

IT-Business Alignment and the Evolving Role of the CIO and IT: 2017-18 Trends and Projections

Jerry Luftman Ph.D.

Abstract

It has been over 30 years since the top IT executive position title Chief Information Officer (CIO) was first introduced. While the role of the CIO and the overall IT organization has continued to evolve, the changes underway and anticipated in the future are perhaps even more profound. During this time period IT-business alignment has persisted as a top management concern. This paper reviews the research on IT trends and alignment conducted by the lead author's team to better understand the evolving role of the CIO and IT organization, while addressing why alignment has persisted for so long. The study includes this year's global IT trends survey responses from 1,659 top IT executives (mostly CIOs or equivalent). The paper also identifies important trends and makes projections about the evolving role of the CIO and IT by comparing and contrasting the survey data to IT literature and surveys published by the lead author and his team in previous years. Furthermore, the paper provides valuable insights that can assist IT leaders in articulating more comprehensive action plans for attaining a more mature IT-business alignment relationship, thus enhancing IT's effect on the business, which, in turn, can lead to better company performance.

Keywords: CIO, IT-Business Alignment, CIO Reporting, IT Budgets, IT Organization Structure.

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1. INTRODUCTION

The Chief Information Officer (CIO) is defined as the highest level Information Technology (IT) executive in an organization (Schubert, 2005). The CIO position emerged in the 1980s and was intended to reflect the belief that the CIO should be on the corporate managing board with the same level of influence and seniority as other C-level executives. While not often the case, more recently, the CIO's influence has increased in magnitude, not only because the CIO is managing a continuously increasing IT budget, but because the CIO (and IT) has also increased their role and impact in enabling and driving the firm's overall strategy including an increasing role in revenue generating initiatives (Luftman and Kempaiah 2007; Preston and Karahanna 2009). In many cases, announcements of new CIO positions convey more influential roles (Chatterjee et al. 2001). Broadbent and Kitzis (2005) have argued that the CIO's role is to lead the entire firm, suggesting that CIO should mean "Chief Influencing Officer." Karahanna and Chen (2006) state that CIOs help create value by increasing the strategic foresight of the IT function, and find that firms with effective CIOs consistently outperform industry competitors on several success criteria. It is, therefore, important to better understand the evolving role of the CIO, and how their role helps align IT and the business to produce demonstrable enterprise value.

The idea of aligning IT and the business (not with the business) is not new. It has been a pervasive and persistent challenge to CIOs for more than 30 years (Luftman et al., 2015). Many researchers have studied this alignment from different perspectives (see, e.g., El-Masri et al., 2015; Henderson and Venkatraman, 1993; Kearns and Sabherwal, 2007; Luftman et al., 2017; and Preston and Karahanna, 2009). This study introduces a model named *The Evolving Role of the CIO*, that analyzes the role of the CIO and associated activities that when implemented can produce better (more mature) alignment, and firm performance. The model is based on the role of the CIO in the firm over the years, and focuses on IT activities that drive and enable strategic business - IT alignment.

By analyzing the current global survey responses from 1,659 top IT executives (mostly CIOs or equivalent), this study confirms that IT-business alignment remains a top management concern. The data also shows that CIOs cannot just focus on what is needed for IT. They need to effectively communicate how to leverage IT, and the impact that IT can have on firm performance. The digital transformation of business organizations relies on effective IT deployment and the CIO is often seen as the leader with credibility to implement new digital initiatives. In that regard, the CIO needs to concentrate on achieving the goals and objectives of the organization as a whole, and not just on the available technology; that is, CIOs do not need to be experts in the technology, but do need to understand how the deployment of these IT

initiatives can enhance business performance, as well as effectively communicate and collaborate with non-IT executives as these technologies are engaged. Important trends including the increased CIO time in their position and improvements in IT alignment maturity assessments are indicative of this change. The research demonstrates that CIOs are able to create and implement more comprehensive, long-term action plans for attaining alignment and business value. Furthermore, the study discusses the impact IT budgets, spending patterns, CIO reporting structure, and the IT organization structure (centralized, decentralized, or federalized) have on IT-business alignment and organizational success.

The remainder of the paper is organized as follows. The next section discusses the current state of IT and business alignment research, and introduces the new model employed in this study. While the Appendix outlines the study's methodology, Section 3 reports the main findings. Section 4 discusses the results, and suggests directions for future research. Section 5 summarizes the conclusions of the study.

2. LITERATURE REVIEW

The idea of IT-business alignment has been (and continues to be) expressed using multiple terms such as 'fit' (Venkatraman, 1989), 'harmony' (Luftman et al., 1993), 'fusion' (Smaczny, 2001), 'integration' (Weill and Broadbent, 1998), and 'linkage' (Henderson and Venkatraman, 1993). This study considers all of these terms as synonymous, and views alignment as the process for coordinating activities across IT and non-IT organizations within the firm in ways that are likely to provide new business services, improve business processes and decision-making, and thereby increase business value/performance. Furthermore, alignment is not a state of being aligned or not being aligned, rather it is how this relationship needs to be continuously adjusted based on business and technology contingencies.

For over three decades practitioners and academics have debated how CIOs should align IT activities and operations with business activities and goals. Surveys on IT management have consistently ranked the *lack* of alignment as one of the top organizational challenges (e.g., Kearns and Sabherwal, 2007; Preston and Karahanna, 2009). Consequently, many researchers view alignment (or its absence) as a persistent pervasive problem (Chan and Reich, 2007; Luftman, 2005; Luftman and Kempaiah, 2008; Luftman and McLean, 2004; Luftman et al., 2006, Luftman and Zadeh 2011). In the quest for "addressing" IT-business alignment, studies have been investigating various aspects of this alignment: what IT-business alignment is, how such alignment can be detected, what antecedents can explain this outcome and what the consequences of the level of alignment might be. The literature covers an array of different approaches to assess alignment, including case studies, fit models, surveys, conceptual models, and quantitative assessments. The meta-analysis reviews of Chan and Reich (2007) and Gerow et al (2014) provide a good summary of much of the literature in this area.

Nevertheless, past empirical research on alignment suffers from several shortcomings, as follows: (1) there is a tendency to look at alignment as a singular state or relationship rather than a dynamic composite of multiple distinct dimensions; (2) there is no unified agreement on what alignment truly means and how it can be detected; and (3) current constructs lack good measures and are not appropriate for IT and business executives to evaluate the current level of alignment and to improve it (Luftman and Ben-Zvi 2011, 2010; Luftman and Kempaiah, 2008; Luftman et al. 2010).

Luftman’s SAM (Strategic Alignment Maturity assessment) in concert with the new model, introduced and employed in this study, addresses the important alignment research shortcomings. The model does not view IT-business alignment as a singular (though varying) state along its dimensions, but rather a continuous process of adjusting capabilities across multiple dimensions, which together result in better (more mature) alignment; that is, the model examines what capabilities jointly result in an improved alignment. The model is in line with the strategic idea of dynamic capabilities that if done correctly, lead to a competitive advantage. While the model is based on the evolving role of the CIO and IT, it concentrates on those IT capabilities that drive and enable strategic alignment between business and IT.

The starting point for the model is Luftman’s et al. (1999) study on enablers and inhibitors of business-IT alignment. Based on interviews with CIOs and IT and non-IT executives/managers, that study identified areas that promote/enable or inhibit business-IT alignment. It then enlisted salient activities that management needs to carry out or mitigate to achieve goals concerning coordinated IT deployment across the organization. This list of enablers and inhibitors was later formulated into a generic model, called the Strategic Alignment Model (SAM), which identifies a set of capabilities that enable, enhance or mitigate IT-business alignment (Luftman, 2000). The model was later validated by Luftman’s et al., (2017), including demonstrating the relationship of alignment on company performance.

