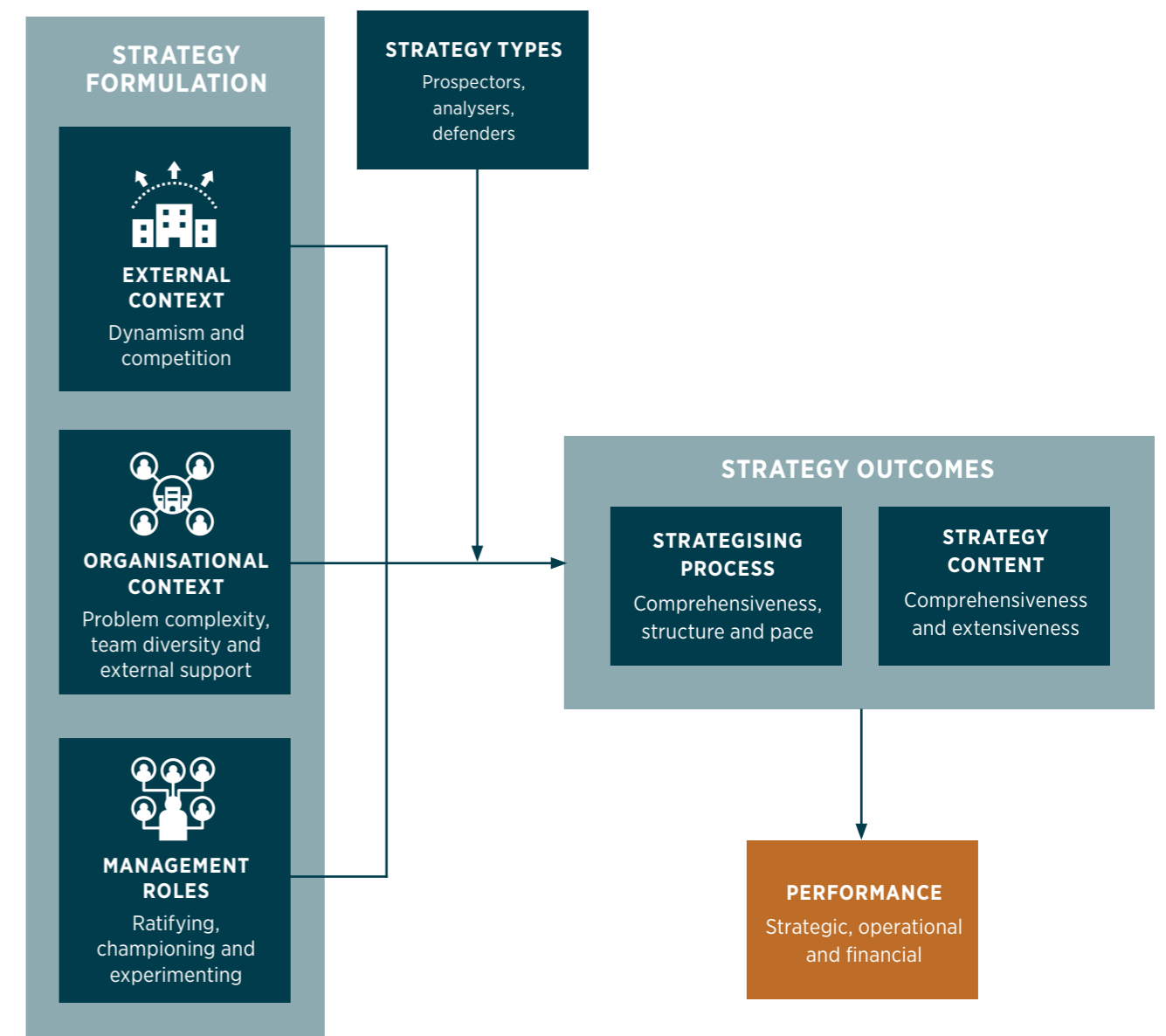


Figure 6: Framework for digital strategy formulation



3.1 EXTERNAL ENVIRONMENTAL CONTEXT

Understanding the external environment and the social, economic and technological changes it is undergoing, is the first step in the strategy formulation process. It is only then that firms can decide whether to position themselves as prospectors, analysers or defenders.

