CREATIVE INTELLECT CONSULTING LTD

Discovered Insights 2018

Understanding Digital Transformation

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A Creative Intellect Consulting Analysis Report

Understanding the ambitions, challenges, underlying technologies, application and working practices, that underpin Digital Transformation initiatives, and to identify the key steps for successful execution.

CREATIVE INTELLECT CONSULTING

A respected, independent Industry Analyst firm, with decades of experience and expertise in the IT industry, CIC has advised clients that include the world's largest IT vendors and enterprise organisations. Our extensive knowledge of technology and market practices provides us with a unique understanding of what Digital Transformation means for those tasked with delivering it. If you would like to discuss your organisation's circumstances with us, please get in touch **bola@creativeintellectuk.com**

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As a key decision maker, you are accustomed to leading and managing change. Digital Transformation, done correctly, turns your vision into business reality, putting technological capability at the heart of your organisation's processes; done poorly, it leads to wasted resources and a loss of confidence amongst your people.

Creative Intellect Consulting (CIC) has collated data from conversations about Digital Transformation, conducted with over 1,100 individuals in organisations both large and small, from across many industries and sectors around the world.

The Discovered Insights portal – www.discoveredinsights.com – uses this information to provide a flexible dashboard, which can be filtered to fit specific organisational, industry or geographic profiles. Charts can be downloaded for use in documents and presentations.

The aim of Discovered Insights is to help you make the right change for your organisation.

The portal provides an opportunity to:

- **See what your peers are focussed on in terms of business change and transformation**
- **Highlight key opportunities and challenges**
- **Identify the key steps for successful implementation of Digital Transformation**

Digital Transformation

Driving innovation in the modern digital enterprise

CIC's definition of Digital Transformation is, "The transformation of business activities, processes, competencies and models to fully leverage the changes and opportunities of digital technologies".

It is fundamentally a business-led change, informed by your medium and long-term strategy, that is about transforming core aspects of how your organisation works internally and how it engages with partners, suppliers, and, most importantly, customers.

The key tenets of Digital Transformation for most organisations are: more efficient and intuitive operation of the business; improved employee, customer and partner engagement and experiences; and to become more innovative in development and delivery.

The importance of education and culture within the organisation cannot be overstated. A lack of understanding as to what it takes to become a digital business is a common challenge. In addition, businesses often lack the skills and experience required of a modern enterprise.

New solutions and processes will be essential, but if they are not embraced and adopted by your organisation, your Digital Transformation will not be successful. This usually means a shift in culture and that can be the biggest challenge.

Where Digital Transformation is delivering successful outcomes, CIC has observed the following:

1. **Ownership of the Digital Transformation strategy is usually held by the Chief Executive Officer, and IT leaders (such as the Chief Information Officer and Chief Technology Officer) are key partners**
2. **There is a strong partnership between the business and IT, where IT has a good understanding of business processes and is measured on delivering business value**
3. **Both the business and IT embrace new technologies and new ways of working**
4. **Small cross disciplinary team with business domain knowledge and technology insights can strategically direct and shepherd in processes that deliver a step change in operations**

What does it mean for IT?

IT will need to deliver many of the technology solutions that enable Digital Transformation. Increasingly, they will do this themselves, rather than through third parties. A challenge for IT will be the current skills shortage. Therefore, it will be important to put in place the technologies, tools and processes (such as Agile and DevOps) to be more efficient. Technologies, such as mobile and Cloud, will need to be introduced, but in ways that integrate with existing IT investments.

