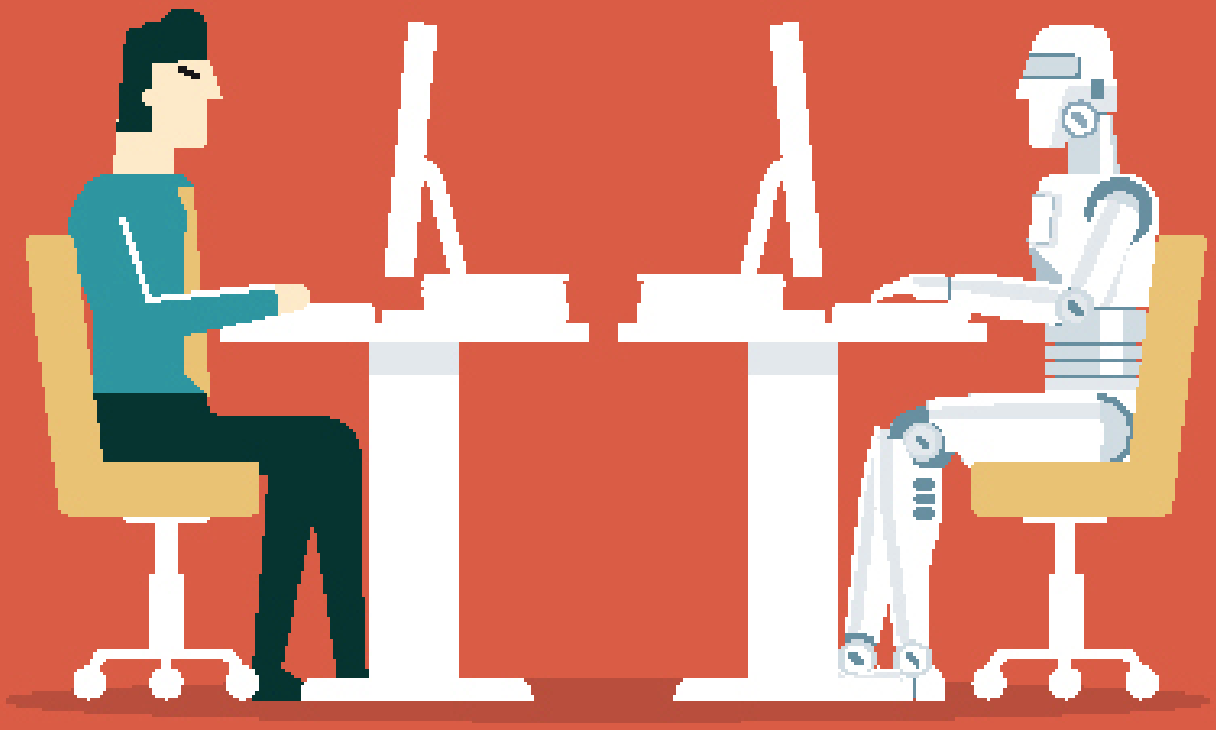
The AI Challenge



Industry conferences are awash with presentations on artificial intelligence (AI) and robotics. Suddenly, everything is possible and everything is changing. No longer is it an option to take a 'wait and see' approach! But, in practice, what should corporate management actually be doing about AI and how? By Ian Herbert and Alex Zarifis, Loughborough University.

In this article, Ian Herbert and Alex Zarifis from Loughborough University look at a typical industry disruption scenario through the eyes of a hypothetical division that has been tasked by head office with planning a digital transformation. The current context and challenges of the hypothetical insurer are outlined first and then a plan to utilise AI is discussed.

The challenge of digital disruption

Backwater Insurance offers a portfolio of insurance products through three primary market channels. Key products are asset-based policies, such as motor and buildings insurance, and personal/entity risks (eg public liability insurance, life assurance, loss of trade, etc). Around 1.5m policies are sold by the Retail unit to individuals and small businesses in the UK. A second business unit (Industrial), sells similar products to very large organisations in English speaking countries across the world, and a third unit (Bespoke), specialises in evaluating and underwriting specialist risks, eg oil tankers and strategic infrastructure. Around 10,000 employees (was 11,000, 5 years ago) produce an annual turnover of just over £7.5 billion and an average operating profit margin of 5%. The three business units have very different revenues, but due to differing margins contribute equally to operating profit.

