



# IT Capability Maturity Framework™ (IT-CMF™)

The Body of Knowledge Guide – Second Edition

Martin Curley | Jim Kenneally | Marian Carcary (Eds.)

# IT Capability Maturity Framework™ (IT-CMF™)

The Body of Knowledge Guide

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# IT Capability Maturity Framework™ (IT-CMF™)

The Body of Knowledge Guide

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Second edition

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# Preface

The software entrepreneur and internet pioneer, Marc Andreessen, famously wrote that ‘software is eating the world’. As each day goes by, rapid developments in technology, as predicted by Moore’s law, continue to enable disruptions that are changing and improving our world. As we continue to embrace computer and communications technology and the internet of things to enhance social, environmental and economic life, we become – as individuals and as organizations – increasingly dependent on distributed systems that operate at scale and contain many interconnected systems of systems – that is, large-scale distributed systems.

While many technology companies rush to create more sophisticated products and services, few have addressed the challenge of how such technologies and systems can be sustainably and reliably integrated and operated. A system that supports a city or an energy grid, for example, is as resilient only as its weakest link or component. While developing technology may be difficult, the organizational management of large-scale systems and IT functions presents challenges that are just as great – capabilities that are not strictly technology-related, such as risk management, governance, supply-demand management, and so on, are critical.

To help manage such systems, the IT Capability Maturity Framework™ (IT-CMF™) takes a systems-technology management and value-based perspective. It helps organizations to manage and improve their interconnected IT capabilities, by identifying areas needing improvement and showing how to make those improvements, based on industry best-known practice. This book publishes, for the first time, a catalogue of critical capabilities – capabilities we believe to be important in successfully managing large-scale systems and IT functions within large organizations.

The origins of IT-CMF lie in the successful transformation and development of the IT function within Intel Corporation in the early 2000s and subsequent research. The resulting set of artefacts was adopted by the Innovation Value Institute™ (IVI™) when the Institute was established, and has since been refined and extended to include additional practices, organizational assessment approaches and improvement roadmaps in a programme of research and experimentation conducted by the IVI in collaboration with a worldwide consortium of academic and industry partners.

IT-CMF does not seek to displace other useful IT frameworks – instead, it provides an umbrella under which other frameworks and methodologies can be understood and integrated to achieve synergy. It offers a coherent vision, a vocabulary, and a set of benchmarks that enable CIOs and other business leaders to identify their strengths and weaknesses, to set targets and to measure progress.

Sincere thanks are due to the many contributors who have helped evolve IT-CMF (from a nascent framework first described in the book - *Managing Information Technology for Business Value*) into the comprehensive body of knowledge that you are reading today. Very special thanks are due to my co-editors on this book, Jim Kenneally and Dr Marian Carcary, who led the team of contributing authors to transfer the IT-CMF body of knowledge into this uniform and cohesive volume. Thanks are due also to the many organizations and leaders who have adopted IT-CMF and supported its development, including the Boston Consulting Group, Chevron, BP, BNY Mellon, EY, and many others. Without their intellectual, resource and monetary support, IT-CMF would not have become what it is today.

The individuals from these organizations who graciously gave their time and insights to develop the IT-CMF body of knowledge are too many to mention here, but can be found in the appendices of this book or on the Innovation Value Institute's website, [www.ivi.ie/contributors](http://www.ivi.ie/contributors). The core team at the IVI – led by Martin Delaney – have been, and continue to be, central to the development and adoption of IT-CMF. Martin deserves special thanks for the energy and enthusiasm he has brought to IVI's General Manager and Technology Leader position, as do successive Presidents of Maynooth University, John Hughes and Philip Nolan, for their support of the IVI initiative. Thanks are also due to Maynooth University, Enterprise Ireland, IDA Ireland and the European Commission for their respective support of the IVI and its research work.

This book can make significant contributions to how your organization manages IT for agility, innovation and value, and also to help professionalize across industries how we manage IT for agility, innovation and value.