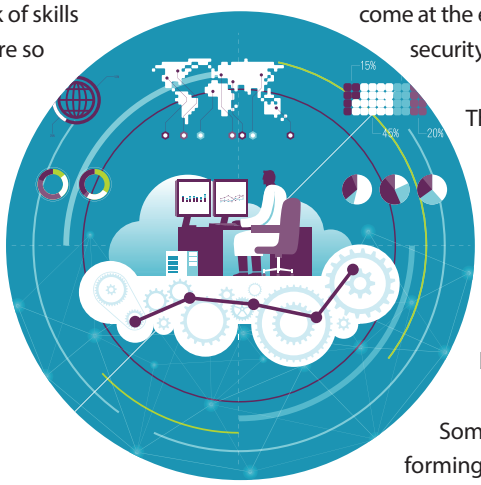
Development strategy

Combining the old and the new to maximise the value of both

Identifying barriers to change is fundamental to successful Digital Transformation. While many organisations, unsurprisingly, cite cost as a barrier, it is important to note that in IT, the lack of skills is often the biggest challenge – more so than budget.

Have you got the right people, with the right expertise, enthusiasm and knowledge? This may determine decisions such as in-house vs outsourced application development, or indeed the use of professional developers vs non-professional developers.

IT's role will be to support Digital Transformation through delivering new solutions. To do this, they will need to change too; not just in new technologies, but mainly in new ways of working. Speed of development is cited as being key to modernisation, but speed cannot come at the expense of such important issues as security and reliability.



There will also be the need for new skills, such as Product Owner, and in new fields like User Experience. Most importantly, the way in which IT is measured should change – no longer based on delivering requirements, but delivering business value.

Some questions to consider when forming a Digital Transformation development strategy:

1. **Should application development be done in-house or outsourced?**
2. **How will new applications interface and integrate with core systems and data?**
3. **How will you ensure applications have adequate security? (Nobody wants their organisation in the news/ facing a massive fine because of a data breach)**
4. **How can applications improve experiences for staff, customers and partners?**
5. **How quickly will your organisation need to change/adapt applications to new or changing demands?**

What does it mean for IT?

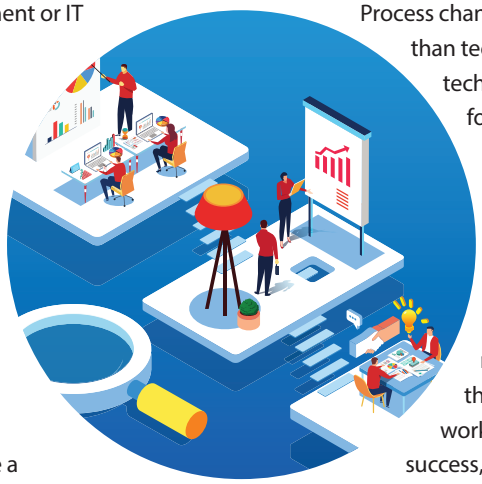
Process changes could be considered as more important than the adoption of new technologies. In some cases, existing technology can be repurposed to support modernisation. For example, the Java programming language – a stalwart of the last two decades – can be used to deliver applications on new platforms such as Cloud and devices. Platforms like Cloud will enable developers to try new ideas more quickly and so support innovation within the business – a key tenet of Digital Transformation. IT needs to create a foundation of technology, skills and process on which innovation can thrive.

Technology and methodology

Process and technology to support the digital enterprise

You may think that senior IT leadership influences the technologies used by your organisation. CIC's research has found that the key influencers tend to be middle management – Heads of Development or IT Managers.

With prices of technology choices reducing, a team leader can pay for some Cloud resources, for example, on a credit card with no need to refer the decision higher up. Technology choices have therefore become more tactical than strategic – whatever best suits a given product or project.



Existing technologies used must be a key consideration in Digital Transformation. While some new technologies undoubtedly have value, there are some that get linked (rightly or wrongly) to innovation. Organisations should be wary of this and of adopting technology with the belief that it intrinsically makes them more innovative.

Process change may present greater benefit than technology. Many existing technologies support faster processes – for example, Agile methodology pre-dates Cloud computing. Similarly, technologies may not inherently support the ambitions of Digital Transformation without a change in the process. This change can be the most challenging, as it represents a shift in culture within the organisation. Supporting a workforce through this will be critical to success, and why top down change is often more successful than grass-roots.