The new *Evolving Role of the CIO* model introduced in this paper examines the changing role of the CIO (and IT) as it also identifies the different areas (called “dimensions”) where the roles of the CIO and IT have changed over time, and also indicates what constitutes those changes in terms of IT capabilities and contributions. The model’s dimensions and the changes in the role of the CIO and IT are detailed in Table 1 and Figure 1 below. These dimensions will be related to the global IT trends research to illustrate these changes and to make predictions about the future.

Model Dimension	Change in role of the CIO and IT
1. Optimize IT	What → How
2. Run the Business (“back office”)	What is needed → What is possible
3. Grow the Business (“front office”)	
4. Transform the Business	Service provider → Innovator
5. Co-Adapt with Customers/Clients	Bureaucracy → Agility

The following introduces each dimension and its associated impact on the role of the CIO, IT, and the overall business. They will be elaborated on with the discussion of the important IT trends and projections.

The first dimension, *Optimize IT*, is focused on IT infrastructure, and got its start with the introduction of the CIO title. Effective optimization of the IT infrastructure continues in its importance in today’s age of fast-paced business and fierce competition, especially with the growing use of Cloud and outsourcing. The ability to optimize a flexible responsive IT

infrastructure, while balancing cost control with the need for increased business functionality, is considered the foundation to IT's success. The desired outcome for IT optimization has evolved toward a dynamic, flexible IT infrastructure that can support changing business needs and emerging application technologies (e.g., business analytics, artificial intelligence, cognitive computing, robotics process automation, social media). CIOs are now expected to leverage technology to help enable and drive business innovation and ignite the integration of business and technology to support business goals. The change in the role of the CIO (and IT) makes organizations rely on them not only to understand what new technologies exist, but, more importantly, to understand how those technologies can be applied to support innovative business strategies and thus, promote IT-business alignment (IBM, 2007; Proctor, 2011). Yet, for the CIO to optimize the value they generate from IT investments, the business stakeholders need to understand (and be actively engaged in) how IT generates this value. Ultimately, generating business value from IT is a shared responsibility; it cannot be delegated solely to the CIO. This is done by creating alignment between/among IT and the business (Peppard et al., 2011).

Naturally it is not the infrastructure unto itself that delivers the business value. Nor is it the data/information/knowledge that resides on the infrastructure. It isn't even the applications that apply the data that all run on the infrastructure. The value comes from how the business changes what they do that takes advantage of the applications that apply the data that resides on the infrastructure. Hence, the importance of engaging the business and alignment, and moving beyond this first dimension of this model.

The next two model dimensions are *Run the Business* ("back office") and *Grow the Business* ("front office"). The terms "front office" and "back office", initially found in service organizations, are probably the most common way of conceptualizing the impact of customer-centric IT services (applications). The front office are the activities where direct customer/client contact takes place and as such is directly experienced by customers, whereas the back office is considered to be the technology and services needed to run the business operational processes that support the business itself; e.g., systems that support accounting, human resources (Zomerdijsk and de Vries, 2007).

In some companies, IT plays primarily a support role, where the focus is on reducing expenses (improve productivity), typically in support of back office processes. Often in these cases the CIO spends most of their time interacting with IT employees; not the non-IT stakeholders. In these companies, IT is viewed as playing the traditional back-office support role without any potential for dramatically altering an organization's current or future strategic direction.

Often, even in a "front office" initiatives, where IT may take part in strategic task performance projects, IT frequently does not participate in setting the strategic direction. Often, front office employees are managed with a customer/client view, without taking into consideration how IT can help grow the business (Melián-González et al., 2017). However, in companies where IT has a strategic orientation, it is viewed as critical in achieving corporate objectives (Karimi et al., 2001). Early examples were described by Applegate et al. (1996) who reported that several banks, such as Bank One, Citibank, and Chemical Bank, had moved aggressively to distinguish their products and services ("front office") through an effective use of IT, while other financial institutions have failed to reap competitive benefits because they kept using IT primarily to support their back office operations, for example, for check processing.

Early examples such as American Airlines SABRE, USAA, and Otis Elevator preceded these strategic examples by decades.

Nevertheless, as companies strive for innovation, CIOs need to provide visionary insights into what is possible with IT, not only what is needed. Their role in effectively communicating how to leverage IT is essential. There is no tool or method that can automate the generation of ideas, yet (Miers, 2004). Larger and more visionary application scenarios, such as business analytics, cognitive computing, and artificial intelligence, are increasingly moving into this realm of what is possible; though, they require a more complex IT infrastructure, greater investment and close cooperation (i.e., alignment) with the business (Mattern and Floerkemeier, 2010).

The next (fourth) dimension after supporting/running (“back office”) and growing (“front office”) is *Transform the Business*. CIOs and IT today play an ever increasing strategic role in driving business transformation (innovating for competitive advantage), and they are typically considered key strategic partners to the organization (Peppard et al., 2011). In terms of practicality, research suggests that to transform the business, the CIO and IT should initially concentrate on important business processes and only then implement the most appropriate technology, rather than allowing the technology to impose constraints on processes (Arif et al., 2005). Accordingly, the CIO shifts roles from a service (or technology) provider to an innovator. As a service provider, the CIO focuses more on providing the organization with the strategic IT applications; that run on the infrastructure, and leverage the data (Leidner and Mackay, 2007). As an innovator, the CIO identifies and develops opportunities with the business to deploy new IT-enabled/driven processes and products and services that give the organization a clear source of competitive differentiation over its competitors. Information is leveraged proactively as an integral part of strategic growth and innovation. Furthermore, the CIO is viewed as a business leader capable of managing information assets (“resources”) in a way that gives them the same status as those who manage financial and marketing resources. The CIO is also regarded as a visionary, who needs to deliver meaningful business innovations and raise the profile of the IT organization as a strategic business partner (Peppard et al., 2011). This business transformation demands and is strongly linked with IT-business alignment (see, for example, Huang and Hu, 2007; Seigerroth, 2011).

A current example of *Transform the Business* is the role of the CIO in the digital transformation, where rapidly changing and available technologies such as smartphones, cloud services, analytics, and big data, allow organizations to compete in new ways and new-comers to compete against traditional organizations. In a Canadian study of CIOs (Love et al, 2017), the CIO was identified, along with the CEO, as the executive leader for their digital transformation. In this study, 57% of the CIO respondents said that digital transformation impact will occur within the next year and an additional 34% said the impact will be in the next two to five years.

The final (5th) dimension is *Co-Adapt with Customers/Clients*. This dimension refers to the continuous process of IT and non-IT organizations working cohesively to leverage emerging technologies and swiftly delivering customized solutions to clients, customers or partners. The dimension taps into the broader impact of IT services through appropriate and innovative scoping of what the IT organization does and how it can provide business value by becoming more agile in moving efficiently and effectively. In this context, this dimension adopts the agile principles of customer collaboration and responding to change (Allison, 2010). The agile CIO has a deep understanding of the potential strategic and revenue/profit enhancing role of information and technology, and the opportunities they can provide for the business (Peppard et

al., 2011). The change and value is directly related to the organizations external partners, who are now in harmony with IT.

Furthermore, based on empirical data, Doz and Kosonen (2010) conclude that successful business transformation is one of the main outcomes of strategic agility. Leonhardt et al., (2017) show that IT agility is an important characteristic due to its positive effect on the IT organization. Tallon and Pinsonneault (2011) uncovered a positive and significant link between agility and IT-business alignment and between agility and firm performance. This suggests that by becoming more agile, a more mature IT-business alignment is engaged, which in turn, can improve company performance.