To be part of the ongoing evolution of IT-CMF and its research and emerging services' ecosystem, I invite you to stay in touch with progress at [www.ivi.ie](http://www.ivi.ie).

### The second edition

For this second edition, we have added a new chapter: **24. Personal Data Protection**.

Prof. Martin Curley  
Vice President, Intel Labs  
Senior Principal Engineer  
Director, Intel Labs Europe  
Intel Corporation  
Co-Founder Innovation Value Institute

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# Foreword

Suresh Kumar, BNY Mellon

BNY Mellon is the oldest bank in the USA – founded in 1784, eight years before the NYSE. Today, we are recognized as a Global Systemically Important Financial Institution (G-SIFI) and play a critical role in the global financial markets. A significant portion of global finances passes through our IT infrastructure on a daily basis.

To ensure that our vast infrastructure and 13,000 technology employees deliver the functionality and value needed to support this global enterprise, we focus on Capability Excellence, which is also one of the priority areas of the IT Capability Maturity Framework (IT-CMF) from the Innovation Value Institute (IVI). IT-CMF provides us with a structured and systematic approach to identify the capabilities we need; a way to assess our strengths and weaknesses; and offers clear pathways to improve our performance.

Today, IT is at the heart of every business. When an organization's IT capability is mature, that organization can derive the full benefits promised by the technology. Without a mature IT capability, an organization can miss opportunities for value creation, and may put its very survival at risk.

The opportunity for value creation and the risk of loss needs to be understood and managed across the organization. IT-CMF enables a continual drive for operational excellence and accountability for business-value results.

Our focus on a capability management and excellence transformation program is organization-wide, and helps us to evolve our IT capabilities to fulfil business needs, ensuring that IT investment decisions are no longer made in a vacuum – rather they are evaluated in terms of their contribution to delivering business outcomes. Because IT-CMF adopts the language of business value, as opposed to a technical engineering language, it provides a solid basis for dialogue with business leaders and a solid understanding of the IT capabilities needed to support both day-to-day business operations and investment to cater for future requirements.

Improving Capability Excellence is an organizational priority, with top personnel accountable for its successful delivery. At BNY Mellon, we use a variety of management approaches, and IT-CMF enables us to holistically align the multiple aspects that relate to the management of technology. The program has already delivered significant, measurable benefits to BNY Mellon, contributing to solid improvement in key areas. From a cost perspective, we have saved millions of dollars since starting the program as well as increased business user satisfaction by over 10%. We have deepened client relationships, and strengthened the skills and engaged the passion of our people. We continue to deliver further improvements as we integrate capability excellence into our normal operations.

BNY Mellon is proud to be a Patron member of the Innovation Value Institute and a key contributor to the development and evolution of IT-CMF. This framework provides a consistent and organization-wide approach to managing the IT capability of our complex, global enterprise IT function, and a platform on which we can deliver enhanced business value and innovation from IT. I am really pleased to see this first edition of the body of knowledge guide to the IT Capability Maturity Framework published and hope it will help you and your organization achieve more value from IT.

Suresh Kumar  
Senior Executive Vice President and Chief Information Officer, BNY Mellon

## **BNY Mellon**

BNY Mellon is a global investments company, delivering investment management and investment services to institutions, corporations and individual investors in 35 countries and more than 100 markets, with a global workforce more than 50,000 strong.

BNY Mellon is dedicated to improving lives through investing, helping people realize their full potential by leveraging our distinctive expertise to power investment success.

Given our global presence and our role in servicing a significant portion of the world's financial assets, we are uniquely positioned to leverage our data and platform assets to alleviate many of our clients' challenges. Our scale and access to data provide rich analytics that help our company and the financial markets make evidence-based decisions, and effectively manage risk.

Under Suresh Kumar's leadership, the Client Technology Solutions organization is delivering innovative and exceptional technology solutions that power our business, secure the sensitive data entrusted to us, and help the company's clients and employees to succeed.

Visit us at [www.bnymellon.com](http://www.bnymellon.com), or follow us on Twitter @BNYMellon.