Key questions that should be asked of new technologies and processes are:

1. **Does a new technology or process support the key tenets of Digital Transformation, such as increased speed, better experiences?**
2. **Will the technology support multiple delivery platforms, such as different types of mobile device?**
3. **Does the organisation support the adoption of new processes through education and remuneration?**
4. **Is there support for critical concerns, such as security and data privacy?**

What does it mean for IT?

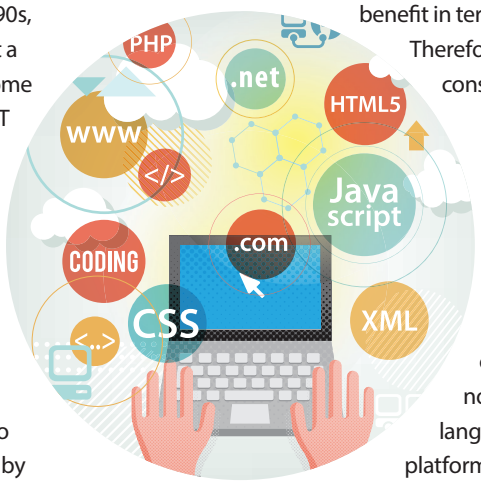
Traditional vendors, such as Microsoft and technologies stalwarts like .NET and Java, are still the most popular. Newer technologies, like HTML5 and JavaScript, have rapidly gained popularity, along with new vendors, such as Google and Amazon Web Services. How IT blends their current investments in skills and experience with new technologies will be critical to success. Importantly, there has been a shift away from traditional processes, like Waterfall, to modern, faster methodologies, like Agile and DevOps. But, do not be fooled into thinking that faster is always better – it's about being able to move at the right speed when needed.

Development languages

What is it that makes a language fit for the modern enterprise

CIC's research has shown that organisations have discovered that the choice of language can have significant implications over the long term. When enterprises began using Java in the 90s, they may not have realised just what a significant investment it would become over time and how it would impact IT strategy in the future.

With this lesson having been learned, the choice of a language may be more strategic today than that of a technology. Development of a language strategy, as part of Digital Transformation, is generally led by your CIO/CTO. Compare this to technology selection, which is done by more middle-management roles.



Where a new language is introduced, it will require an investment in training, tools and support. Fortunately, many developers today are polyglots and so used to working with multiple languages. When selecting a language, it is often the tooling that provides the greatest benefit in terms of more efficient development. Therefore, tool support is an important consideration.

Apparent trends do not always manifest in the real world; for example, Open Source is often cited as being important to developers and customers. However, CIC's data suggests the contrary to be true; organisations do not want to be locked in to proprietary languages that may not support new platforms as they emerge and may also result in higher costs over time.

What drives the choice of language, and adoption of new languages?

1. **How languages can cross over technologies (e.g. Java can be used on desktop, server, devices etc.)**
2. **New requirements, such as the importance of the web (HTML5), or popularity of the iPhone (Objective-C for iOS apps)**
3. **Language attributes, such as performance and inbuilt security**
4. **Cost – many leading programming languages are free, so this is not always a limiting factor**
5. **Availability of developer skills and support for developers looking to reskill**

What does it mean for IT?

It is no surprise that the number one language across delivery platforms (desktop, mobile, web, server, IoT) is Java. Java is free, performant, with inbuilt security, and a wealth of available support and skills in the market. It can also be used across a variety of delivery platforms, including server, desktop, mobile, web and Internet of Things. The second most popular language is JavaScript, for very similar reasons. The continued success of Java, and other traditional technologies, shows that the future is not necessarily all about what is new, but that language investments can support new platforms, like web, Cloud and Mobile.