Overall, the *Evolving Role of the CIO* model describes the areas where IT and the CIO have changed (or should change) to establish IT-business alignment and business success. While some researchers maintain that it is enough for IT to enable companies to operate more efficiently or deliver better services, to reduce costs or heighten customer satisfaction (see, for example, Carr, 2003), those claims limit the role of IT to infrastructure and back-office systems; the CIO as a utility provider. Improving operational effectiveness is a necessary part of the CIO's role, but it does not drive strategic business growth. While both are essential, by confusing the two, the CIO and organization may unintentionally adopt a way of thinking where IT impedes its ability to drive revenue growth. Understanding and leveraging IT's ability to enable/drive business revenues provides a more seamless line of sight connection between IT strategy and its execution (Alleman, 2007) and foster the digital transformation.

Furthermore, to succeed in today's dynamic environment, the CIO needs to excel in all of the model's dimensions, albeit the last two dimensions, where the focus is on innovative revenue generating initiatives, is where the most successful CIOs spend most of their time. The appropriate balance of time in the respective dimensions provides the distinctive IT strategy with mature alignment. The notion of IT being a strategic enabler for the business depends on the role of IT and the CIO and how they align together with the business: if IT supports the business strategy, then it is an enabler of revenue; if IT leads the strategy, then it drives revenue.

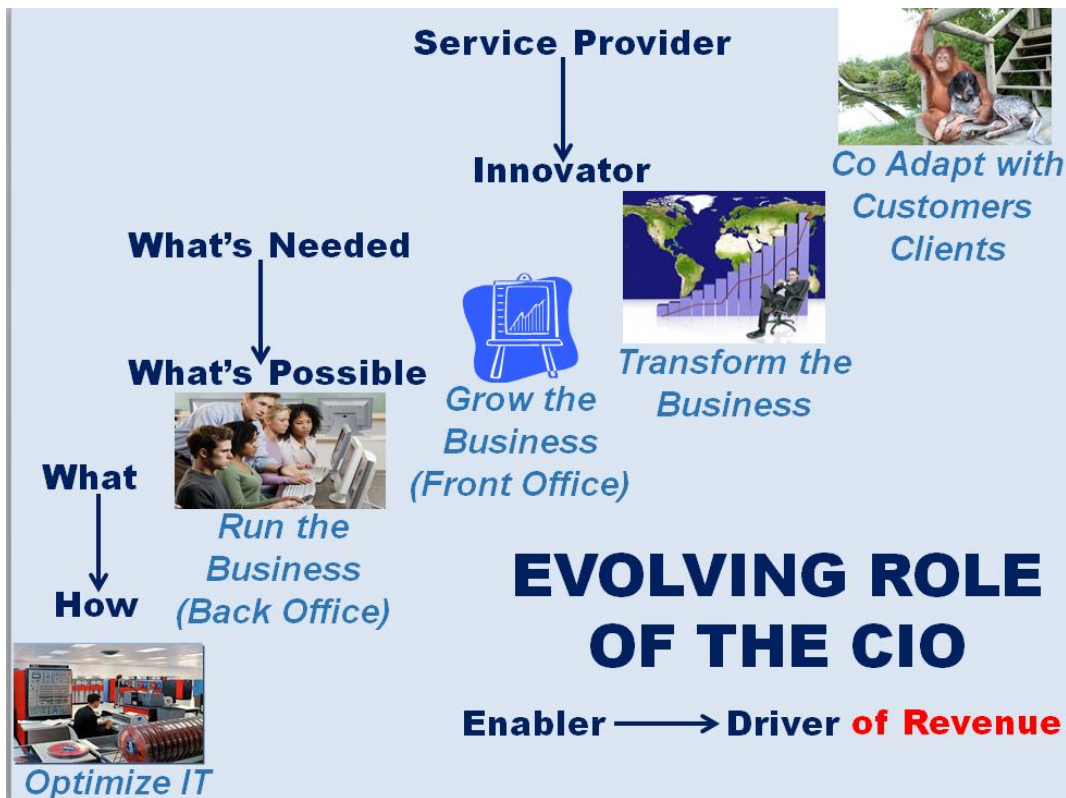


Figure 1. The *Evolving Role of the CIO* Model

3. FINDINGS

This section expands the discussion of the Evolving Role of the CIO Model as it is related to the global IT trends survey and strategic alignment maturity research results. The Appendix describes the survey methodology and data collection. Data were collected on various IT factors, such as CIO management concerns, IT budgets, budget allocation, and CIO traits. The analysis is discussed in the context of the *Evolving Role of the CIO* model and relates them to IT-business alignment. The following topics are described in detail:

1. Top IT Management Concerns
2. Top IT Investments
3. IT Budgets
4. IT Budget Allocation
5. CIO tenure in his or her position
6. CIO background (where they are hired from)
7. How CIOs spend their time
8. CIO reporting structure
9. IT Organizational Structure

3.1. Top IT Management Concerns, IT Investments and the Role of the CIO

Since SIM and the lead author started surveying CIOs on an annual basis in the 1980s, most of the top IT management concerns that CIOs had to address have changed considerably. Many of the top concerns of previous years are no longer in the top ten, and new concerns have emerged as essential. Very few concerns remained relatively constant. To obtain the 2017 ranking, respondents were asked to identify their top concerns. The top 10 management concerns for 2017 are shown in Table 2 along with the associated model dimensions; where there is a balance of the respective dimensions. Comparative rankings showing trends since 2012 are presented in Table 3. For example, security/privacy was ranked the top IT management concern in 2017; it was ranked 2nd in 2016 and 2015, 6th in 2014, etc.

Management Concerns	The Evolving Role of the CIO
1. Security/Privacy	Optimize IT
2. Alignment of IT and/with the Business	Transform the business
3. Compliance and Regulation	Optimize IT
4. Business Cost Reduction/Control	Run the business
5. IT Cost Reduction/Control	Run the business
6. Data Analytics/Data Management	Transform the business
7. Innovative Use of IT	Transform the business
8. Business Agility	Co-adapt with customers
9. IT Agility	Co-adapt with customers
10. Digital Transformation	Transform the business

IT Management Concerns	2017	2016	2015	2014	2013	2012
Security/Privacy	1	2	2	6	9	8
Alignment of IT and the Business	2	1	1	1	1	2
Compliance and Regulation	3	15				
Business Cost Reduction/Control	4	5	5	4	3	1
IT Cost Reduction/Control	5	6	9	16	5	5
Data Analytics/Data Management	6					
Innovative use of IT	7	3	4	10		

Business Agility	8	4	5	2	2	3
IT Agility	9	5	11	24		
Digital Transformation	10					
* Cells with blank data indicate that the issue was not asked in the survey						

Table 3 shows that indeed the top IT management concerns continue to change dramatically even in recent years. One exception is the *Alignment of IT and the Business* concern, which remains a top concern for CIOs (persistently ranked either 1st or 2nd).

In addition to identifying the top management concerns, as in previous surveys, respondents were also asked to rank the importance of their IT investments by selecting their top technology investments from a list of 38 IT technologies. IT technologies have fueled, and will continue to fuel, the development of new products and services for all organizations. The list of choices in the survey continues to evolve from the authors' research and experience as well as technologies added by survey participants. Table 4 lists the top 10 IT investment rankings for 2017 along with the model dimensions; where there is a strong presence of the Optimize IT dimension. Comparative rankings since 2012 are presented in Table 5. For example, security/cybersecurity was ranked the top IT investment in 2017; it was ranked 3rd in 2016, 7th in 2015, etc. As expected, the top technologies have varied greatly over the years, and recent developments in cloud technologies, security, and analytics caused IT executives to rethink their technology priorities.