# Foreword

Christian Morales, Intel Corporation

Information Technology (IT) is becoming pervasive and already underpins a significant proportion of our societal, economic and industrial systems. In parallel, data and knowledge are being referred to as the new crude oil of the 21<sup>st</sup> century. Despite the exponential advances across the board in the development of IT and technology, driven by Moore's law advancements, similar progress has not been seen in practices for the management of information technology for value, and organizations often struggle to convert the high velocity of advances in IT into tangible business value. There was thus a need and an opportunity to create a cohesive framework and set of management tools that organizations can use to systematically design, deploy and operate integrated information systems for value.

In this context, Intel is proud to have co-founded the Innovation Value Institute (IVI) with Maynooth University. The core goal we set ourselves was to create an international ecosystem of learning, expertise and experience that could cooperate to research and develop an integrated framework and set of management tools that could be deployed globally.

I have been pleased to see the number of leading companies, such as the Boston Consulting Group, Chevron, BP, Cisco and many others, who joined us on the journey to create and validate the IT Capability Maturity Framework (IT-CMF). I am particularly pleased to see organizations around the globe use the framework to deliver higher levels of value. IVI's way of working is a great exemplar of Open Innovation 2.0, with the collective output and impact far greater than any one organization could achieve on its own.

As technology's influence becomes more and more pervasive throughout every aspect of organizational life, firms need to consider IT's role in shaping their competitiveness as a whole. To successfully respond to competitive forces, organizations continually need to review and evolve their existing IT practices, processes, and cultural norms across the entire organization. IT-CMF provides a structured framework for them to do that, and it gives me considerable pleasure to see this first edition of the body of knowledge guide published, so that the insights it incorporates can be used more widely.

I hope it helps you and your organization achieve even better results from using information technology.

Christian Morales  
Corporate Vice President and General Manager Europe, Middle East, Africa  
Intel Corporation



# Foreword

Ralf Dreischmeier  
The Boston Consulting Group

When I first met Martin Curley, Director of Intel Labs Europe, and discussed his vision for the IT Capability Maturity Framework, I quickly realized that this was something that would be tremendously valuable to CIOs and their management teams everywhere. In BCG's work with technology leaders at some of the world's largest and most successful companies, we have found that their biggest challenges often lie in building the management capabilities necessary to use technology to transform their businesses, in partnership with their business colleagues, technology suppliers, and ecosystems of partners.

There are, of course, other IT frameworks that have proved useful in helping professionals address specific challenges. Some are more domain-specific, some more industry-specific, some more controls-focused. The challenge of managing the contribution of IT to business value, however, has – until now – received less attention – probably because it was more of concern to other business unit leaders outside of IT, and perhaps also because it really is difficult.

Recognizing this need and opportunity, we were delighted to join Intel and Maynooth University as one of IVI's Steering Patrons, to help develop IT-CMF and to validate its relevance and business impact. BCG, along with other consortium members, contributed expert resources, intellectual property and experience to the project, and helped orchestrate some of the working groups that developed elements of the framework. Working group contributors typically drew on decades of real-world experience, and were also familiar with other IT frameworks – this ensured that IT-CMF neither reinvents nor competes with other frameworks, but rather augments them and facilitates integration between them. This allows companies that already have investment and skills in such frameworks to maximize the value of that investment.

The decision to use an open innovation development methodology for IT-CMF has clearly helped to keep the work relevant: practitioners from enterprise end users of IT (public and private sectors), from the high-tech and IT industry, from academia, and from professional services companies joined forces in these working groups to create something that would help bring IT and value generation closer together.

We have found IT-CMF to be a powerful tool to help technology and business leaders respond to questions such as:

- ▶ Which of our IT capabilities are ahead, on par with or behind our peers and competitors?
- ▶ Where are the most valuable opportunities to improve our IT capability?
- ▶ How ready is my IT function to exploit the new challenges and opportunities in the world of digital (or cloud computing, or the next technology trend)?

IT-CMF provides not only the diagnostic framework to assess an organization's current capability, but also the industry-specific benchmarking data to calibrate that assessment, and the toolkit of practices, outcomes and metrics to chart the way forward, along with valuable case studies of what others have done to improve their IT capability.

