



Organize for Digital — the CIO / CDO relationship

December 2018

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Infusing Digital DNA

Many enterprises embarked on a journey to become digital organizations. In this journey, they need to develop from merely 'doing digital' into 'being digital', where digital DNA is infused in every part of the enterprise.

The digital imperative

There's no question that in today's digital age, the pace of disruption is only set to increase. As new technologies—such as the Internet of Things (IoT), artificial intelligence, robotics, and, virtual reality—proliferate, organizations are coming under mounting pressure to rethink not just their technology strategy but their entire business strategy. These new digital technologies have the potential to disrupt entire markets, value chains and business models.

In the view of Deloitte, every business will be digital and therefore the ongoing digital technology push will force your organization to better organize how you identify, trial, evaluate, risk assess and scale or fail new digital technologies and make them business relevant.

The impact of this goes beyond the introduction of new technology, it impacts business models, way of working, culture and behavior, and leadership as well. There is a big difference between 'doing digital' and 'being digital'.

Becoming digital mature

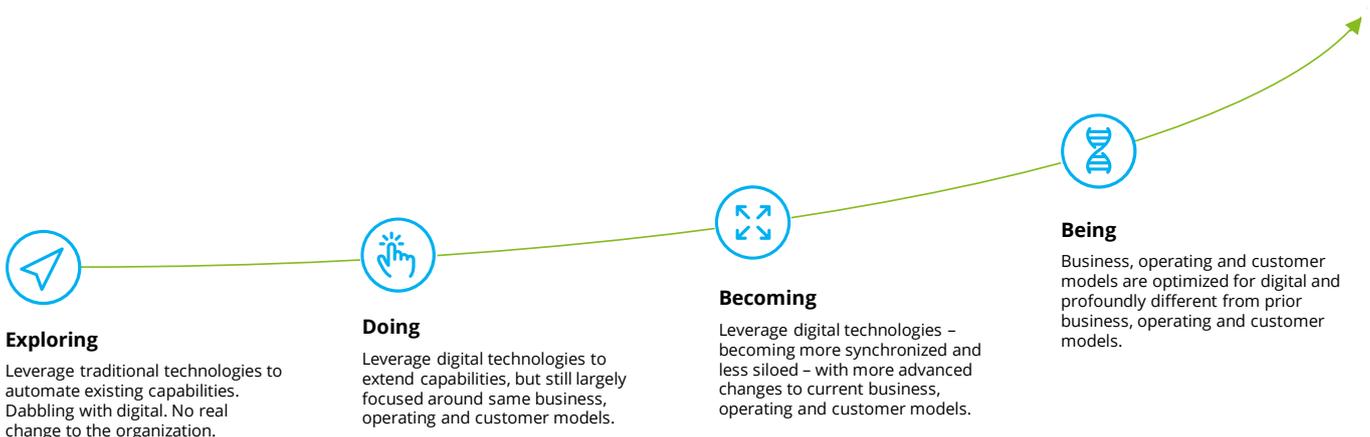
When organizations embark on their digital journey, they typically pass through several phases of maturity. During the earlier phases, this mostly means they are focused on **'doing digital'**—leveraging digital technologies to extend their operational capabilities (often focused on customer channels), while still largely relying on traditional business, operating, and talent models. They remain traditional enterprises that do digital projects.

Enterprises that have reached higher levels of digital maturity, however, are perceived as **'being digital'**. For these enterprises, digital traits and a digital mindset define their corporate outlook and behavior. Rather than merely digitizing customer touchpoints, they *reimagine* new ways to engage with customers. Similarly, rather than simply 'doing' digital projects, they have adopted an integrated strategy that makes them digital at the core—right to the level of their DNA. They are not traditional organizations that 'do' digital projects; instead, they have altered their corporate DNA to *become* digital.

Playing the long game

Digital DNA doesn't develop accidentally; it takes time, commitment, and a degree of risk appetite and leadership. Instead of trying to make quick fixes, digital leaders play the long game. They imagine what kind of organization they want to become in the future and empower their leadership to deliver on that vision.

Digital maturity is about putting your money where your mouth is: by first imagining a digital future and then delivering on it.

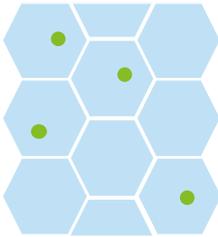


Organizational choices

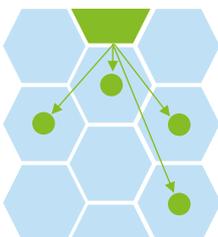
Another lens to look at the journey of increasing digital maturity is to consider the typical organizational models enterprises adopt along the way.

The journey starts with an **ad hoc** organizational model, where bits and pieces of digital initiatives emerge in different parts of the enterprise, typically small initiatives that do not scale, with duplication of effort and lack of transparency in spending and revenue generation (sometimes referred to as 'shadow IT'). This corresponds to the 'exploring digital' maturity phase.

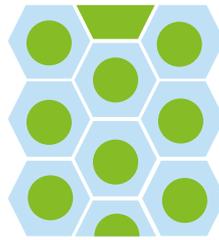
Our 2018 Global CIO Survey indicates that a significant number of enterprises is still in this early phase, as only a quarter of CIO's report that their organization has an enterprise wide digital vision and strategy in place.