Research^{2,3} has identified two key dimensions of the external environment that particularly affect a firm's approach to strategy formulation: the intensity of competition firms are experiencing and the rate of change they are seeing in their markets, the latter often driven by customer demand.

Why are these two dimensions so important? In sectors experiencing high levels of competition, firms may be forced to actively differentiate themselves from their competitors by being more of a prospector than a defender. High levels of market turbulence make the strategising problem a more complex one – you are dealing with a constantly moving target – which also has an impact on the strategising process.

“We are very aware of our competitors. They are all working on digitalisation. We respect all of them and hope to outcompete them with our strategy.”

Senior executive, global aerospace company



WHAT DOES A GOOD STRATEGY LOOK LIKE?

COMPREHENSIVE

It considers many different aspects when deciding the course of action to take and thoroughly examines all perceived potential opportunities and threats. Each strategic option is thoroughly analysed and alternatives explored and assessed.

WELL-STRUCTURED

There are specified activities with clearly defined go/no go decision points for each phase. It is used to guide all digitalisation strategy development activities and there are designated managers to review the activities at each stage of the process.

RAPID

The firm is able to make decisions – and implement them – quickly.



“The pace is aggressive... it is dictated as if we were a digital company.”

Senior executive, global aerospace company



3.2 ORGANISATIONAL CONTEXT

PROBLEM COMPLEXITY

Clearly, the complexity of the problem being addressed by the strategy will have a bearing on the strategy formulation process⁴. In the case of digital transformation the level of complexity is likely to be high (although there is significant variation between sectors), with decisions having to be taken in a constantly shifting external and internal landscape. There is, for example, likely to be uncertainty about which technologies to choose, how rapidly they are changing and what innovations are most likely to emerge in the near-term. In addition, there is the challenge of implementing a number of new Industry 4.0 technologies simultaneously, seamlessly integrating them across the supply chain from procurement, through design and manufacturing and throughout the customer journey, often in collaboration with supply chain partners. At the same time the market is also changing, with new, more agile entrants appearing and customers (even in the B2B world) having their expectations raised by the kinds of digital services they receive day-to-day, from firms such as Amazon, Airbnb, Uber and Netflix.

INSIGHT

Problem complexity can actually enhance strategy formulation. We found that where there are **high levels of complexity, the planning and introduction phases of the strategies are more comprehensive and better structured**. Unsurprisingly, complexity does not have a positive effect on the pace of strategy development. However, at the transformation and operational stages, problem complexity does appear to result in more rapid progress, perhaps because the strategy planning stage was more effective.

TEAM DIVERSITY

Given the complexity of the 'problem' being addressed, the composition of the team involved in addressing it is likely to be an important factor in successful strategy formulation⁴. We know that a diverse strategy formulation team makes better decisions. The more functions that are represented (for example, HR, manufacturing, supply chain, IT, sales and marketing) at different levels of seniority with a variety of different backgrounds and experience, and the greater the age, gender and ethnic diversity of the team, the more effective the strategy is likely to be.

INSIGHT

At the planning and introductory stages, the **diversity of the digital strategy formulation team** is the single most important success factor. It is still important at the transformation and operation stages, resulting in a more structured process.

EXTERNAL SUPPORT

We also wanted to find out how much external support companies were seeking from, for example, consultancy firms, business investors and partners and universities and how much impact their input had on the process.

INSIGHT

Our findings suggest that in the early phases of strategy development, **external support helps to increase the pace of decision-making** but it improves neither the comprehensiveness nor the structure of the process. In contrast, in the later stages, it improves both the comprehensiveness and structure of the approach but does nothing to increase the speed of implementation.



“It's been a very complex task – it's new... We've been taking a look at what's going on in the market and we've been listening to our customers. That creates great complexity ... because we operate in every industry type.”

Head of Digitalisation, global technology company



3.3 MANAGEMENT ROLES

Leadership is a critical success factor in strategy formulation but firms find that it is not straightforward to apply the usual governance structures and mechanisms when dealing with rapid technological and market change.