We have successfully applied IT-CMF in over 200 assignments for clients in diverse industries, including IT, financial services, telecommunications, medical technology, consumer goods, fashion, energy, natural resources, and the public sector. We've seen IT-CMF applied by a newly-appointed CIO of a European technology company looking to get a handle on what they inherited; a global chief enterprise architect for one of the world's largest energy firms use it to track and drive the transformation of the enterprise architecture function; and an experienced CIO use it to chart the journey to world class for a major bank. We've been privileged to be partners with these leaders and their teams in supporting them on their journey, and happy to be using and recommending a framework that fits with our philosophy of client enablement – helping our clients be more capable at the end of an engagement than when we started, and not be dependent on external support or a proprietary framework.

Many of our clients have gone on to become members of IVI and also make contributions to IT-CMF in their own right.

As IT-CMF has gained traction globally and across industries, demand has continued to increase for broader access to IT-CMF beyond IVI members and the clients of IVI and its partners. I am therefore delighted to see the first edition of the body of knowledge guide to the IT Capability Maturity Framework become more widely accessible to technology and business professionals as well as students across the globe. We believe this will help support IT-CMF's continuing journey to become the gold standard for managing IT for business value.

IT-CMF just works. Or, as our clients confirm, it helps them create more value from IT.

Ralf Dreischmeier  
Senior Partner and Managing Director  
Global Leader, Technology Advantage Practice  
The Boston Consulting Group

# Foreword

Philip Nolan, Maynooth University

Maynooth University traces its origins to the foundation of the Royal College of St. Patrick in 1795, and today draws inspiration from more than two centuries of tradition in education and scholarship. The university has earned an international reputation for its teaching and research in the humanities, and in social and physical sciences. The University has particular strengths in the areas of mathematics, computer science and electronic engineering. At Maynooth University, we are committed to tackling real-world problems and are proud of the impact that our research work has had throughout the world.

Within 25 km of the university campus are situated the European headquarters of many of the world's leading high-technology companies, who choose to locate in Ireland because of the high quality of our graduates and the excellence of our research. In this context, our partnership with Intel Corporation in establishing and supporting the Innovation Value Institute (IVI) is easy to understand. Intel's European base is located just 5 km from the university, and there is a constant flow of people, knowledge and ideas between the two institutions.

The model of cooperation and mutual learning between academia and industry that has been adopted by the IVI points the way for the future of university-enterprise cooperation. It shows how research results can be transferred into industry to create real value and innovation. And, equally important, it shows how real-world experience can be leveraged to inform teaching and further research.

IVI is a not-for-profit organization that supports and is supported by an international membership consortium of industry, academia, and public sector organizations, who collaborate in order to deepen their understanding and develop their abilities. The consortium includes many of the world's largest and most prestigious enterprises.

The research and development model in IVI is based on the principles of open innovation, in which IT practitioners and academic researchers jointly define the research agenda and validate the results. This collaborative model results in the rapid generation and adoption of new management approaches and perspectives that can be applied in different industries and contexts. This open, intensive and rich collaboration provides IVI with an essential feedback loop that ensures that its research continues to be both relevant and rigorous.

This book – *IT Capability Maturity Framework (IT-CMF): The Body of Knowledge Guide* – represents the early fruits of this collaborative model. It provides managers with direction and guidance to help them to understand what they need, to evaluate their current situation, and to make realistic, concrete plans for improvement.



Information technology is a defining element in today's business world. However, the technology is not an end in itself – it is of limited value unless it adds real value to business or the wider society. By using IT-CMF, business leaders can make sure that the tremendous potential of information technology is realized in their organization.

Professor Philip Nolan  
President, Maynooth University  
Chairman, Innovation Value Institute

# Foreword

Colin Ashurst,  
Newcastle University Business School

The focus of my work over the past 35 years, as consultant, IT manager and academic, has been deriving business value from IT. Although I had hoped that we would have tackled the IT attention deficit by now and developed both business-savvy IT leaders and IT-savvy business leaders, progress has been slow, but it is encouraging to see the issues and opportunities come sharply into focus now that every business is becoming a digital business, and exploiting waves of technology to enable business innovation is a strategic priority.