Top IT Investment	Evolving Role of the CIO
Security and Cybersecurity	Optimize IT
Analytics/Big Data/Business Intelligence/Data Mining	Transform the business
Application and Software Development	Run/grow the business
Cloud Computing (e.g., SaaS, PaaS, IaaS)	Optimize IT
Enterprise Resource Planning (ERP)	Run/grow the business
Customer Relationship Management (CRM)	Grow the business
Data Center/Infrastructure	Optimize IT
Network/Telecommunications	Optimize IT
Legacy Applications	Optimize IT
Enterprise Application Integration (EAI)	Run/grow the business

	2017	2016	2015	2014	2013	2012
Security/Cybersecurity	1	3	7	8	16	15
Analytics/Business Intelligence	2	1	1	1	1	1
Application/Software Development (previously Apps developments)	3	2	3	2	5	4
Cloud Computing (SaaS, PaaS, IaaS)	4	4	4	4	2	2
Enterprise Resource Planning (ERP)	5	6	2	3	4	3
Customer Relationship Management (CRM)	6	5	5	6	3	5
Data Center/Infrastructure	7	7	6	3		
Networks/Communications	8	8	10	11	10	8
Legacy Applications	9	10	9	15	16	
Enterprise Application Integration (EAI)	10	9	11	10	11	16

The data shows that security remains a top concern and a top IT investment. Nevertheless, when looking at the big picture and the trends of IT investments over time, CIOs need to be mindful that the technology will keep on changing and evolving in the future. The buzz words of the day, like Big Data, Cloud Computing or Cybersecurity will most likely be replaced by different ones in a few years' time. Therefore, CIOs do not need to be experts in the technology, but be somewhat conversed in how technology can be leveraged to provide demonstrable business value (Hoffman and Preus, 2016). Furthermore, CIOs need to focus on achieving the goals and objectives of the organization as a whole, in light of its vision, and not just focus on the available technology (Dahlberg et al., 2016). CIOs, as strategic leaders, should consider the overall benefits of the organization, lead valuable IT initiatives, continuously improve information systems quality, and develop and utilize information resources to enhance the business value of IS (Ding et al., 2014).

As the new model suggests, the CIO needs to concentrate not on *what* technology is available, but *how* the technology can be leveraged to produce demonstrable value to the business. The CIO should not become simply a technology or a *service provider* for the business, but an *innovator* - the leader who introduces new ways to apply the technology for the business. This emphasizes the importance of creating alignment between IT and the business, as well as with external customers/clients. Consequently, CIOs today need to be both open and agile: be open to technological innovation and also be able to direct the organization towards change quickly.

3.2. IT Budgets and Budget Allocation

IT budgets in the past 20 years have experienced significant changes. They had been continuously increasing until 2007. When the recession hit in 2008, most companies reported that their IT budgets remained flat or decreased. This negative trend continued throughout the recession and the belief that the economy was improving, 2011, when the world economy started

a slow recovery (Luftman and Ben-Zvi, 2011). Since then, budgets have been consistently increasing. Figure 2 shows the trends in IT budgets in the past decade.

The changes in IT budgets over time are also linked together with the Evolving Role of the CIO Model and the changing role of the CIO. In the past, IT was viewed as an expensive necessity to the organization by many business executives, mainly CFOs, who used to simply ask IT leaders to cut or contain their budgets. In recent years, however, business executives have been rethinking the role of IT in the business, and they are now asking IT leaders to work with the business to cut costs and to improve the productivity of the rest of the business (Luftman and Ben-Zvi, 2011), and more recently to leverage IT for revenue growth. This fundamental change of IT and the role of the CIO from *service providers* who enable revenue to innovators who *drive revenue* for the business, as the model suggests, demands a better (more mature) alignment between IT and the business. Yet, to institutionalize this change in the organization, the CIO cannot just convey *what is needed* for IT, but effectively communicate *what is possible* to achieve with IT, in terms of productivity, revenue, business agility, and speed to market; all are essential for the survival of the organization today. As IT progresses through the Evolving Role of the CIO Model it moves from an expensive necessity to a transformational necessity.

Nevertheless, while IT budget sizes may show some correlation with the state of the economy overall (i.e., increasing budgets when the economy is growing; flat or decreasing budgets during recessions), IT spending patterns reveal even more how the CIO plans to achieve the goals and objectives of the organization; particularly, these spending patterns demonstrate how the CIO views and promotes alignment between IT and the business through IT spending allocation.

As with IT budget size, the past decade also saw significant changes in IT spending patterns. As Figure 3 illustrates, staffing still remains the largest component of IT budgets, but the portion of the budget allocated for infrastructure has been continuously increasing. IT infrastructure represents how IT components, such as hardware, software, networks, coalesce together to enable specific organizational activities. IT infrastructure provides the foundation for deploying distinctive IT capabilities within an organization.

The responsibility for determining the proportion of the IT budget allocated to staffing versus investment in IT infrastructure is predominantly the CIO's. On the one hand, the IT staffing budget plays a major role in attracting, developing, and retaining high-quality IT professionals (Luftman and Kempaiah, 2008) necessary to deliver IT initiatives. On the other hand, investing in IT infrastructure is necessary to ensure the technical platforms are available to support the new applications that provide the conduit that provide a distinct IT competitive advantage (and consequently, the whole business). IT infrastructure can be targeted to achieve strategic objectives defined by managers. These changes in business processes and reengineering efforts are often shaped by the firm's overarching IT strategic objectives (Kohli and Grover 2008; Kohli and Johnson 2011). Furthermore, Mithas and Rust (2016) argue that it is not so much which applications firms use, but rather what their strategic objectives are for deploying/leveraging those applications, in that IT strategy and IT investments jointly influence profitability and the market value of the firm. IT investments and IT strategy should not be viewed separately from each other, and that firms need to synchronize their IT investment levels and their IT strategies for improved performance. Having effective governance processes, established by the CIO, is fundamental to ensure these appropriate and adequate budget allocations. IT's value comes from

how the business changes what they do by leveraging the deployment of these strategic IT initiatives.

Furthermore, literature reveals a covariation relationship between IT-business alignment and IT infrastructure and suggests that IT infrastructure may be instrumental to an organization’s competitive advantage, agility, and performance (e.g., Roberts and Grover 2012; Croteau and Bergeron, 2001). Furthermore, studies show that while alignment allows IT and business executives to identify opportunities for IT to promote agility and value, IT infrastructure is what will ultimately execute these opportunities (Tallon and Pinsonneault, 2011). Therefore, we conclude that as the trend for investing more in IT infrastructure continues, and its portion of the IT budget continues to increase, it will enhance the ability of organizations to achieve better IT-business alignment and business value.

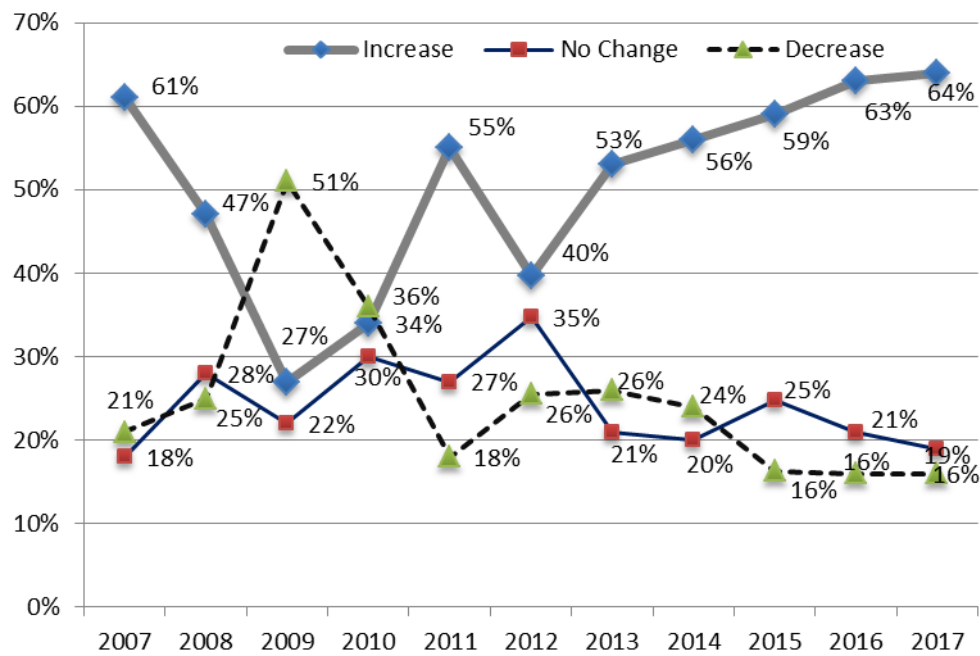


Figure 2. Percentage of Changes in IT Budgets Compared to Prior Year, 2007-2017.