Professional developers

Acquiring talent with the right mix of skills and experience

Software is increasingly becoming the differentiator between organisations. This makes developers a highly sought-after and valuable commodity. Over half of enterprises have over 100 developers, with a third having more than 200.

Digital Transformation means more software and that will require more developers. However, it will be important for your organisation to have developers with the right mix of skills and experience. This will include both traditional and more modern technologies.

Large organisations need to retain developers with experience of existing business systems and applications. Many future applications will require integration into legacy IT and so developers with that experience have value.

Equally, developers with domain knowledge are also highly sought and finding them is a challenge that is holding some organisations back. Where developers have deep knowledge of the business or industry sector, they can deliver solutions that add value much more quickly.

Two thirds of developers have more than 10 years' experience; to put this into context, these developers were working before the iPhone was released. There may be a challenge in finding developers with skills in new technologies, such as Web, mobile and Internet of Things.

Considerations when utilising existing developers or hiring new ones are:

1. **Developers with different experience can come from different cultures; how does an organisation blend these cultures?**
2. **Legacy solutions will still require maintaining and so the appropriate skills will continue to have an important place**
3. **New processes are often more important than new technology skills; how can developers be supported through such change?**
4. **Developers with an understanding of the business needs can deliver solutions that create more value**

What does it mean for IT?

The market is short of skills and IT environments require both traditional and modern skills and experience in technology and process. The question is how to create a strategy that supports Digital Transformation and best uses professional developer resources. CIC sees many organisations build out platforms that abstract critical business systems, so that new solutions can be rapidly delivered on top – often using new skills and processes. APIs are core to this approach. Developers with traditional skills can create these APIs and those with more modern skills build on top is often an efficient use of different resources.

Non-professional developers

Enabling the modern workforce to support IT

The idea of empowering non-professional developers to build applications may make you recoil in horror. Think of all the things that could go horribly wrong. How about the idea of a business user building macros in Excel or mini applications out of Microsoft Access? That's ok. In fact, thatis probably happening right now somewhere in your organisation.

Enterprises view non-professional developers as a potential asset. These people can be key to successful Digital Transformation – imagine the existing resources you have at hand to ease IT functions that are under pressure, if you provide a secure and robust foundation with the right tools.

Employees are increasingly technically savvy and the growth in tooling – especially in the Cloud, which circumvents many IT restrictions – that enable them to build apps means that many are already crafting their own solutions. Such tools are often referred to as "low code", as they usually require the application builder to write minimal (if not zero) code.

For some time, IT has attempted to curtail these practices. Today, we see more progressive organisations embracing these inclinations among some of the work force – this will not appeal to everyone. Even those with the inclination, and perhaps some experience, will require training and support.

Potential benefits of empowering non-professional developers include:

1. **Speed up application development, using low-code tools that often support rapid application development processes**
2. **Reduce development costs by operating outside of more complex IT environments**
3. **Help the business to adopt faster development and deployment processes**
4. **Faster integration across legacy and new software – often a core feature of low-code tooling**
5. **Improve application security**

What does it mean for IT?

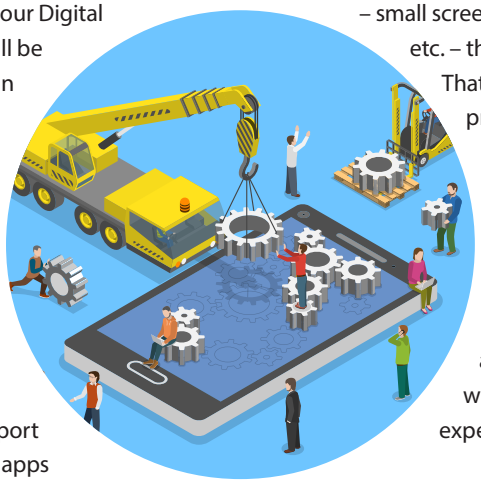
Historically, IT has not sanctioned development by those outside of its walls – often for good reasons, relating to security and data protection. There has also been a reluctance to use low-code tools, as they can result in proprietary lock-in and have limited capabilities. However, these tools have improved and IT is under greater pressure to deliver solutions that it has not the resources to do. By putting in place the right foundation – such as a platform that abstracts business systems in a way that secures them and controls access to data – IT can empower non-professional developers and low code tools.