Backwater Ltd is a division of Gettingby PLC, a large, diversified, multi-national company listed in the UK. In the past five years, performance could best be described as 'mature and stable'. Recently though, an activist shareholder has been agitating for a significant improvement in the share price. A new Group CEO, with a reputation for turnaround success, is very keen to create some good news for investors in terms of a new 'direction of travel'. Due to recent boardroom changes, the Group has some breathing space to think beyond short-term cost-cutting and there are good reserves of cash. Unfortunately, there are relatively fewer ideas for improvement within the five divisions.

Notes

Retail represents a high-volume sales operation based on national advertising and sports sponsorship. From past

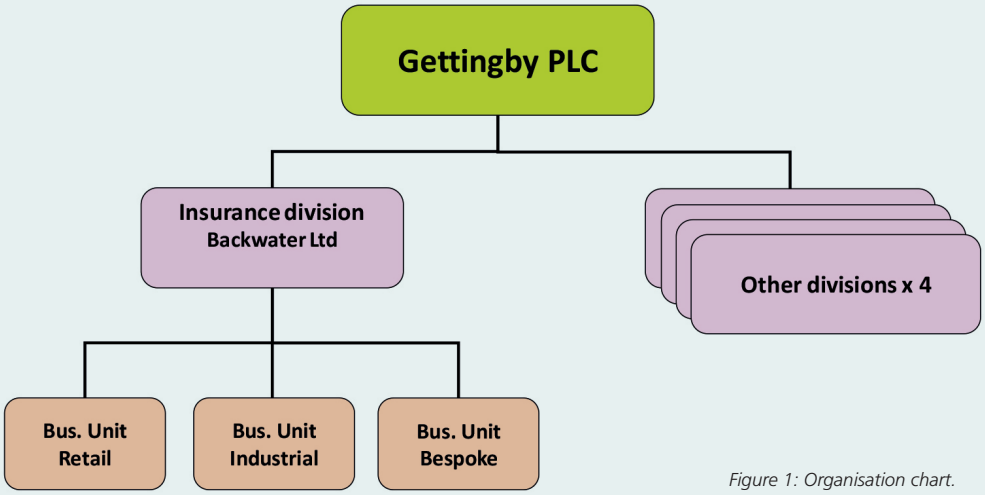


Figure 1: Organisation chart.

acquisitions, there are a few legacy sales/admin offices scattered around the UK although, 80% of business is now created through a direct website, referrals from comparison sites and telephone enquiries. Prices are given to salespeople but the central team are constantly adjusting them. The present emphasis is on increasing sales (at effectively the prevailing market rates) while keeping operating costs (mainly staff) down along with a 'keen' approach to assessing claims and minimising payouts through national purchasing contracts.

Industrial employs more sales professionals who follow-up and close sales leads that have been generated through industry advertising and telephone canvassing. Sales representatives have little discretion to adjust pre-set prices, the skill is in understanding client needs, giving good personal service and knowing when to give incentives for additional business – which must be cleared with their country office. Sales commission and employment policies vary between countries. A central team co-ordinates communication across those multi-national clients that have central purchasing policies. When a formal bidding process is required, mainly for public sector clients, the central team submits a tender document.

Bespoke emphasise clever networking, risk evaluation and negotiation by highly paid expert staff who have deep knowledge of the insurance market. A highly skilled trader decides what business to take, at what price/risk. It is very much an individual approach, but nonetheless, relatively easy to monitor performance over a year in terms of revenue versus claims.

Planning for a new vision!

Mina Santos is the CEO of Backwater and has called a meeting with David Young, Head of Strategy, to discuss her recent visit to Head Office (HO).

Mina: HO want the whole Group shaken up: this division, in particular, is under the microscope! Basically, they see Backwater as a transactional process factory that is 'heavy' on people and therefore should have the potential to make step changes in efficiency and effectiveness through AI. Of course, I argued that we have been following developments in our sector and have a number of pilots running. Unfortunately, that was swiftly knocked back. Instead, I was asked how well we would cope if a digital 'disrupter' such as Amazon decided to offer insurance?

David: That's not a fair comparison!

Mina: I agree but I was promptly told that it is the benchmark that will be used from now on to evaluate our strategic planning processes.