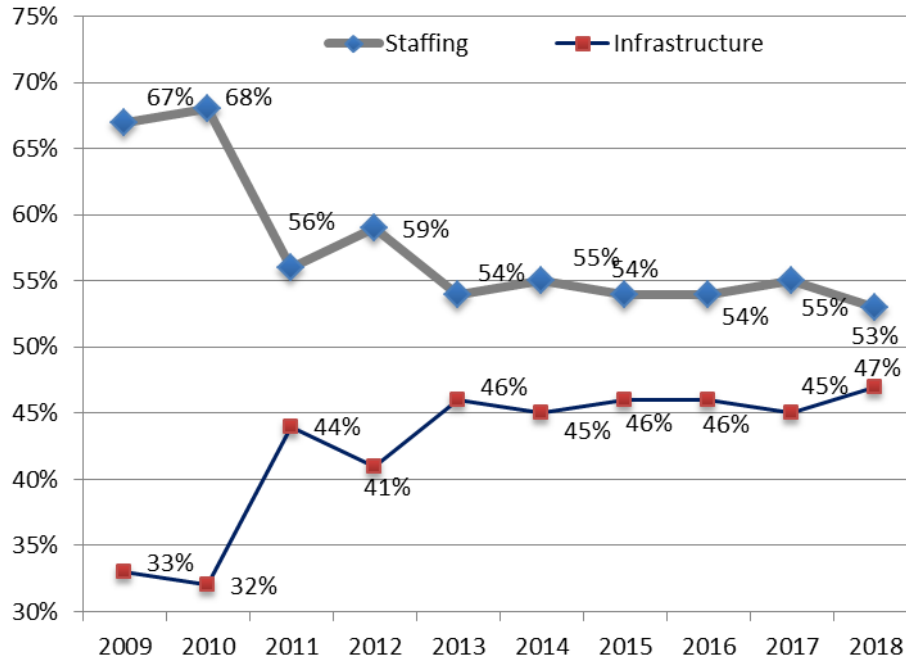


Figure 3. IT Budget Allocation: Staffing and Infrastructure, 2009-2018 (expected).

3.3. CIO Traits

This section describes how trends in CIO traits, namely, tenure, where CIOs are hired from, and their reporting authority impact the role of the CIO and relate to IT-business alignment and the Evolving Role of the CIO model.

CIO tenure is an important consideration among executives, especially when the role of the CIO is on the line. The reason is that when it comes to cost reduction, traditionally IT becomes the first target and in most cases, CIOs are blamed. However, research has shown that companies enhance their performance when business executives are trying to work together with IT to leverage IT to reduce business expenses, improve business processes, and initiate revenue generating initiatives. (Luftman and Ben-Zvi, 2011); moving towards the 5th dimension of the Evolving Role of the CIO model. In fact, research has shown that companies can realize significant performance benefits when they combine higher levels of IT investments with more sophisticated management and governance capabilities (Mithas and Rust, 2016). This has had a significant impact on CIO tenure in the organization, as CIO tenure in 2017 remains high at 5.8 years, compared to 3.6 years in 2006. Figure 4 presents the data for CIO tenure since 2006 along with (an increasing) trend-line. Prior to 2000 IT tenure was averaged 18 months. Low CIO turnover (that is, longer tenure) makes it easier for CIOs to address many long-term changes to the business and the IT organization. It allows the CIO more time to effectively help run, grow and essentially transform the business, three of the model dimensions that the CIO is expected to accomplish. CIOs are then able to focus on the long-term quality of IT professionals, IT revenue generating systems, and to address the everlasting question of alignment. Research has shown that during the same period the level of alignment has demonstrated some improvements (Luftman and Ben-Zvi, 2010; Luftman et al., 2017). Yet, the alignment challenge remains partly due to lack of good measures. If this trend in CIO tenure continues in the coming years, as the

trend-line in figure 4 suggests, we predict improvement in IT-business alignment, as CIOs will be able to create and implement more comprehensive, long-term action plans for attaining greater IT-business alignment, and thus, enhancing IT's effect on the business. Models measuring and validating this improvement are thus warranted.

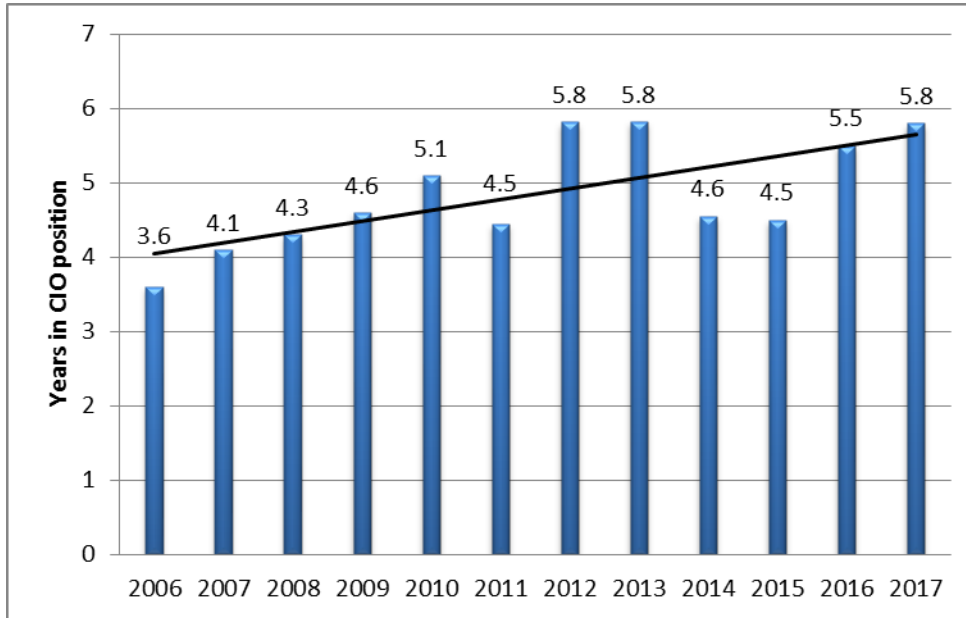


Figure 4. CIO Tenure, in years, 2006-2017.