Research² identified three different management roles that are critical in supporting strategy formulation, including ratifying, championing and experimenting.

- ▶ **RATIFYING:** evaluating the solutions that emerge from the digitalisation strategy development process and endorsing and monitoring those solutions that have the greatest potential to meet the challenges emerging from environmental demands. This role is expected to sit with senior management.
- ▶ **CHAMPIONING:** presenting and advocating the most promising solutions and their long-term implications during the digitalisation strategy development process. Championing is expected to sit with middle management.
- ▶ **EXPERIMENTING:** reacting to information from and developments in the firm's business environment when developing the digitalisation strategy. Operations managers are expected to engage in experimenting, which includes learning and improving, linking technical ability and need, initiating autonomous activities and taking risks.

INSIGHT

The academic literature² tells us that these roles are all important for success in strategy formulation and that they are typically carried out at different levels within the organisation. However, we found that for digitalisation strategies, while the roles themselves are important, it is senior management that is, in most cases, doing all three.

Of the three roles, **experimenting** seems to be the most important, particularly at the planning and implementation stages where it has a positive impact on all three dimensions: comprehensiveness, structure and pace. For firms at the more advanced digitalisation phases, being able to experiment increases the speed of the strategising process.

Championing and ratifying are not important early on but they become critical during the transformation and operation stages.

04 GOOD PROCESS LEADS TO GOOD STRATEGY LEADS TO GOOD PERFORMANCE

Having identified some critical success factors for strategy formulation we wanted to see if the effectiveness of the process improves the content of the strategy and if that, in turn, has an effect on performance.

A GOOD PROCESS LEADS TO A GOOD STRATEGY ...

Our analysis shows that for firms in early digitalisation phases, the nature of the strategising process has an important impact on its outcome. The comprehensiveness of the process, how well structured it is, and the speed with which it is developed and executed have a significant impact on the extensiveness and comprehensiveness of the strategy itself^{2,5}. For those firms at a more advanced digitalisation stage, we see the same results but with less of an impact on speed.

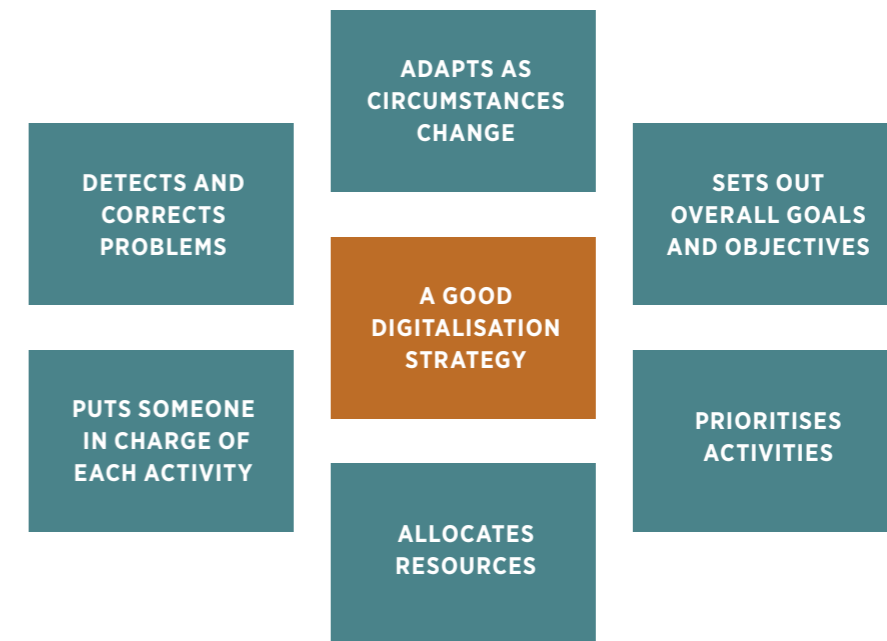


Figure 7: *Key attributes of a successful strategy*



We want to be a fully digital company... The ultimate goal is to be a one-stop shop company for digital solutions in the industrial market from the customer perspective. Internally, we want to enable every worker to be a digital native without necessarily being a digital native.”