At some point, these symptoms can no longer be ignored, and the **centralization** starts. Digital is brought under single leadership, and scarce digital capabilities are consolidated to a single place in the organization, to be developed to a higher level of maturity and proficiency. This corresponds to the 'doing digital' maturity phase.



Having developed a minimum level of maturity and scale, the hotspot of digital capabilities needs to start **infusing** the other parts of the enterprise with digital capabilities and digital solutions, as part of introducing digital business models. This corresponds to the 'becoming digital' maturity phase.



If done well, this brings the enterprise to the final organizational model, where digital is so embedded in every part of the enterprise that it has become **business as usual** and in fact decentralized again. This corresponds to the 'being digital' maturity phase.



In this final phase, digital has become so natural that the adjective 'digital' is no longer used in job titles and organizational units. There is no 'digital business' any more as all business has become digital.

Don't get stuck in 'doing digital'

In these four stages, the second one – centralizing digital capabilities – is not the most difficult one. It is merely hiring the right team and providing them with the resources they need.

The real challenge is in the third phase; is the digital organization able to infuse the other parts of the enterprise with digital DNA and make them digital as well? Or does the central digital organization end up as a 'digital empire' that is disconnected from the rest of the enterprise, creating lots of small digital pilots but not being able to scale to enterprise level? The way enterprises organize their digital capabilities should aim at establishing the fourth stage, and not be limited to the horizon of the second stage.

In the view of Deloitte, monitoring the progress of this digital infusion of other business units needs to be high on the agenda of the Board. To do this

effectively, enterprises need to be able to measure the digital maturity of business units. For this purpose, Deloitte developed a digital maturity / digital DNA assessment tool.

Who will lead?

The question who will lead the digital transition is not self-evident. Will it be one of the business executives with a focus on the customer, e.g. from the marketing and sales domain? If this choice is made, he/she can then own the physical channel (stores) as well as the digital channels (web and app). Or does the CIO shift to the role of digital leader, simultaneously offloading the operational IT responsibilities to a Chief Technology Officer (the COO of IT)? You can also argue that leading a digital transition is a full-time role, for which a new position needs to be created in the leadership team; the Chief Digital Officer (CDO).

No one size fits all

There is no 'one size fits all' solution. In the market, we see different models, some successful and some less successful. However, in the past years, sufficient experience has been built to make it worthwhile to learn from others.

Whatever choice you make, leading a digital transition differs from existing roles and responsibilities. This Deloitte point of view helps you in making these choices, with practical guidelines based on our experience in the market.

10 Traits of Digital DNA

1. Compelling digital vision
2. Strong leadership and governance
3. Culture of innovation and exploration
4. Data-driven decision making
5. Distributed decision rights
6. Agile way of working
7. Commitment to driving down complexity
8. Multi-speed operating environment
9. Fast learning and collaboration
10. Establishing ecosystems



Navigating the waters

Going digital is a journey that may be a bumpy one, and the way you organize the journey determines the success of it. Dealing with innovation antibodies and innovation theater are two of them.

Innovation antibodies

If done well, a digital transition transforms the organization to its core. The impact will not only be in a superior customer journey but will change business processes and the way work is done as well. Management and staff will be impacted by digital, and what seems a “cool” initiative to digital leaders, might not seem so cool to the managers and staff its concerns. Especially when digital initiatives are cannibalizing existing business. Resistance is likely to emerge, and this phenomenon is often referred to as the ‘**innovation antibodies**’. Just like every human being has antibodies to biological viruses in his/her blood, every enterprise has “innovation antibodies” that can be dormant for a long time but get activated by possible disruption. The antibodies have the form and shape of departments and staff that view disruptive ideas as a risk that must be mitigated. They can be very effective and suck the life out of disruptive innovations and effectively kill them.

In setting up the digital leadership and digital organization, you need to be aware of this mechanism and take effective measures to deal with them. For example, by strong change management, actively engaging departments and making them part of the solution. It is also essential to have a psychological safety net in place for failures that will inevitably happen as the result of digital experiments.

Having said that, the existence of innovation antibodies is a fact of life and they are not all bad too. They serve to protect existing value streams and brand image. These antibodies can act

as checks and balances against risks that shouldn't be taken. It only becomes a problem when these antibodies mistakenly identify digital disruption as a threat.

To make sure these checks and balances between innovation antibodies (protecting the existing business) and digital disruption (creating the new business) effectively takes place, organizations may decide to deliberately create a ‘**managed conflict**’ in their organization. The idea behind this is that the conflict will happen anyway, and if that is the case it can best happen in a controlled way.

Bottomline, digital disruption cannot take place without conflicts. The way you organize your digital transformation must make sure these conflicts will take place, but in a controlled manner.

Innovation theater

Another phenomenon that threatens enterprises from really becoming digital is what has been referred to by some as ‘innovation theater’. This is when enterprises try to look innovative by mimicking what they observe successful digital enterprises do, without really making an impact in the organization. It's all appearance and no substance.

Typical ingredients of this digital theater are fancy job titles (of course starting with the adjective ‘digital’), startup-like office spaces (with beanbags and games), wearing jeans and sneakers, digital jargon (talk a lot about ‘failing fast’ and coin every change as a ‘disruption’), taking the tour to Silicon Valley, and setting up an innovation lab (though not delivering scalable innovations).

To avoid getting stuck in digital theater, you need to articulate **measurable goals**, linked to business innovation and customer engagement. To keep your eyes on the ball, you will need **board level reporting** every quarter.

What makes a good digital leader?