More positively, the Board will offer £2 million seed-corn funding to two of Backwater's five main divisions to develop a full AI strategy. They want us to prepare an outline strategy in two weeks' time that explains in broad terms how we would use the £2m over 12 months to undertake research and work some ideas up to 'proof of concept' stage in order to develop a more detailed proposal that would explain in detail how we would invest up to £20m over five years to transform our business.

David: Well we can definitely give them some projects.

Mina: Perhaps so, but a series of individual projects will not be sufficient. The Board are keen to understand what our overall vision will be to transform Backwater into a 'data-driven' business model, particularly how we would apply AI in the business. The key objective is to improve our ROCE.

Personally, I'm never sure where strategy ends and business models begin. But, in the first instance, I need you to come up with a couple of pages for our senior management meeting in two days' time. Remember, think Amazon and use Plain English, I need to keep our more conservative colleagues onboard. Oh, and there's no pressure!

David spends the next day doing some research and writes the following introduction.

A DIGITAL-FIRST BUSINESS MODEL FOR INSURANCE

Introduction

Once the stuff of science fiction, artificial intelligence (AI) and robotic process automation (RPA) are rapidly becoming 'business as usual' in a wide range of service sectors from health care to transport and logistics. Not surprisingly, there

Robots, informed by AI, can not only perform routine tasks but also add intelligent thinking to the process and its outcomes.

is a lot of hype, either about whizzy technology and massive profits or, alternatively, about the long-term effects of workers' relationships with 'humanoid' machines and the likely extent of job losses.

The received wisdom seems to be that the low-level jobs will mostly disappear. However, this assumes (perhaps mistakenly) that intelligent automation will be based on how work is presently performed and in the context of the present workplace. It also underestimates the ability of AI to enable a number of technologies and organisational methods to coalesce and fundamentally reorient customers' expectations. Moreover, AI looks set to 'turbocharge' the continued decline of middle management, leading to a hollowed-out organisation. This may have all sorts of consequences for individual careers and organisational talent management.

In order to respond to HO, I suggest that we think more generically about what we actually do for our customers, why they deal with us and how we presently organise our value-chain to service their needs? Our mission to be 'a trusted lifetime friend' has served us well, and our present strategy clearly sets out our key products and sectors along with our objectives and goals. But, 'clear' does not, necessarily, mean 'right' and we have never really articulated what our overall business model is, or even how congruous our three different business units might be? Very crudely, strategy sets out the 'what' of our business rationale, but it is the business model(s) that sets out 'how' we will deliver the strategy, vis-à-vis, our competitors.

Amazon is a great example of a company based on data (see example), the problem for incumbent operators, like ourselves, is that such disruption creates a honeymoon period when both traditional and digital models co-exist: customer choice increases, and the overall market enjoys a fillip. But, as many high street retailers have found, the problem is that it is difficult to appreciate the long-term trend or to spot the exact tipping point when digital wins out and the traditional model is relegated to a supporting role. This proposal will discuss both our long-term digital vision and our more immediate business model.

There may be trouble ahead!

At this stage, David was finding it difficult to go much further without more guidance on what the Board's reaction might be

Amazon as a digital first company

As an example, Amazon started out selling books. While many others had been doing that for years, Amazon offered only mail-order through a self-service website, supported by extensively computerised/automated operations and back-office administration. The long-term strategy was to be the 'last man standing' in the mail order goods market, and the company did not return a profit for many years. The business model was to sell off-the-shelf products through the website and operate a fast home delivery service.

However, what many people did not appreciate is that behind the brown boxes and delivery trucks, Amazon was first and foremost a digital company. Unlike its competitors, it knew little about books and authors. Its strength was the ability to gather, curate and analyse enormous amounts of data from its own customers to identify market trends at a micro-level and give customers access to personalised information about (literally) millions of products. Like its fellow tech giant, Apple, it stitched together, mostly pre-existing proprietary technology, to provide great customer service. It was soon able to disrupt first bookselling, and then the wider retail sector. Many people do not realise that Amazon is now the leading provider of cloud computing services.

to some of the more fundamental ideas that he was having. He arranged another session with Mina.

David: This isn't straightforward. An overall vision is easy enough to see, albeit, somewhat harder to articulate, but where do we start? I've taken some soundings with the senior managers, and the broad consensus seems to be to 'sprinkle' AI throughout the business in lots of small projects on a sort of 'experiment and scale' approach.