It is also interesting to understand the implications of the background of CIOs on IT-business alignment; whether they had IT experience or if they were hired from within the company or not. Table 6 summarizes and illustrates this important trend. Approximately 80% of the respondents said that the CIOs were hired with an IT background and 70% were hired from outside the organization. Less than 25% of CIOs are hired from within the company's IT organization. This means that the likelihood of getting a CIO position in your current company is not high. Yet, these results conflict when relating them to the Evolving Role of the CIO model and to IT-business alignment: On the one hand, IT professionals would have a better understanding of the complexities of managing IT, and can relate to the complexities of progressing through the Evolving Role of the CIO model. In addition, research shows that financial measures tend to be higher when the CIO was from IT rather than general management (Sobol and Klein, 2009). These CIOs can envision what IT can do for the business (*what is possible*), not just *what is needed*; they can become *innovators* instead of simply *service providers*. Furthermore, the Gartner CIO Survey reveals that CIOs perceive their strategies to be intimately connected with business strategies, a reflection of their objective to get closer to the business (McDonald and Aron, 2011). Therefore, hiring a CIO with an IT background can enhance alignment, especially if the CIO also has a good understanding of the business needs, goals and objectives (Luftman et al., 2015). On the other hand, hiring a CIO from outside the company may hinder alignment, as the CIO may not be familiar with the company's culture (Štemberger et al., 2011). For example, one important aspect of alignment is communication (see Luftman et al., 2017). This alignment

component measures not only the level but also the effectiveness of the exchange of ideas, knowledge, and information between IT and the business. Organizational culture is a big part of communication. And while a new CIO may possess the formal skills required for the position, he or she do not possess the organizational cultural knowledge to facilitate effective communication within the company. Nonetheless, it is important for the CIO to show that IT is an important vehicle for achieving business goals and is not just an additional supporting department (Luftman and Ben-Zvi, 2010). The CIO should therefore be able to establish proper relationships with managers in the company other than his direct report. On the other hand, a CIO from outside the company can bring a fresh perspective that is required in many cases.

Furthermore, with the rise of other C-level functions, such as Chief Technology Officer (CTO), Chief Data Officer (CDO), and Chief Information Security Officer (CISO), which are closely related to the CIO position, we see an organizational orientation shift from IT to technology, data, and security (Williams, 2016). Originally managed within the CIO domain, these areas now introduce new positions in the organization (Bakas, 2016); for example, the Chief Digital Officer is one of the fastest-growing C-level positions found today in many companies and has become a global trend (Horlacher and Hess, 2016; Mathison, 2014).

It is plausible then that with this changed focus and the new positions at the board level, in the next few years the CIO role will become more strategic – an IT leader rather than an activity facilitator. Since the focus will be more on coordination and communication and less on technology, it is more likely that the CIO position will be filled internally with a person familiar with the organizational processes, he industry, IT structure, and the business culture. This could end the trend of relatively smaller likelihood of getting a CIO position within your company, as shown by the data, and will help facilitate better IT-business alignment by the CIO. However, should or can the CIO, CTO, CDA, CISO, etc, all report to the CEO???

Last Position before CIO	Percentage
IT, same organization	23%
IT, outside organization	56%
non-IT, same organization	6%
non-IT, outside organization	15%
Outside organization	71%
Same Organization	29%
Prior IT position	79%
Prior non-IT position	21%

Additional evidence to the evolving role of the CIO is the time they spend on different activities. Figure 5 shows what percentage of their time CIOs have been dedicating to IT-related activities, non-IT related activities, strategic activities and operational activities since 2012. While the data show a relative stability in the distribution of each activity time, the implication

of the time spent on each type of activity is significant. The results show that in the past five years, CIOs have been spending the majority of their time, about two thirds, on IT-related activities, such as interactions with IT staff, IT strategy, software development, IT operations, etc. Nevertheless, about 33% of the CIO time has been spent on non-IT related activities, such as organization architecture, organization strategy, business innovation, learning the needs of customers of the organization, etc. This result aligns well with the different dimensions of our model and the move of the CIO from an IT authority in the organization, concerned with technology and technical matters, to a C-level executive involved in business affairs, understands how IT can support and promote the entire company, and co-adopt with customers and clients. Furthermore, the data also show that CIOs have been spending approximately 35% of their time on strategic activities, as opposed to operational activities. This is another indication to how CIOs have become *innovators* and not merely *IT service providers*. Moving towards the 5th dimension of the Evolving Role of the CIO model demands spending more time with non-IT executives is strategic discussions.

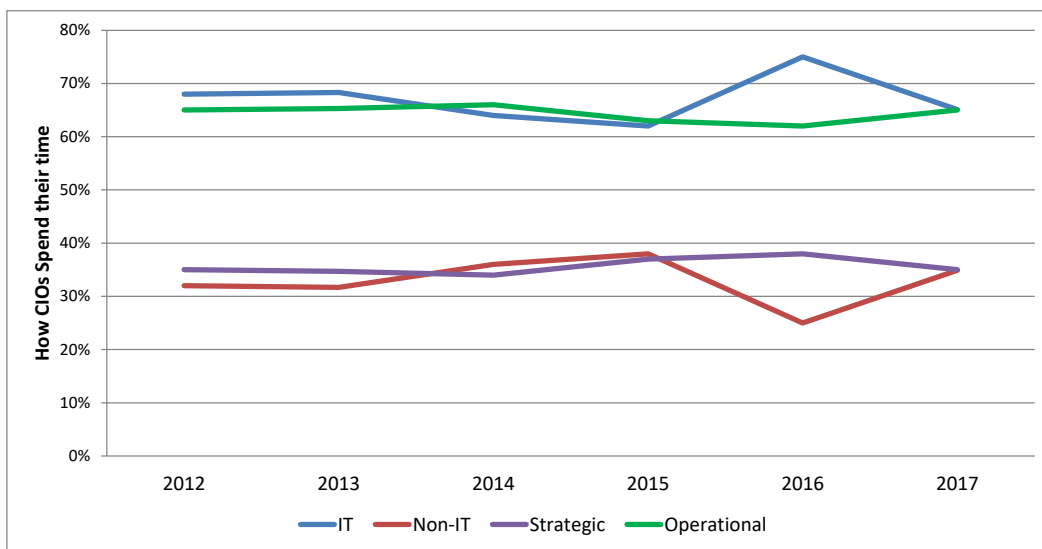


Figure 5. How CIOs Spend Their Time, 2012-2017.

CIO reporting structure impacts both the CIO's role and the alignment between business and IT. Researchers have debated to which two key entities CIOs should report to: the Chief Executive Officer, the highest-level executive in the firm, or the highest-rank finance executive, the Chief Financial Officer (Banker et al., 2006). The reporting structure usually reflects how critical IT is considered to the company's strategy and how much the company's culture appreciates or considers IT related factors (Luftman and Kempaiah, 2007). Nevertheless, the CIO reporting structure should not be viewed only as a means to enhance or limit the CIO's power or to determine the role of IT in the firm, but rather seen as a means to create business value. A suitable CIO reporting structure gives the best opportunity for the CIO to pursue appropriate IT initiatives that enable and drive the firm's strategic positioning. By allowing the CIO to work under the most appropriate C-level executive, IT can focus on supporting (or leading) the firm's strategy, and thus, promote IT-business alignment and business value.

Figure 6 shows to whom the CIO or the company's senior IT executive reported since 2005. In 2017, approximately 50% reported to the CEO, about 25% to the CFO. The rest were reporting to the Chief Operations Officer (COO) or another senior business unit executive, which are less common than the CEO and CFO reporting entities.

The CIO reporting to the CEO structure has been viewed as an indication of the CIO's authority and power in the firm. There is an assumption among some proponents of IT that the CIO should always report to the CEO to promote the importance of IT and the CIO's clout and power in the firm (see Luftman and Kempaiah 2008, Armstrong and Sambamurthy 1999). This reporting structure enables the CIO to promote a vision for IT, exchange ideas about IT initiatives, and assure proposals are heard by the appropriate executive, thus facilitating the CIO's role (Csaszar and Clemons, 2006; Preston and Karahanna, 2009). *Innovators*, for example, are better served by the CIO reporting to the CEO. These CIOs have a broader cross-functional view of the firm and its needs for collaborative tools, real-time intelligence and global visibility systems, data mining tools, etc. This gives the CIO a similar status as those who manage financial and marketing resources. These CIOs are thus able to *transform the business* and facilitate *agility*, as the CEO is the top executive leader and final decision-maker in the firm. Furthermore, a reporting structure where a CIO reports directly to the CEO indicates that the company is more likely to have a more formal IT strategy (and associated governance), a strategic IS orientation and greater IS planning levels resulting in better IT scoping, value analytics and skills development (Hu et al., 2004).