Transitioning to a 'being digital' organization requires strong leadership, equipped with some very specific traits, that follow from the nature of digital transitions.

The remit of digital leaders

The remit of digital leadership is:

- Sense the **opportunities** of emerging digital technologies and digital enabled business models (what is relevant and what is not).
- Build and maintain external **relationships** with vendors, startups, analysts, and academia and be part of relevant ecosystems.
- Act as a **thought leader** who articulates the digital future of the enterprise.
- **Educate** the Board on digital, building tech fluency from the top down.
- Ensure the **business strategy** leverages the full potential of digital, i.e. the business strategy is a digital strategy.
- Lead the development of the digital **capabilities** and digital DNA that are needed to thrive in the digital age, throughout the entire enterprise.
- As part of this, drive the move towards an **Insight Driven Organization**, leveraging the power of data.
- Build digital **talent** in the organization, by developing current staff, and by attracting external talent as well (being a magnet for digital talent).
- Champion the process to identify, trial, evaluate and **scale or fail** new digital technologies and make them business relevant.

- Oversee the **execution** of digital initiatives, providing guidance and steer to maximize value.

Five digital leadership traits

To be successful, digital leaders should combine the following competencies and skills:

1. First, digital leaders must have a deep **understanding of the digital world**: how digital technology is used by others, and how digital technology itself is evolving. Digital leaders often have a track record at digital mature enterprises, where they learned what digital is all about first hand.
2. As digital is positioned to transform the organization into a digital business, digital leaders must have strong **business acumen and domain specific knowledge of the enterprise**. This is more than just 'speaking the language of the business'; it is a deep understanding of the enterprises' customers, its products and services, the position in the value chain, business processes, etc.
3. Digital leaders must be **strategic thinkers**, who play the long game driven by a clear picture of the long-term future of the enterprise. They are able **'zoom in and zoom out'**. In the 'zoom in' mode of thinking, they can bring details into sharp focus. But they are also capable of 'zooming out', looking at the big picture and the long-term, seeing patterns rather than individual events. This allows digital leaders to "reimagine the

enterprise of the future". They will do real strategic thinking on the new business opportunities now open to organizations because of digital technologies. Opportunities that we could not even imagine in the past.

4. Since digital leaders are change agents, they need to excel in **building relationships and influence others** to create buy-in and build trust. Digital leaders are **change advocates** who partner with other business leaders to identify opportunities for leveraging digital technology, and to initiate initiatives to realize the potential. Those digital leaders who are outstanding in this role will be an advisor to the business.
5. Finally, digital leaders must have the ability to **create and develop a team**. He/she develops, coaches, and inspires the team members, to establish a high-performing, result oriented and innovative team. The digital leader must be the one that fosters the team spirit that helps the team to overcome setbacks. He/she will also strive for continuous improvement to **automate** repetitive tasks and enable the team to focus on the 'cool' 'value add' stuff which will drive up engagement.

Who will lead? Three options

There is not one ‘best’ answer to the question who will lead the digital transition. Multiple models can be successful. However, there are some clear do’s and don’ts that can be learned from.

Option 1: a business executive adds digital leadership to his/her role

The first model we see in the market is where existing business executives take the lead in the digital transition. This can be the CEO, who steers his/her enterprise into the direction of its digital future. It can also be the leader of the business unit that is at the heart of the digital transition, e.g. the Marketing / Sales director of a retailer, or the Customer Contact director at a financial institution.

In both cases, the model can only work when the business leader possesses the traits of a digital leader, as described in the previous chapter. Some, like business acumen, will most likely be there. A deep understanding of the digital world, however, is still scarce among long established business leaders.

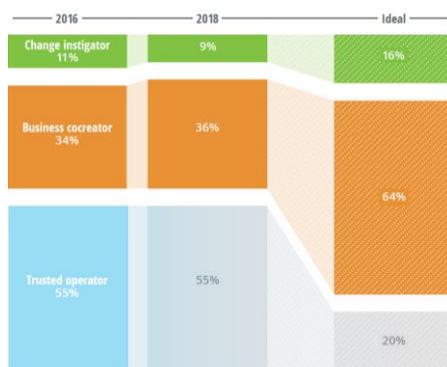
The advantage of having a business leader responsible for the digital transition, is that both worlds (digital and traditional) are in one hand. In retail enterprises for example: both the website / app and the physical stores are under the same responsibility. This reduces the risk of two worlds existing next to each other without converging into one new model.

A challenge of this model, where the digital leader is an existing executive, is the bandwidth of the digital leader to infuse *other* business units with digital capabilities. As the digital leader remains responsible for one of the business units, his/her main attention will likely be there.

Option 2: the CIO adds digital leadership to his/her role

In some enterprises, we see the CIO shifting to the role of digital leader, simultaneously offloading the operational IT responsibilities to a Chief Technology Officer (CTO).

The majority of CIO’s, however, is not yet positioned to make this shift as their current role can best be characterized as ‘trusted operator’ instead of ‘change instigator’ or ‘business cocreator’. According to our 2018 global CIO survey, 55% of all organizations have a ‘trusted operator’ CIO, 34% have a ‘business cocreator’ CIO, and only 9% have a ‘change instigator’ CIO. Furthermore, these percentages did not change significantly in the last two years.