Mina: Yes, a low-risk, incremental approach has served us well with the many improvements we've made in back-office processes, through the shared services programme. However, whilst we can accommodate 'workarounds' between separate systems when they are out of the customers' sight, the AI agenda needs to be applied to front-facing operations, and that requires a broader, more joined-up, approach with a stronger end vision. This is what head office want to see.

David: Well, when I said that there was a consensus amongst the managers, the term 'lowest common denominator' is perhaps nearer to the truth. Indeed, there was quite a mixture of strong views expressed by individuals in different parts of the business.

For example, the retail unit employs by far the greatest number of people, and some managers in the other two units say that we should start in Retail, where there are the greatest number of programmable transactions. Yet, the customer service teams say that it's our people on the phones that give us an edge in the market, and we should not be replacing them with faceless robots. The central IT Director points out that we transferred the ERP system into the 'cloud' three years ago and, as a consequence, we lost most of our IT staff; the very people who could now provide the capability to implement AI. A senior manager, who did not want to quoted, told me that the lack of IT staff is likely a blessing because AI is vital to our future and the last thing we need is for it to become an IT project, rather than be business-led. The executives in the underwriting unit argue that our retail salespeople are already low-cost and automation will bring only marginal benefits. Instead, they want to see investment in big data analytics to help them to 'work smarter' in finding new niche products/clients, and so raise their margins. The central marketing director complains that some of our competitors on the retail side are already building better web interfaces to rival the 'comparison' websites. They are also using AI to augment their top sales operators while reducing lower-level, call handling, workers. Fortunately for us, most of the insurance sector is adopting a wait and see approach, and perhaps we still have a little breathing space?

Mina: I can see what you're saying and maybe we are some way from achieving a cohesive vision. However, we need to demonstrate to HO that at least we have a systematic approach to our decision-making processes, even if there are going to be tensions for a while. Tell me what you think?

David: We should start with our financial model and explain how our various activities feed into ROCE, which is HO's primary KPI. Our present approach is a tried and tested compromise between efficiency (doing things right) and effectiveness (doing the right things). We have a different approach for each of the three business units.

Mina: OK, I hadn't thought about things that way. But, we don't have a lot of assets, and with many premiums being paid upfront, surely ROCE cannot be the right measure for us? Hence, little emphasis in your diagram on reducing assets.

David: Agreed, but Gettingby's other divisions are fairly traditional manufacturing industries, and so ROCE makes sense to them. By that logic, we could look at AI applications that reduce our non-current assets, which points us in the direction of the retail business, where reducing people reduces the need for computers and accommodation, etc But, that would hardly 'move the needle' of our overall performance in terms of ROCE. In any case, we could largely achieve the same result by subcontracting voice operations to a BPO vendor or, arranging a 'sale and leaseback' on our freehold buildings. We've already