Mobile development strategy

How IT will meet the demand for more applications

If you're looking for efficiencies by enabling a modern Digital Workforce, or looking to improve the customer/employee/partner experience, you're looking to deliver mobile solutions as part of your Digital Transformation. Your IT function will be called upon to develop and maintain these.

There will be many business processes that can be more efficiently enabled through mobile. Often, through the combination of the right device and the right app to match the use case. This means having a development strategy that can support the creation and evolution of many apps that run on a multitude of different devices.



Mobile development requires new skills in technology, tools and platforms. But also in new disciplines, such as User Experience. Due to the limitations of mobile devices – small screens, relatively limited hardware, etc. – the app experience must be superior. That requires both new skills and new processes.

Ownership of mobile development is currently distributed across roles – in both IT and the business. As such, a development strategy must work across numerous distributed teams, with differing skills and domain expertise.

What needs to be considered within your mobile development strategy?

1. **User interface and usability, taking device limitations into account**
2. **New deployment considerations (for example, iPhone apps must be approved by Apple)**
3. **New security and architectural challenges**
4. **How much IT resource will be needed to meet demand for new apps/ support for existing apps**
5. **Does your existing IT function have the required skills to deliver/ maintain apps?**
6. **Where are the quick wins that will get more people on board with Digital Transformation?**

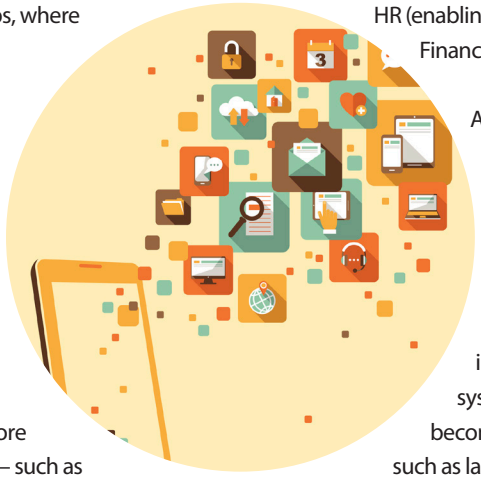
What does it mean for IT?

Mobile apps tend to be small projects – relative to traditional IT projects. Therefore, they present a great opportunity to try new skills, technologies and processes. It is no surprise that we have often seen mobile projects as the first to try Agile or Cloud within an organisation. They also provide IT with quick wins. Being able to prove to the business that innovation can be done faster and more iteratively. Most modern apps – especially those for the internal work force – require integration into traditional systems. This makes such projects great for beginning to build out integration platforms, such as APIs.

Mobile app strategy

Building more apps to support the digital enterprise

Although Business-to-Customer (B2C) apps are undeniably important within Digital Transformation, organisations are shifting focus to Business-to-Employee (B2E) and Business-to-Business (B2B) mobile apps, where both improved user experience and efficiencies may be yielded.



Mobile applications will be considered within your organisation's mobile app strategy. It is important to note that CIC's research has found that in many organisations, B2E and B2B apps tend to far outnumber B2C apps. Most organisations have now built 3 or more apps for internal use; often more than they have for external audiences – such as customers. These numbers are likely to grow rapidly.

The Mobile Workplace is often an aspiration of Digital Transformation, as it enables employees to be more efficient and effective. It is not just about mobile enabling existing processes, but mobile enabling all new processes that add value to the business. Popular business functions for apps are HR (enabling employee self-service), Marketing and Finance.