The advantage of this model, with a CIO who also acts as digital leader, is that all technology, both the predictable IT (Gartner ‘Mode 1’) and the explorative and innovative IT (Gartner ‘Mode 2’), is in one hand. (Needless to say, it is a mistake to view ‘IT’ as mode 1 and ‘digital’ as mode 2. Instead, ‘IT’ and ‘digital’ both have elements of mode 1 and mode 2, but in a different mix.)

Option 3: a new leadership role is created (with a limited lifespan)

Enterprises can also decide to appoint a Chief Digital Officer (CDO) to lead the digital transformation. This new position creates the opportunity to attract new leadership from outside, with the experience and skills that are needed for the job. The CDO is a catalyst and driver of change, bringing a new culture and mindset, and new ways of working to the enterprise, that would otherwise not have happened, or would have happened too slow. To be able to transform the business, the CDO typically reports to the CEO.

The role of CDO as a catalyst for change has a limited lifespan. The goal of a CDO is to develop the enterprise to a state where digital has become the norm, and where digital DNA is deeply embedded in the very fabric of the organization. Once that goal has been achieved, the need for a CDO will cease to exist.

The CDO will typically have a small team of digital experts and analysts, that works with business leaders, and with CIO and CHRO as well, to initiate and grow digital initiatives. These digital solutions are transferred to the lines of business when possible. By doing this, the CDO contributes to making the lines of business increasingly digital.

Clearly, CDO and CIO need to work hand in hand as digital solutions that are born as small experiments eventually need to scale to robust, secure and sustainable solutions, which is typically the domain of the CIO (see next chapter).

Delineation of responsibilities (1/2)

When the CIO does not lead the digital transition, he/she plays a vital supporting role in providing the enabling technologies. To make this work, responsibilities of CIO and Digital Lead need to be clearly delineated.

Responsibility delineation

When the digital transformation is not led by the CIO (option 2), but by business executives (option 1) or a CDO (option 3), there needs to be a clear delineation between responsibilities of the digital leader and the CIO. If this delineation is not clear, it may result in diverging solutions and lack of standards and consistency in technology selection and implementation that hinders the digital transformation.

In this chapter, we describe the responsibilities that are always allocated to the CIO and follow from his/her remit. In the next chapter, we present a couple of choices that need to be made for responsibilities that can be either allocated to the Digital Lead or to the CIO.

The remit of the CIO

Responsibilities that follow directly from the remit of the CIO (or the Chief Technology Officer to which the CIO delegated these responsibilities) are:

- First, the CIO will be responsible for provisioning the lower levels of the **technology stack**, ranging from (hybrid) cloud services to shared platforms and databases (as illustrated in

the diagram at the bottom of this page). These parts of the technology stack are typically organized centrally and offered in a self-service model to development teams in the organization, whether in the IT organization, the CDO organization or in the Business Units.

- Second, the CIO will be responsible for **table stakes** like cost containment, efficiency and reliability of the IT estate.
- Third, the CIO will be responsible for setting (and enforcing) **standards and policies** in those domains that are critical for securing the integrity of IT across the enterprise (see list below). This is important in a hybrid model, with central IT and Business Unit IT. To enforce compliance, the CIO has the mandate to take measures when standards and policies are not adhered to. The domains are:

Enterprise architecture

- Set enterprise architecture principles
- Define IT reference architecture
- Provide guidance to DevOps teams (just enough, working in the same heartbeat as those agile teams)

Technology standards

- Cloud services (IaaS, PaaS, SaaS)
- Operating Systems
- Virtualization
- Databases
- Generic Platforms
- Application Integration
- application development

Cyber security

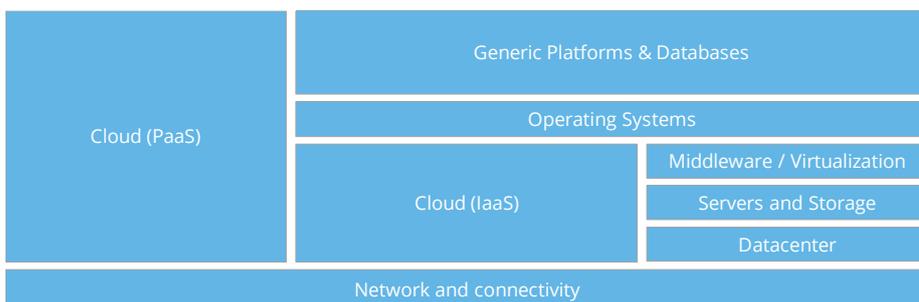
- Set cyber security standards for IT systems and digital solutions
- Assess conformance to cyber security standards
- Organize penetration tests and vulnerability scans

Business continuity

- Set business continuity standards for IT systems and digital solutions
- Assess conformance to business continuity standards

Vendors and contracts

- Set minimum requirements for new IT vendors and IT contracts
- Be consulted in IT vendor selection processes conducted by BU's



“Flashy digital capabilities may generate all the headlines, but they are built on a strong technology core and depend on hardware and software that are usually much less colorful.”

Deloitte - 2018 global CIO Survey

Delineation of responsibilities (2/2)

When the CIO does not lead the digital transition, he/she plays a vital supporting role in providing the enabling technologies. To make this work, responsibilities of CIO and Digital Lead need to be clearly delineated.

Choices to make

We will now present responsibilities that can be either allocated to the Digital Lead or to the CIO. (Clearly these choices need only to be made when the Digital Lead is not the CIO). The options represent valid choices that can be made, depending on the specific situation of the enterprise and the specific profiles of both CIO and Digital Lead. There is no single solution that is best for all.