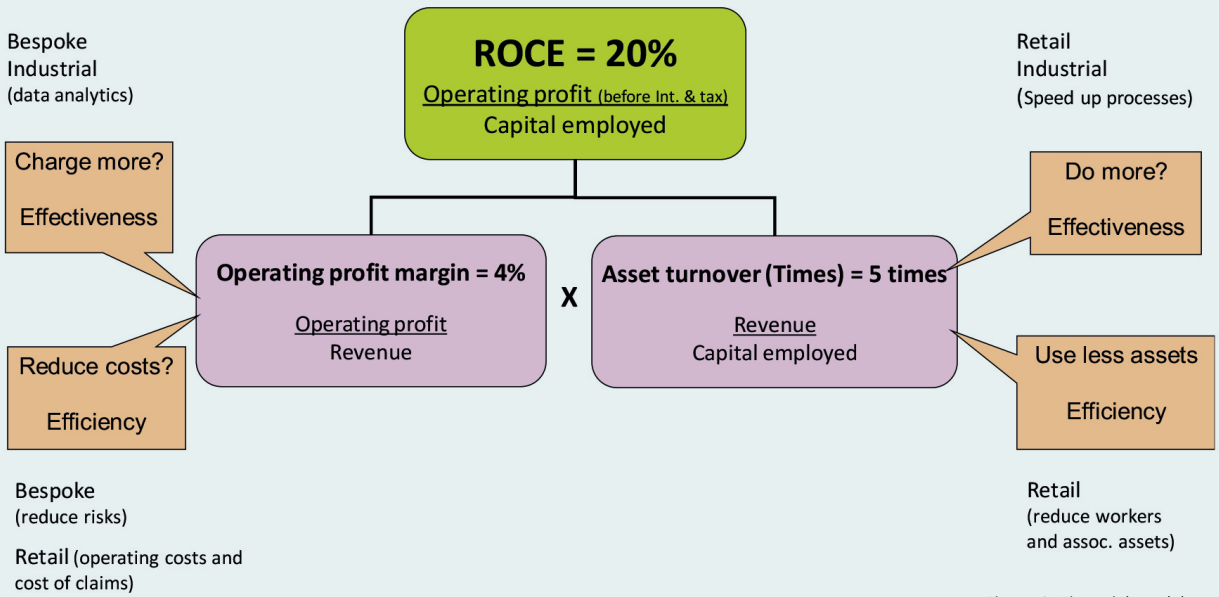


Figure 2: Financial model.

Once the stuff of science fiction, artificial intelligence (AI) and robotic process automation (RPA) are rapidly becoming 'business as usual' in a wide range of service sectors from health care to transport and logistics.

placed the ERP system in the Cloud on a 'software-as-a-service' basis.

One thought. If we replaced 'capital employed' in the diagram with the number of people employed, then we have quite a different way of looking at things. This would help us to focus us on reducing the number of people in some areas to create better efficiency (the ratio of inputs to outputs) but, at the same time, signal that we also need clever people who can generate greater sales revenue per head at better margins in other areas.

Mina: That sounds like a good basis for a long-term vision. In Retail, it also gives us some short-term wins to build credibility with HO, but it doesn't really feel like it's applying leading-edge AI especially when you throw in the reference to 'robotics'. The brief is clearly about AI, and the manufacturing divisions have been using robotic tools for years. They will be way ahead of us. In any case, there is a danger that using robots in a service industry like ours will be seen as just brute force cost reduction, with the risk that we will just speed up the present mess and upset customers.

Towards some definitions

David: Robotic process automation (RPA) and AI might crudely be seen as the difference between doing things and knowing things. However, there's a considerable overlap between the two concepts. To do the right things, 'right first time', we need both the right knowledge and application.

Automation is focused on replacing human actions across relatively programmable activities. For example, in the Retail operations there are a myriad of voice snippets, keystrokes and decisions recorded when dealing with clients. Operational efficiency is about getting the inputs right so that the desired outputs will follow. For example, a first-generation car navigation system (satnav) merely automated the process of a human navigator reading out a set of directions at the appropriate part of the journey to get to a specified destination via a predetermined route, say, using the motorway.

Robots, informed by AI, can not only perform routine tasks but also add intelligent thinking to the process and its outcomes. Smartphones now have satnav capability, but we don't think of this as representing either AI, robotics or data analytics. The interface that we see is a clever combination of all three, and the app. is as good as free, which leads us all to think that it must be simple. Yet, behind the scenes, the app. is a combination of separate components that together make a 'game-changing' experience for road users. For example, Amazon delivery drivers do not need to have in-depth knowledge of their delivery area, and this enables Amazon to scale its operations across the world. I've drawn up an illustration of data applications in satnavs.

Automated data processing in satnavs

To take just four of the key components of a satnav app.: First, there is a massive amount of preloaded map data (historical) gathered, curated, stored and made available on demand. Second, is the satellite-enabled global positioning system (a proprietary data system). Third, continual sensing of the environment (the speed and volume of other traffic) spots and assesses the severity of traffic jams ahead (real-time data from an 'OpenData' provider, eg trafficmaster). Fourth, there is a

means of interacting with the human driver (two-way voice communication and a graphical display) to suggest alternative actions or correct their errors (feedforward control).

To translate all that into a practical example, if the motorway ahead is blocked, then the satnav will spot this by scanning its environment (actual traffic data) and suggest an alternative route towards the original destination. During this process, it will adjust the estimated time of arrival, and even suggest when and where to take a break. That could be critical for a lorry driver close to his/her allowable driving limit. In this way a satnav augments and improves human activity, making drivers more effective, whereas the usual image of the robot in a factory is about replacing very repetitive human labour, ie making the factory more efficient[1].