A fundamental question to consider is whether to outsource development, or do this in-house. Past IT strategy has often been to outsource development. However, with organisations wanting to move faster and apps often requiring deep integration into existing business systems, in-house development has become the preference. There are challenges, such as lack of skills, that can make this difficult – at least in the short term.

Key considerations when planning a mobile application strategy are:

1. **Which apps will add most value to the business?**
2. **Which apps best serve the ambitions of Digital Transformation?**
3. **Which skills and capabilities does the organisation currently have to deliver apps?**
4. **Who will own the app? Often it can be challenging to find product owners for mobile apps?**

What does it mean for IT?

Mobile app strategies are going to place a burden on IT – the number of apps demanded from across the business can be overwhelming. In addition, apps often evolve rapidly and so, unlike traditional IT projects, these apps will require constant resources to iterate them. IT therefore needs to be a partner with the business in developing an app strategy. IT leaders will also need to consider their mobile development strategy and what skills, tools, technologies and processes it will require. With apps being very focused on domain specific use cases, this highlights how important domain understanding in IT will be.

Mobile technology strategy

Optimising technology for a fragmented platform market

Mobile is a fragmented platform market, split between Google's Android Operating System and Apple's iOS. While Android dominates (90%+) in terms of the overall market, Apple is still important to many organisations. Such that most organisations treat them as equal. There is no sign of this changing in the next 12-18 months.

The question for organisations is how to best support two platforms – and potentially more in future – in a way that is efficient. Creating and supporting what are essentially two apps that serve the same purpose is not efficient. With a shortage of skills, having two separate teams replicating each other's work is not the best use of resources.

The issue of technology is not just about building apps, but there are other issues as well. For example, collecting data from live app usage and then analysing it for insight that can help to improve apps. Testing is also critical and capabilities in this area have evolved significantly – often involving Cloud based testing tools.

Most mobile apps require common features, such as the ability to send push notifications, or perhaps an awareness of the app user's location. Building out these capabilities from scratch and maintaining them is not sensible - so looking to third party services is a better alternative. This also allows your organisation to focus on what is unique about your apps, rather than common, shared capabilities.

When considering technology for us in mobile development there are some issues:

1. **What best supports cross platform development, and potentially other types of development as well, to maximise skills re-use**
2. **How to support the complexities of mobile app deployment, such as unknown delays created by Apple's approval process**
3. **How best to handle security on the app and any backend systems that need to be exposed beyond the company firewall**
4. **Create common components or toolchains that enable multiple development teams to be efficient and share in best practice**

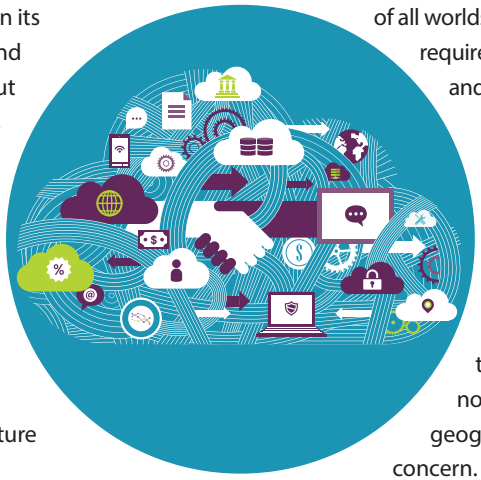
What does it mean for IT?

Native app development means having multiple teams split across Java (Android) and Objective-C/Swift (iOS) and associated tools. This approach will not scale well, especially for large portfolios of internal apps. Technologies, such as HTML5, enable hybrid development in which code-bases can be shared across apps. Mobile Platforms have not proven popular – often due to limitations – and therefore organisations typically pull together their own toolchains and re-usable components, along with UI toolkits that create commonalties within the code and the User Experience.

Cloud

Embracing a multi-cloud, hybrid-cloud world

Organisations have been challenged by the Cloud, with concerns such as security and data sovereignty – where is their data and IP being stored and who could access it? Whilst each organisation, based on its own concerns such as governance and regulations, must make choices about whether to and how to adopt Cloud, most already are.