The five choices are:

1. Customer focus – employee focus
2. Owning the DevOps teams
3. Data
4. Innovation
5. Tech fluency

1 Customer / Employee

It is helpful to distinguish two different focus areas in digital transformations:

- *Customer oriented* – digital solutions used as part of the customer journey, through all digital channels available (web, app, IoT).
- *Employee oriented* – digital solutions used as part of the employee journey, innovating the way work is done ('digital at the core').



The first focus area, the customer, is always the responsibility of the Digital Lead. It is his/her *raison d'être*. For the second focus area—the employee—a

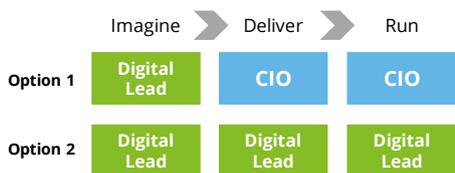
choice can be made to allocate this responsibility to the CIO. The advantage of the latter is that 'innovation' is not exclusively owned by the Digital Lead but shared by Digital Lead and CIO (albeit for other domains).

2 Owning the DevOps teams

When we view the life cycle of digital solutions as Imagine-Build-Run, the Digital Lead and his/her team will always be responsible for the Imagine part and oversee the Build and Run part. The choice to make here is whether the DevOps teams for Build and Run are hierarchically owned by the Digital Lead, or, alternatively, are organized in IT and work dedicated for the Digital Lead.

Option 1 – organize Build & Run in IT

The Digital Lead has a small team of digital experts and analysts, leaving the actual development and run of digital solutions to Development & Operations



(DevOps) teams that are owned by the CIO but co-locate with the digital team. In this model, the CIO is responsible for having high-performing DevOps teams in place with the right digital technology skills and a digital mindset and way of working.

Pro's:

- The CIO controls all DevOps teams in the enterprise, enabling a uniform

way of working and common standards.

- Hence, knowledge transfer and cross-pollination between DevOps teams working for the Digital Lead and DevOps teams working for other Business Units becomes easier.
- The CDO organization can remain small and focused on business change, which perfectly fits the temporary nature of the CDO organization.

Con's:

- The CIO may lack the digital expertise to establish digital DevOps teams. These teams may use different technologies (app front-end) and have a different way of working (Design thinking, Lean Startup). They thrive in different cultures too (experimentation, fail fast). For a CIO in a traditional environment, this is really a different ballgame. To mitigate this risk, the digital DevOps teams could be organized in a separate 'digital' team / CoE directly under the CIO.

We have seen this model work in several places. In one example, we have seen the CIO hire the development lead from a digital frontrunner (pure play online), who then retrained and reorganized the development department, introducing lots of digital DNA in the way of working. Having one development organization, working for both the Digital Lead and the Business Unit leads, was a great advantage here.

Option 2 - organize Build & Run in Digital

An alternative model is to make the Digital Lead responsible for execution too and organize the digital DevOps teams under the Digital Lead instead of under the CIO.

Pro's:

- The Digital Lead has full control (hire and fire) over the digital DevOps teams, and is end-to-end responsible for development and operations of digital solutions.

Con's:

- There is a risk of establishing two competing 'IT factories' in the enterprise, one led by the CIO and one led by the Digital Lead. In particular when one of the two exclusively claims the cool and innovative IT and the other is left with maintaining the legacy applications. This can lead to what we earlier referred to as the 'empire of the CDO'.
- These two IT factories may create different employee standings for IT roles, the ones that do cool stuff in digital and the ones that take care of the legacy in IT.

Enterprises that made this choice had a complex application landscape and an ambitious digital aspiration. That combination justified having two leaders, the CIO to focus on IT and the CDO to focus on the digital transformation. The DevOps teams were moved from IT to the Digital organization. At the same time, the CIO strengthened the enterprise architecture function overseeing the digital initiatives, and created 'guilds' for fostering craftsmanship of typical IT roles like Developer, Tester, etc. All professionals in those IT roles, whether part of IT or part of Digital, became member of these guilds. To prevent confusion at business units regarding which door to choose for a new initiative, IT and Digital installed a shared portfolio management process, and a single door for business units with ideas for new initiatives. Finally, to

prevent a permanent 'empire of the CDO', the enterprise decided at the start of the digital organization to transfer the digital DevOps teams to the lines of business within a period of three years (also refer to the chapter 'Anticipating the final stage' for this).

3

Data

In the digital economy, data will become the lifeblood of organization and fuel business processes. Therefore, enterprises with a digital aspiration need strong data management & analytics skills. To build those skills, it is helpful to consolidate scarce resources, in a Center of Excellence (CoE). This CoE does not replace decentral roles in the business units, but it will enable them to do a better job, under the adage 'closely aligned, loosely coupled'.

In case of a model with a CIO and a Digital Lead, the question is where to organize that CoE. A possible solution could be:

- The CIO is responsible for the data platform and the data integration tools, as these are shared IT assets that serve the entire enterprise.
- The Digital Lead is responsible for the data CoE, in which skills for data management and data science are built. This choice follows logically from the importance of data for digital solutions.

4

Innovation

First, innovation should be in the DNA of everyone in the organization. It's not an option to have one individual or team 'doing innovation', but rather to drive a culture of innovation across the entire organization. This is likely best driven by the CDO as the CIO is typically focused more on operations and fire-fighting than on innovation.