Mina: Yes, I can see where you are coming from. Although, I confess that I'd not thought about satnavs quite like that. But, where does that takes us with our scenario planning for an insurance business?

David: The lesson from this is that we have to analyse our component activities in a different way and need to think how these might be reconfigured and combined, perhaps with proprietary algorithms/data sets in a different way that changes our wider business proposition. What do we want it to look like in, say, five years' time? What technology packages are available 'off-the-shelf'? What needs to be developed from scratch? How can a number of individual components, when taken together, really change the way we do things?

Mina: You mentioned 'algorithms'?

David: Sorry, think of these as computer programmes. But, in a service environment that can be misleading. In a factory, a robotic machine arm is programmed to carry out a predetermined series of mini-tasks to produce a specified outcome. In our case, we need to understand a customer's asset and personal risk profile from the proposal they submit. Most of the required actions are programmable, and a quotation can largely be produced automatically, say for a customer using a comparison website. However, some responses may require customer clarification, additional data, approval from the team supervisor, or even authorisation from the ultimate underwriter. That is where the software has to be more flexible and undertake further investigations, perhaps throwing out a small percentage of queries to a human operator with a number of suggestions for action?

In the case of a satnav, the algorithm may also consult other databases, inside and outside the company. For example, what is the credit rating of the customer? How relevant is that to driving a sports car safely? Is there a correlation between credit score and driving behaviour? Does the proposer have any other insurance history with us? In other words, the concept of a robot has progressed from merely a 'dumb' calculating programme to a 'smart' predictive algorithm, able to operate under various conditions of uncertainty. Further sophistication might come from letting the algorithm monitor claims and learn from its own decisions; eg did that sports car driver make a subsequent claim and whose fault was it? This is known as machine learning (ML).

There are several current implementations of AI in insurance. Firstly, there are voice assistants that utilise AI for the natural language processing used to communicate and the analysis. These voice assistants are utilised by both the customer and the employee. AI is also utilised for image processing such as handwriting recognition and evaluating damage from accidents. For audit, conforming to regulation and fraud detection, machine learning is used to review many cases and identify a subset of unusual cases for an employee to check[2].

The point is that we need to analyse exactly how our customer service teams do their work, what queries they raise with customers, what decisions they make on rejections/prices, and how successful they are. Whilst managers can be expected to be quick to point out all the tasks that RPA and AI will not be able to handle very well, it may be that we decide that within our overall vision we will be better off conceding that business to smaller niche players. When should we concentrate on specifying the exact outputs of a process and when we want to harness AI to help us achieve that?

There are a number of ways that we can cut this. Should we take a structural/technology-led approach to change, or should we look to change human behaviours/roles and use technology to augment human processes?

Mina: Well, which way is best?

David: That I don't know and that's what I suspect Head Office will be expecting us to discover in the seed corn phase before they invest £20m. There are other ways to approach this. For example, we could also choose to attack activities that have a high fixed cost element, turning them into variable costs. This may be important because AI development and operations is likely to add significantly to our fixed cost-base.

A tentative plan

Mina: While you were talking, I sketched out a framework that we could use to guide the discussions at the board meeting. Let me summarise where I think we have got to, so that you can make sure that I have understood everything correctly.

There seem to be several ways to tackle this project, but in the first instance, we need to understand and re-engineer our basic processes. This starts by challenging whether the task needs to be done the same way as at present, or does it need doing at all? There are three key aspects.

First, there is a continuum of technology starting from the programming of routine work in the Retail unit, to highly sophisticated algorithms that could replace some of the risk evaluation and trading practices of our top traders. To make lights-out processing possible, we first need to re-engineer work to make it standardised, simplified and digitised. We can then codify explicit knowledge and embed it as automated routines in our processes. We can even codify some of the tacit knowledge that our top salespeople are using in their work and augment what they do through big data analytics that feed into decision-making algorithms.