Cloud presents various opportunities, from a new platform to deliver applications, to a new way of more cost effectively and efficiently consuming business applications. For many, it represents the ability to reduce capital expenditure in their own data centres by moving workloads into the public Cloud.

But public Cloud is not the only Cloud. For some, running their own Cloud within their own data centres is the solution.

For many, the answer will be a combination of public and private – so called "hybrid" Cloud. Enterprises, especially, will make use of multiple Public Clouds, making use of the best of all worlds. However, such heterogeneity will require managing and that means new skills and tools.

Despite the belief that locality of public Cloud data centres is critical, CIC's data shows that it is not as high a priority. Although, incoming regulation, such as European GDPR, may once again sharpen the focus on this issue. However, the main vendors now have data centres in multiple geographic locations to alleviate this concern.

When selecting a Cloud, there are various concerns that organisations prioritise:

1. **Availability is the most important attribute and something the major Cloud vendors will provide service level agreements to address**
2. **Core services are critical, such as compute and storage, in addition to new services, such as Artificial Intelligence**
3. **Support for third party services, such as different types of data stores – relational, non-relational and big data – as well as support for popular applications, like Oracle and SAP**
4. **Organisations may look to very specific capabilities that a specific vendor may be strong in and hence a multi-Cloud strategy**

What does it mean for IT?

The market leader in public Cloud is Amazon Web Services, however, within enterprise organisations this changes to Microsoft Azure. Perhaps a reflection of Microsoft's history as an enterprise vendor and its understanding of the market. That said, we see enterprises using multiple public Clouds and IT looking to the best fit for a given solution. While native Cloud development is happening, it is an aspiration for many, while the majority are looking for easy on-ramps, such as extending existing virtualisation estates into the Public Cloud. Those that have most success have a clear Cloud strategy in place.

Application strategy

The right applications and environment for the future

Digital Transformation will mean more technology, more solutions and more applications. With limited resources to deliver these, it is critical that organisations have a clear strategy and prioritise. For many, traditional desktop/server applications will remain vital for some time. These will be supplemented by mobile apps and increasingly we will see Internet of Things lead to more connected devices.

There will be key questions that organisations will have to answer, that cover everything from technology, through skills, to organisational structures and processes. There is already a move away from traditional IT projects measured by how they deliver a set of requirements, towards products that are judged on how they deliver value to the business.

The future will require the business and IT to partner closely, to deliver the best solutions that add value relative to the resources and budgets available. Over 80% of IT spend is still in traditional areas and this will change, but not rapidly. Therefore, the business will need to continue to leverage existing solutions and many will be fundamental to new products.

Many of the existing vendors and technologies will remain important. For example, virtualisation, which has been used heavily over the last couple of decades, will continue, as will the server operating systems on which it runs. New vendors may come in, but often side-by-side with the old, rather than a replacement. For example, new container technology will run on traditional server environments.

As organisations consider an application strategy there will be key concerns:

1. **How best to handle integration between legacy systems and new solutions**
2. **How to leverage existing investments to support new requirements and capabilities**
3. **How to put in place the right components to enable fast delivery of new solutions**
4. **How to make sure that different teams are aligned, to ensure that they all serve a common ambition**
5. **How to support a product lifecycle approach rather than projects with the correct team structures, roles and skills**

What does it mean for IT?

Moving forward there will be more applications, serving different delivery platforms and they will be more iterative. This will mean putting in place the right skills, methodologies and processes to support this type of development. Agile, DevOps, Product Owners and User Experience will all be critical, but will require the right culture and alignment of KPIs to be successful. Increased volume and velocity, with a mix of old and new technologies will require new platforms – most often supported through APIs. An API strategy that handles issues such as security, governance, versioning, and developer experience will be crucial.