However, it is an oversimplification to state that all innovation is the sole responsibility of the digital leader. Innovation cannot be claimed exclusively by one single leader in the enterprise.

Delineation of responsibilities

A possible demarcation of innovation responsibilities could be:

- The Digital Lead drives the culture of innovation and initiates and oversees business innovation driven by digital technologies. This includes the more transformational innovations, that tend to benefit when the initiative is separated from the existing business. Only by having this distance, they can resist the anti-innovation antibodies. The Digital organization may be best positioned to provide such an environment and culture.
- The CIO is responsible for innovation of the technology stack up to the level of generic platforms (see also page 7), enabling the digital teams with better technology to develop and run their digital solutions.

5

Tech fluency

In the digital era, the days when enterprise technology could be viewed as someone else's concern have come to an end. IT workers have long been encouraged to "speak the language of business", but increasingly it is becoming just as important for the business to speak the language of IT/Digital. To engage in and contribute to a tech-driven business environment, all staff must become tech fluent.

Like other competencies, tech fluency encompasses different levels of proficiency. At an intermediate level, for example, people have detailed working knowledge of how technology capabilities can drive new revenue and open fresh opportunities in the near term. At the advanced level, individuals can sense the disruptive opportunities that may arise in three to five years due to emerging innovations—and can use that foresight to help their enterprises create sustainable competitive advantage.

The emergence of tech fluency as a driver of career success among non-IT workers—even at Board level—is a relatively new phenomenon. It means

that business leaders—executives and strategists in particular—must now understand both top-level technology trends and how those trends may affect the business. A CFO, for example, who has the final say on whether a new technology-driven initiative gets funded, should be fluent in that technology's capabilities and risks before the project proposal is even written.

Becoming tech fluent is a daunting task. Like most proficiencies, it isn't a once-and-done matter of mastering a set of knowledge. Instead, it is an open-ended adventure of continuous learning. Enterprises need to offer tech education programs to help their people understand the major systems that form the technological endoskeleton of enterprise IT, the technology forces that are changing the world in which we live and work, and the way technology is used in the market to enable competitive advantage.

Who should lead?

There is only one right answer to the question who should lead the tech fluency programs: **tech fluency is a joint responsibility of CIO and Digital Lead**. All alternative models are flawed:

- Tech fluency programs driven only by the CIO or only by the Digital Lead are likely to be unbalanced in the spectrum of what we call 'technology', with 'IT' on one hand of the spectrum and 'Digital' on the other end of the spectrum.
- The model in which CIO and Digital Lead each launch a tech fluency program is even worse, as it confuses the business and creates an unnecessary emphasis on the differences between 'IT' and 'Digital'. (We will argue that the boundaries between 'IT' and 'digital' will fade, later in this document).

There is no doubt that CIO and Digital Lead should work together, making the business fluent in 'Technology'.



Anticipating the final state (1/2)

The ultimate objective is a fully digital enterprise, where digital has become 'business as usual', and lines of business have end-to-end responsibilities for their technology, whether 'IT' or 'digital'.

Digital becomes Business as Usual

If an enterprise chooses the CDO model for leading digital, the role of CDO is temporary and CDO's need to aim at a fully digital enterprise where digital is in the capillaries of every line of business. The job of the CDO is not to build a permanent 'empire of the CDO' next to the existing lines of business, but rather building digital DNA in those lines of business to create the conditions for **shifting end-to-end responsibilities for digital solutions to the lines of business.**

Clearly, this will not be done in a big bang but rather in a gradual process of increasing digitization, but the end-game is clear: digital has become business as usual.

Business-IT shifts to LoB's too

At the same time, we see the end-to-end responsibility for business-IT shift to lines of business too. We have already described this trend in our research note *'Digital era Technology Operating Models - The 9 big shifts to the Technology Operating Model and how to address them'*. There is a clear trend of

application development and maintenance being organized closer or even in the business.

In the 'light' version, we see long living business-IT teams who co-locate at the lines of business, but with IT roles still hierarchically organized in IT (and controlled by IT). The business unit is the product owner and prioritizes changes. The CIO is responsible and accountable for development, testing, deployment and operations.

In its full version, business unit directors manage their IT/digital as an integral part of their business, like other assets under their command. Consequently, they own the business-IT DevOps teams that develop and maintain these (i.e. these DevOps teams become hierarchically part of the business unit organization). This enables the *end-to-end responsibility* of business units for their own applications.

This 'end-to-end' responsibility, encompasses the full life cycle of business-IT applications: requirements engineering, design, develop, test, deploy and run. It also includes, among others, solving the dilemma between

investing in solving (or preventing) technical debt, versus investing in innovation and growth.

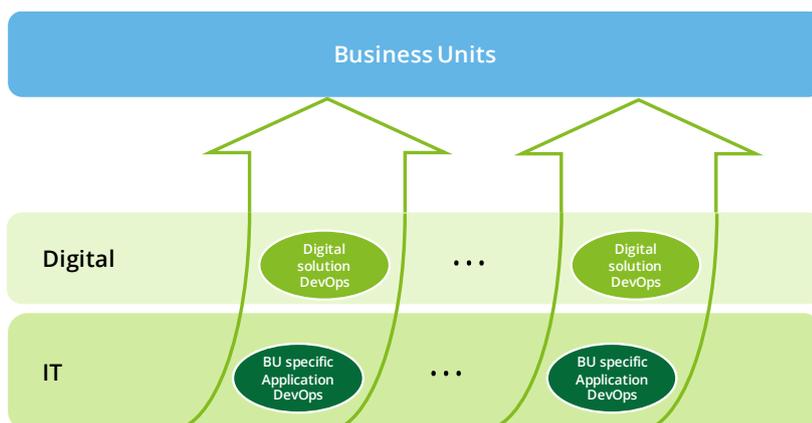
The end-to-end responsibility of business units is always subject to standards and guidelines set by the CIO (see page 7).