In contrast, adversaries of IT call for a reporting to the CFO to keep a tab on IT spending; the traditional reporting model. Companies where the CIO reports to the CFO tend to leverage IT as a way to cut operating expenses (Caldwell et al., 1998). This reporting structure is associated with cost leaders, who view the IT unit as a cost center that must be scrutinized by the CFO and where the CIO's role is to be a service provider, supporting the firm's overall cost leadership strategy while reducing IT costs (Banker et al., 2011; Krotov, 2015). Cost leaders are better served by a CIO–CFO reporting structure that focuses on reducing costs across the firm, promoting lean operations, tight cost management, automated processes, cost-effective asset utilization, reduced cycle time, and incentives based on quantitative targets. Companies with this reporting structure have less formal structures (other than cost cutting and containment), less focus on skills development, less concern for broad value analytics and poorer partnerships and communications. The IT function in these instances is viewed as a supportive function aimed to reduce costs and improve productivity. This enables the CFO to work together with the CIO to scrutinize the firm's cost patterns to identify inefficiencies and pursue IT initiatives for cost cutting to enhance the firm's bottom line (Banker et al., 2011). This limits the CIO role to *running and growing the business*, but not transforming it; placing IT in a low dimension of the Evolving Role of the CIO model.

The reporting structure of the business, therefore, dictates how power and control are allocated to CIO throughout the organization. Organizations, whose CIO reports to the CEO, tend to have a strategic IT orientation, while organizations, whose CIO reports to levels lower than the CEO, have an operational IT orientation. Those organizations do not place a high value on IT or IT planning (Banker et al., 2011).

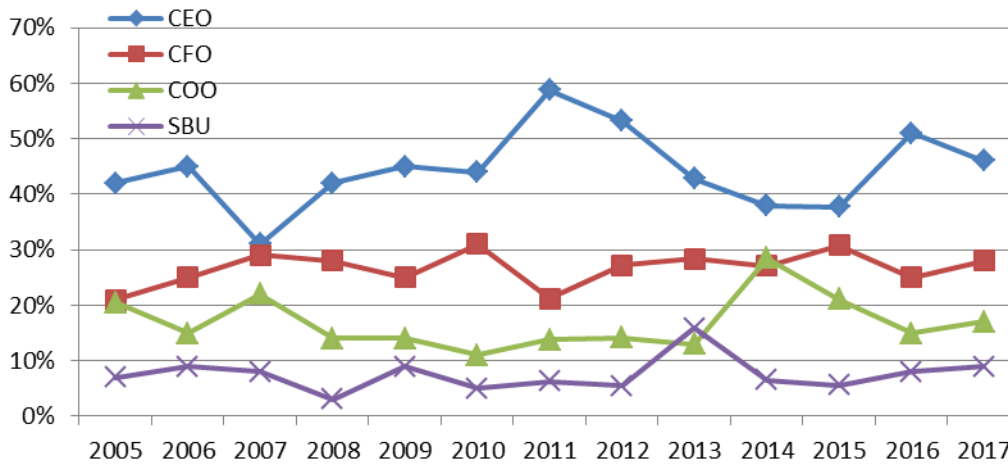


Figure 6: CIO Reporting Authority, 2005-2017.

3.4. IT Organizational Structure and the CIO

One of the major factors that can affect IT-business alignment and the performance of the IT organization is the degree to which it is centralized, decentralized, or federalized (see Luftman and Ben-Zvi, 2017). Figure 7 shows the breakdown of the IT organization structure among respondents.

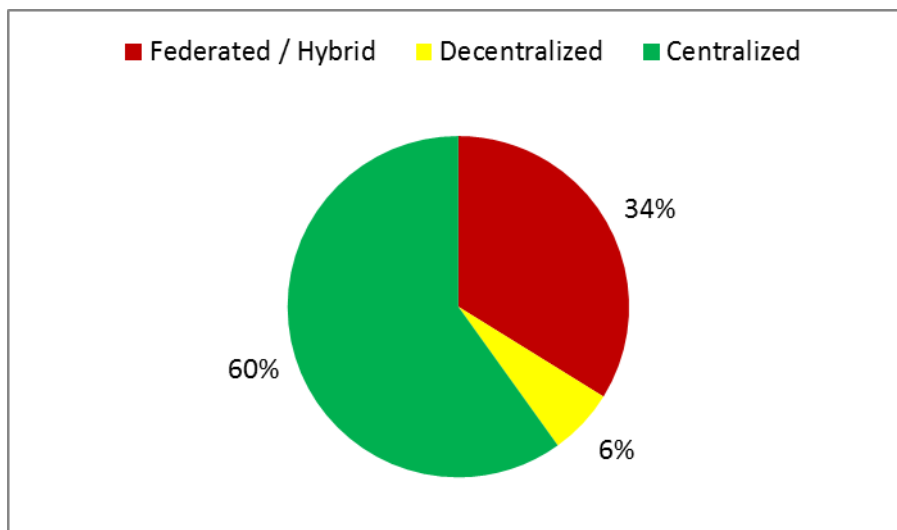


Figure 7: IT Organization Structure, 2017.

As the data show, 60% of the respondents said that their IT organizations were centralized. With a centralized IT structure, all of IT reports to a single IT unit, which can lead to improved economies of scale; the responsibility for all IT services typically resides with the corporate organization. The benefit of having a centralized structure is (or should be) consistency and

standardization of IT management practices, and more flexibility in assigning IT staff. In a centralized IT structure, the role of the CIO is more apparent as head of IT with better control over the entire IT unit. Running a unified unit assists the CIO in better *running and growing the business*. The performance of the IT organization, therefore, could (and should) be ascribed to his or her (personal) performance as CIO.

Only 6% of the respondents said that their IT organization was decentralized. In a decentralized structure, each business unit has its own IT organization (including IT infrastructure). There is little or no coordination across business units or with the corporate unit; corporate IT primarily supports the corporate departmental staff and some enterprise applications. Therefore, although the CIO oversees the IT activities, they possess less power and control over the activities of each business unit. This encumbers the IT function from becoming *agile* and *innovative* as an organizational function, as opposed to possible local innovative initiatives.

Furthermore, several studies have argued that how the IT function in a company is organized affects IT-business alignment (a top IT concern); see, for example, Brown and Grant, 2005; Huang et al. 2010. The relationship between IT organizational structure and strategic alignment expresses fundamentally the degree of structural fit between IT and the business, specifically in IT decision-making rights, reporting relationships, (de)centralization of IT services and infrastructure, and the deployment of information systems personnel (Chan and Reich, 2007). A centralized IT function creates scale benefits for IT such as improved productivity, cost reductions, and better resource utilization (Levina and Ross, 2003; Sambamurthy and Zmud, 1999). A centralized IT structure can also better promote efficient IT use (Huang et al. 2010). Companies tend to adopt a centralized structure when their strategies emphasize efficient operations (Weill and Ross, 2005). Wu et al. (2015) conclude that centralized IT encourage a high degree of standardization in the pursuit of profitability and operational excellence. Thus, under specific circumstances, this structure can be associated with a better strategic alignment fit. In contrast, a decentralized structure being more autonomous helps different business units achieve their goals rather than the IT function's goals (Sambamurthy and Zmud 1999). That is, a decentralized IT structure can increase business value by increasing the unit's flexibility to respond to market demands (Reynolds and Yetton, 2015). This makes the organizational IT structure less effective in terms of IT-business alignment, as decentralization is appropriate when decisions and departments are modularized (Tiwana and Konsynski, 2010).