Head of Digitalisation, global technology company

WHAT DOES A GOOD STRATEGY LOOK LIKE?

It should document – in writing – both the digitalisation vision and strategy and be widely shared and understood by everyone across the organisation. It should look at least three years ahead and specify:

- ▶ Its overall goals and objectives, priority decision areas (for example, processes, markets, products, industries, technologies), how resources should be allocated for each activity and who is responsible for each area of implementation.
- ▶ It should also describe how the firm intends to detect, prevent and correct any problems that arise and how it will address changes to the external environment that will inevitably arise during its implementation.

... LEADS TO GOOD PERFORMANCE

To find out if a good strategy results in good performance, we asked firms to rate their performance against their competitors over the last three years in three ways:

- ▶ **STRATEGIC:** has it led to the firm developing new products or services or entering new markets or introducing new technologies?
- ▶ **OPERATIONAL:** has it reduced costs, improved processes or reduced lead times?
- ▶ **FINANCIAL:** has it resulted in increased sales and market share, profitability and delivered a significant return on investment?

INSIGHT

We found that a good strategy does indeed result in strong performance in all three areas with operational performance fractionally ahead of financial performance, followed by strategic performance.

For firms engaged in digital transformation, this is clearly an important finding. It seems that how you set about formulating your strategy directly effects the content of the strategy, which in turn effects the firm's performance.

05

SUMMARY: HOW TO CREATE A SUCCESSFUL DIGITALISATION STRATEGY

How can executives use these insights to improve their strategising processes and ultimately their outcomes and business performance?

KNOW WHAT YOU NEED TO KNOW

Understand your external environment – what's driving change – and what are your overarching strategic objectives: do you want to be first in with new digital technologies such as IoT in order to gain competitive advantage or are you taking a more incremental approach to product and service improvement? In other words, are you a prospector or a defender?

DO WHAT YOU NEED TO DO: CRITICAL SUCCESS FACTORS

PLANNING

&

INTRODUCTION

- ▶ **APPOINT DIVERSE TEAMS.** Appoint people with different experience and backgrounds at different levels within the organisation and representing all key functions.
- ▶ **DON'T BE AFRAID TO TACKLE COMPLEX PROBLEMS.** Problem complexity can be your friend: the more complex the problem the more comprehensive your approach is likely to be and the greater the need for structure.
- ▶ **BE WILLING TO EXPERIMENT.** Being able to experiment is critical in these two phases resulting in a more comprehensive, better structured and faster process.
- ▶ **BRING IN EXTERNAL SUPPORT.** Asking for support from external sources at this stage can help speed up the process.

TRANSFORMATION

&

OPERATION

- ▶ **MAKE SURE YOUR LEADERS ARE 'RATIFIERS' AND CHAMPIONS.** Management roles are critical at the implementation and operating stage of the process.
- ▶ **KEEP EXPERIMENTING!** Being able to experiment is still important in these later phases where it can speed up decision-making.
- ▶ **ENSURE YOU HAVE GOOD TEAM DIVERSITY.** Team diversity will give you a better structured process in these later phases.
- ▶ **CONTINUE SEEKING EXTERNAL SUPPORT.** Utilising external support will improve process comprehensiveness and structure.

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ABOUT PITCH-IN

The Pitch-In project shows how the Universities of Sheffield, Newcastle, Oxford and Cambridge, together with industrial and commercial partners, can deliver benefits by significantly enhancing Internet of Things (IoT) innovation.

The project has a particular emphasis on how to overcome technical, social, managerial and organisational barriers to innovation in IoT within the Manufacturing, Energy, Cities and Health & Wellbeing sectors. It also addresses issues that apply across all sectors and its work supports the UK Government's Industrial Strategy by making apparent the value of IoT methods and technologies in addressing and enabling achievement of the Grand Challenges.

Pitch-in has carried out a range of 'mini-projects', each developing and trialling solutions to address one or more barriers, or seeking to exploit IoT opportunities.

The project is funded until 2021 through Research England's Connecting Capability Fund.

Find out more about Pitch-In:

www.pitch-in.ac.uk

www.twitter.com/Pitch_In_IoT

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