The need to synchronize

As the figure illustrates, both CIO and CDO transfer some of their responsibilities to the business units. Forward looking executives do not treat these two shifts in isolation, but as part of a larger shift towards integral responsibility for business unit technology. They need to be kept in sync to secure a successful transition from traditional to digital.

The difference between 'IT' and 'Digital' will fade away

Ultimately, the distinction between 'IT' and 'Digital' fades away, as the enterprise enters the state of 'being digital'. The question 'who will lead the digital transition' is therefore a temporary one, though essential for delivering on the digital aspiration.



IT and Digital have become business as usual for Lines of Business.

The CDO, acting as catalyst of change that transforms the LoB's, ceases to exist. A permanent role as Chief Data Officer remains.

The CIO remains responsible for infrastructure and shared platforms, and for e.g. architecture, security and continuity.

Anticipating the final state (2/2)

Shifting IT responsibilities from the CIO to business units makes accountability for IT more complex and requires additional measures to secure quality.

Who is accountable?

In the traditional model, accountability is clear: the CIO is accountable for all IT. He/she controls the full IT stack, from infrastructure to applications. If a system fails, it is 100% clear who to call: the CIO.

When the responsibility for business-IT and digital solutions shifts to the business units, the accountability becomes more complex as it rests no longer with one person (CIO), but is distributed among multiple persons (CIO and business unit leads).

This new situation requires:

- a sharper delineation of technology stack responsibilities
- additional measures to secure business continuity and cyber security
- additional measures to secure professional standards in IT roles
- enforcement of central policies and standards

In the next paragraphs we will address these issues.

A - Sharper delineation of technology stack responsibilities

Seen from the perspective of the technology stack, the CIO remains responsible and accountable for the lower levels, up and including the level of generic platforms and databases. The former are software platforms that provide generic / shared functionality on top of which business solutions are built. Typical examples are: API platforms, data platforms, IoT platforms, etc.

In the new model, responsibilities for the technology stack change as illustrated in the figure below. This can only work when the interface between the green and the blue parts of the stack are very clearly defined. More than ever, the CIO needs to define the services that are provisioned by IT and consumed by the BUs.

B - Additional measures to secure continuity and security

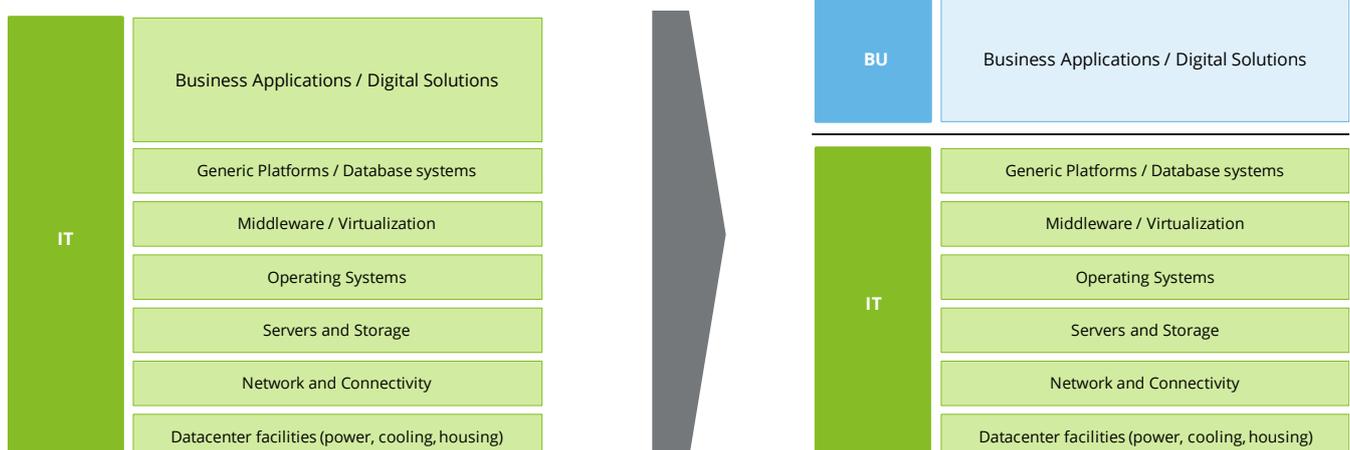
In the new model, business continuity and cyber security are not self-evident. Even more, as the frequency of deployments increases, the risk of

business continuity incidents will also increase, without additional measures, among which:

- Virtualization of network, compute and storage, by implementation of cloud technology to create self-healing infrastructure services (which means common IT infrastructure issues can be fixed automatically without human intervention), acting as the first line of defense in case of failures
- Automation of IT processes for infrastructure provisioning, software testing, software deployment and operational monitoring. Manual activities are eliminated where possible
- Refactoring of legacy systems by using new computing abstractions like microservices and containerization

C - Additional measures to secure professional standards in IT roles

Once IT roles become hierarchically dispersed over various business units,



there need to be a mechanism in place for knowledge sharing and professional development of IT roles. A good practice is to use the mechanism of *guilds*, and the CIO is well positioned to organize these guilds for IT roles.