About one third of the respondents said that their IT organization was federated/hybrid. The federated structure can achieve both centralization and decentralization benefits because it ensures corporate-wide synergy is maintained while leveraging the opportunity for business units to manage their own IT initiatives. This hybrid organizational structure facilitates *innovation* and *agility* on both the local level and the company levels. This is also reflected in the most effective results in terms of IT-business alignment (Luftman and Ben-Zvi, 2017). More specifically, the decentralized units favor activities related to three dimensions of the SAM model: communications, analytics and partnerships (Sambamurthy and Zmud 1999), while centralized units favor the other dimensions: IT governance, IT scope and IT skills development (Levina and Ross, 2003; Sambamurthy and Zmud, 1999). The hybrid combination of centralized and decentralized units, if done correctly, can take the best of both worlds and promote IT-business alignment. Notwithstanding, the balance within the federated structure between the two approaches greatly depends on the CIO, their personality and style of management they follow.

Having IT application initiatives reporting to the business is more important as IT moves towards the 5th dimension of the Evolving Role of the CIO model

4. DISCUSSION

It has been more than 30 years since the role of the CIO emerged; yet, this role continues to evolve as IT is reshaping entire companies. The data show that businesses today continue to concern themselves with leveraging IT to reduce costs, achieve agility and create IT-business alignment. Technical skills and technology awareness become second (or third) to the ability of the CIO to apply IT to the business. And the best way to demonstrate the value of IT to the business is to create a better understanding and alignment between IT and business. This alignment between business and IT is indeed a top concern, second only to security. Yet, while the survey shows that security has become an important concern in recent years, achieving and sustaining IT-business alignment has been a major concern to organizations for many years. For IT to transform the business mature alignment is essential.

The focus of IT-business alignment is on activities that are performed out either by IT or by a business function and enable strategic alignment of the business with IT. Alignment focuses also on a collection of activities that IT managers and business managers carry out jointly to coordinate goals and operations across IT and other organizational functions (e.g., finance, marketing, HR). Organizations and their leadership - both IT and non-IT executives - need to recognize that it is not just how IT is aligned with the business; it is how IT and business are aligned with each other. Business executives tend to look for the one silver bullet that will enhance this alignment. However, in reality, there is no one silver bullet and organizations need to address many strategic alignment maturity components (see Luftman et al. 2017).

The *Evolving Role of the CIO* model employed in this paper looks at the changing role of the CIO and how the IT function and other business functions mutually engage and enable the coordination of IT related activities to increase alignment and business value. The model investigates dynamic capabilities that support IT-business alignment and identifies related CIO roles, which are likely to improve the state of the alignment. The model illustrates how CIO traits have addressed the changing role of the CIO, and how the role of the CIO shapes the organization's strategic alignment.

Overall, this study opens a new horizon for researchers and practitioners to leverage IT. Essentially, and contrary to past research, the study provides a vehicle to examine where an organization stands in its alignment and perhaps more importantly, insights on what promotes this alignment. Employing the model and evaluating a company's alignment is a fundamental step in identifying specific actions necessary for enhancing the congruent relationship between business and IT, and to ensure that the CIO is providing demonstrable value to the business.

Looking forward, research has shown that there is a strong correlation between alignment maturity and organization performance (Luftman et al., 2017). IT and business leaders need to work closely together and leverage existing tools and the lessons learned from their application to help the organization improve performance by applying IT and enable business change. Therefore, based on the data, we conclude that there are still significant opportunities for organizations to improve IT-business alignment. Executives can (and should) seize these opportunities to articulate more comprehensive action plans for attaining greater IT-business

alignment, thus enhancing IT's effect on the business, which will lead to better company performance.

Future research should consider collecting performance data (e.g., earnings, revenues, return over IT investment, net profit margin, or industry specific analytics) and measure the relationship between alignment and company performance, taking into consideration the factors examined in this study (IT budgets, organizational structure and reporting structure). As more data is collected, additional investigations that detect causal effects among the measures would become valuable. This would allow scholars and practitioners to gain insights on the various interactions of IT-business alignment measures. For example, a consultant would be able to assist a company in deciding where and how to intervene to improve strategic alignment. This prospective line of research would enhance the application of the *Evolving CIO* model described in this study as a prescriptive tool to leverage the role of the CIO to achieve better alignment and company performance.

IT is increasingly taking on a more strategic revenue generating role in companies; the digital transformation. As a result, CIOs are now facing growing business responsibilities. In addition to providing high quality and cost-effective IT services, which is the more traditional CIO role, CIOs are expected to enable/drive the business with revenue generation, optimizing various business processes, improving the client experience and co-adopt with customers. Consequently, CIOs can utilize the model introduced in this study to focus more on generating revenue and on creating business value.

5. CONCLUSIONS

IT is a vital part of the 21st century organization's strategy. IT is more important today with the digital transformation than ever. Changes in technology and how they are applied by the business are shaping the future of IT. Organizations must recognize that competitive advantage is driven and facilitated by IT. That requires the role of the CIO and the IT organization to transform. This is why it is important for CIOs to "evolve" in each of the five dimensions of the *Evolving Role of the CIO* model, which in turn, demands mature IT-business alignment. A harmonious IT-business relationship is fundamental. And as new organizational positions directly related to technology (the CTO), data (the CDO) and security (CISO) emerge, the role of the CIO, their responsibilities, the IT organizational structure and governance, and even the CIO's reporting supervisor will probably be very different in the next few years than what we see today. With top management concerns focusing on IT-business alignment, business and IT cost reduction, innovative use of IT and agility, it is those organizations and individuals who are best prepared that will thrive in the coming years.

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APPENDIX: SURVEY METHODOLOGY

The Society of Information Management (SIM), and the lead author and his team have been conducting surveys of senior IT and non-IT executives since 1980 to help IT and business leaders to better understand and prepare for important IT issues and trends. It is an empirical investigation that applies the survey method as a way to gather data. Organizations and CIOs world-wide have been using the findings of previous surveys as a barometer to prepare for the future; especially in the past decade, when the lead author added global researchers and their network to his team, whereby the research included organizations located outside the United States.

Although the SIM survey has been conducted for almost 40 years, surveys prior to 2000 focused only on top management concerns. Since then, the survey has been extended to pursue more specific insights regarding the key IT issues of the day. The main weakness of the SIM survey is that it is almost exclusively based on respondents from the US (approximately 95%). The (complementary) survey conducted by the lead author's team provides a more diverse representation by extending the survey to additional countries and world regions.

Surveys were sent to CIOs or senior IT executives of large and medium sized organizations, inviting them to take the online survey in the summer of 2017. Participants were asked to rate the importance of 42 managerial concerns, 38 technology investments and opportunities, and answer 53 questions related to organizational issues. By the third quarter of 2017, a total of 1,659 participants had responded to the surveys. These IT executives represent more than 1,000 organizations from 16 industries and different world regions: North America, Asia, Europe, Africa, and Middle East. Table 7 provides a breakdown of the respondents by industry. The data were then consolidated together and analyzed. Key findings and major insights are reported in this paper in an aggregative manner. A significant strength of this study is in its ability to identify important trends by comparing the new survey data to surveys published by the lead author and his team in previous years.

Table 7: Percentage of Respondents by Industry	
Industry Classification	Percentage
Aerospace / defense	0.7%
Auto / industrial manufacturing	9.9%
Business professional services	2.9%
Chemicals / energy / utilities	4.0%
Construction	2.4%
Education	10.6%
Financial services / real estate / insurance	17.3%
Food beverages consumer packaged goods	2.4%
Hardware / software / networking	12.6%
Healthcare	6.8%
Media / entertainment / travel and leisure	3.8%
Pharmaceutical / biotechnology / life sciences	1.0%
Public sector / non profit	9.8%
Telecommunication	4.5%
Transportation / warehousing	2.8%
Wholesale / retail/ trading	6.1%
Other	2.4%