Second, we need to think of our business as both enabled and constrained by people, and we can focus our AI programme on making their work more efficient and/or effective. ROCE is unlikely to be a satisfactory guide, but we can expect that HO will set a threshold return on investment

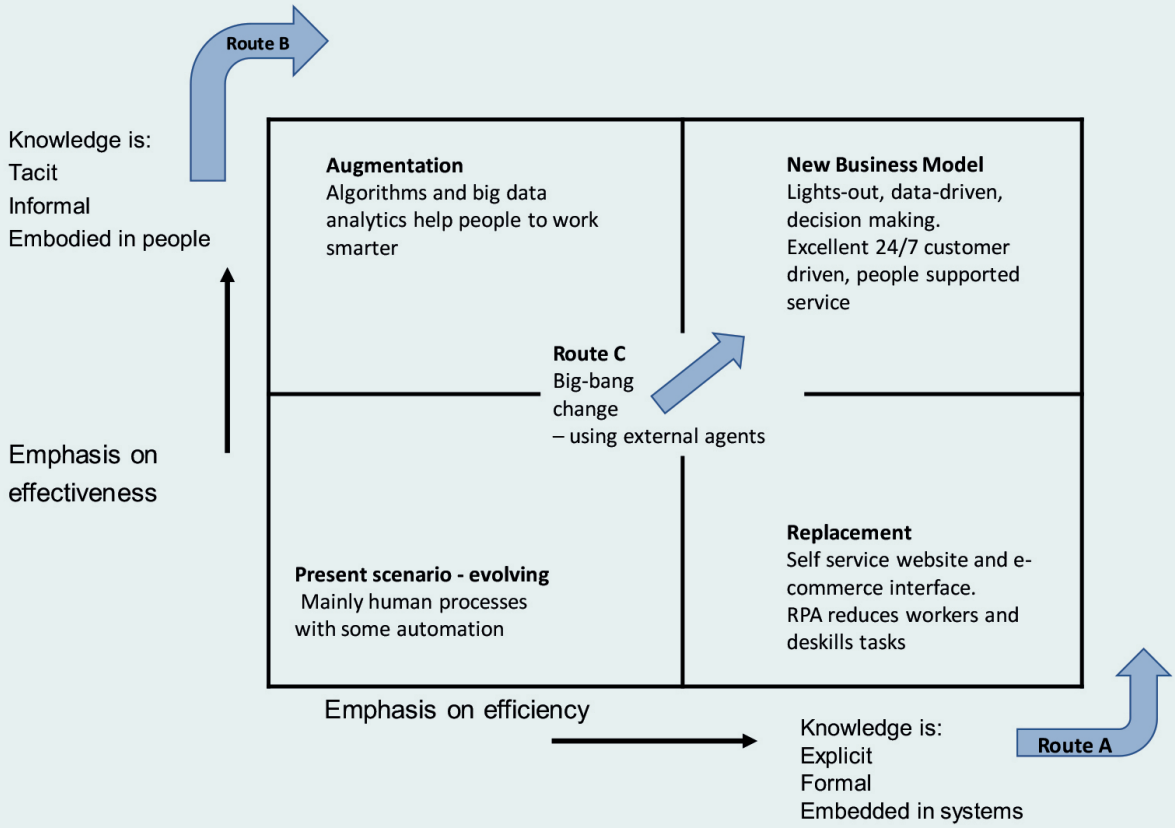


Figure 3: A framework for digital transformation.

rate when appraising our request for capital investment.

Third, implementation planning will be key to success and we can use the diagram above as a framework for thinking through the three basic options; pursue either route A (efficiency-led, emphasis on robotics) or B (effectiveness-led, emphasis on AI) to start with but accept that both aspects will be necessary to get to the top right hand quadrant. Or, go for a 'big-bang' approach, Route C, using BPO vendors, consultants and proprietary software from start-up companies developing robotics and AI technologies to quickly transform.

David: You have got a very good grasp of the issues, but a radical transformation of the business model will require a longer-term commitment that may not be beneficial for one or two years.

Mina: That's exactly right. But, both routes A and B can provide interim benefits that will build further support moving forward[3]. Indeed, the more incremental approach provides an opportunity to reflect and recalibrate the journey. On the other hand, route C, the 'big-bang' approach led by external consultants/vendors, requires total conviction in the new business model as we initially envisage it.

David: I'll just add one thing for now. There are significant opportunities in achieving a vision of 'lights-out' processing and data-driven decision-making', but significant benefits at a strategic level will not arise until we address both routes. Therefore, we need to think very carefully about our capabilities for both planning and implementing change. In other words, a co-ordinated organisational strategy will be as important as the specific technologies/vendors that we might choose.

Mina: Sounds good to me, please get this written up for the meeting.

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