D - Enforcement of central policies and standards

When the responsibility for business applications and digital solutions is distributed over multiple business units, adherence to central policies and standards needs to be monitored and enforced in new ways. The following mechanisms have proven to be useful for that.

Dotted line to BU Technology leads

In general, business units who manage their own business applications and digital solutions will have a Technology lead, hierarchically under the business unit Director. A good practice (illustrated in the figure) is to let the CIO have a dotted line to this business unit Technology lead, as a formal basis for providing functional guidance, and to keep all business units aligned to the overall technology strategy. Furthermore, this dotted line allows the CIO to provide input for hire and fire decisions, as well as appraisal and evaluation.

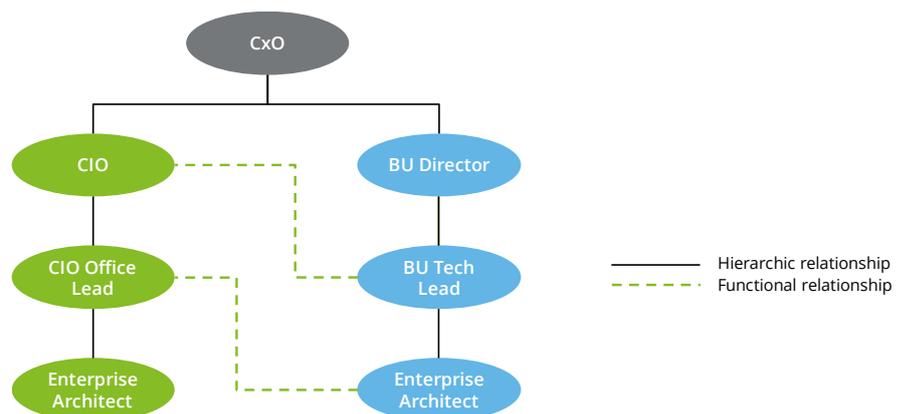
Dotted line to Enterprise Architects

In a model with distributed responsibilities for business applications and digital solutions, the CIO will have the mandate to set common policies and standards, which is often organized in an Office of the CIO. This CIO Office can only be successful when business units perceive it as a value adding function instead of the 'department of no'. Professionals working in the CIO Office need to combine deep functional expertise with excellent communication and collaboration skills.

The CIO Office has a core team of experts, hierarchically under the CIO, that define common policies and standards, e.g. enterprise architects or cyber security specialists. Applying the common policies and standards in

projects is the responsibility of roles organized in the business units. In larger organizations, there will be at least one enterprise architect in each business unit too, who provides guidance to the solution architects close to the DevOps teams in the business unit.

To make this model work, enterprise architects at central level and enterprise architects in the business units need to be closely aligned. To foster this alignment, the CIO Office lead should have a solid line to the enterprise architects at central level, and a dotted line to the enterprise architects in the business units.



Observed CDO profiles

We have analyzed the profiles of executives that currently hold a Chief Digital Officer position. Here are the results.

Research approach

To learn more about the profiles of Chief Digital Officers, two hundred LinkedIn profiles were reviewed, and relevant information was stored. This ended up in a database with information on:

- Industry
- Enterprise size
- Years of working experience
- Years in their CDO role
- Whether their previous job was in business or in IT
- Whether they came from inside or outside the enterprise
- Highest ranked skills & capabilities as listed on their profile

Out of these two hundred profiles, 164 were selected to analyze further based on their enterprise size (> 500 employees).

Research results

87% of CDO's have a business background

Out of the 164 CDO profiles with enterprises >500 employees, 87% held a previous business job and only 13% held a previous IT job. Interestingly, when looking at the industries the average percentage of CDO's coming from IT instead of the business is largely overrepresented in the Information Technology & Services Industry (33,3%) and largely underrepresented in the Financial Services (4,2%) and Retail Industry (0%).

Industry	% CDO's coming from IT
IT Services	33%
Insurance	11%
Manufacturing	11%
Financial services	4%
Retail	0%

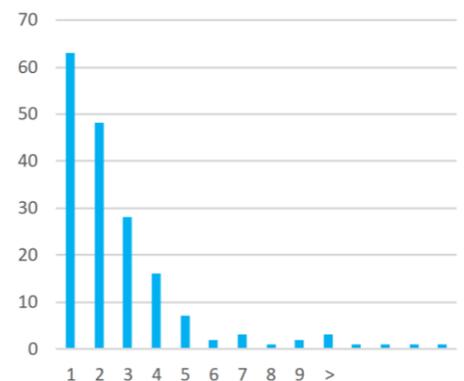
The average CDO has 23 years of working experience and has been a CDO for 2,6 years

The average of 23 years of working experience confirms our assumption that the role of CDO require a senior leader.

The average of 2,6 years in the role illustrates the relatively newness of the CDO as part of the leadership.

For both averages, we compared the results of enterprises of different sizes and found no significant differences between the averages.

Years in CDO role



Note: in the x-axis, a value of x means 'between x-1 and x years'.

Strategy, E-Commerce and Management are the top-3 CDO skills

When looking at the skills & capabilities of the CDO's five were mentioned often:

- Strategy 71 times
- E-Commerce 38 times
- Management 21 times
- Leadership 14 times
- IT Strategy 12 times

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