As a consequence, organizations need to focus more on developing their key capabilities, and this book presents an opportunity for doing so, along with practical guidance that is based in sound research and real-world experience. Based on experience, I can't stress enough that the need is for *organization-wide* capabilities and leadership, and so this book and the framework it sets out are just as relevant for the CEO and the wider business leadership as they are for the CIO and IT management team.

I have recently conducted an in-depth survey of organizations who have adopted IT-CMF, ranging in size from medium to very large, including, at the top end, organizations employing over 5,000 IT staff. Without exception, all said that IT-CMF was a valuable management tool, and that they recommend it to other organizations without hesitation. One CIO commented: 'we were able to take a hated function and create self-respect. We have an IT function that is relevant, that is respected and on a journey.'

I believe IT-CMF to be comprehensive and credible. The assessments it incorporates bring valuable insights for managing IT performance. Using the framework helps organizations to objectively identify and confirm priorities as the basis for driving improvements.

IT-CMF has been developed – and continues to be developed – with inputs from a group of major, industry-leading organizations, as well as academic research and insights from around the world. It can provide your organization with valuable and powerful resources for developing organization-wide IT capabilities. With these resources, there is no need for any organization to start from scratch, to reinvent the wheel – they can use IT-CMF to build on the hard-won experience of others. They can also participate in the IT-CMF community and share in further developments with other leaders.

Within an organization, IT-CMF can be the basis for a shared language, generating a broader understanding and improved practice – all with the object of delivering business value and innovation.

Dr Colin Ashurst

Senior Lecturer and Director of Innovation, Newcastle University Business School

Author, *Benefits Realization from Information Technology*, Palgrave Macmillan, 2011,  
and *Competing with IT: Leading a Digital Business*, Palgrave Macmillan, 2015

# IT-CMIF™

## Introduction

### The Management of IT Challenge

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The rapid developments in information technology (IT) present a challenge for all organizations, large and small, public and private. While IT-enabled change and innovation are increasingly critical for their continued viability, many struggle to support and catalyse changes that will contribute value across the organization.

The rapid advances in IT have not been matched by developments in the management of information technology, and as a result many organizations fail to derive the full value from their investments – for example, over half of all large-scale technology deployments regularly fail to deliver the value and innovation expected of them [1][2]. With IDC estimating annual worldwide IT spending at around \$2 trillion, such failures represent a significant loss of value and innovation.

Organizations must deploy and use IT effectively to remain relevant in an increasingly digital economy [3][4]. They need to continually innovate and differentiate themselves to keep pace and gain competitive advantage [5]. However, IT on its own does not provide competitive advantage – only an effective IT capability that delivers a steady stream of IT-enabled changes and innovations can provide sustainable competitive advantage [6].

The Innovation Value Institute™ (IVI™) was founded to address these issues, as an open innovation ecosystem to research and develop an integrated management framework and set of tools for designing, deploying, and operating information systems to deliver sustainable business value and innovation.

### The Innovation Value Institute™

The Innovation Value Institute (IVI) was established in 2006 as a non-for-profit, multi-disciplinary research and education institute within Maynooth University, Ireland. It was co-founded by Intel Corporation and the university with the objective of creating an international consortium of companies and public sector organizations to build on work already carried out in Intel and create an international standard for the management of information technology.

As well as the consortium's commitment of funding and in-kind resources, Enterprise Ireland and IDA Ireland, through the Technology Centre programme, support IVI's research agenda to focus on the creation and accumulation of knowledge and best-available practices in the management of IT.

## Consortium Membership Profile

IVI supports and is supported by an international membership consortium of industry, academia, and public sector organizations who collaborate to deepen their understanding and develop their ability to manage their IT functions and realize the value of IT for their organizations. The consortium currently includes over 100 members, including many of the world's largest and most prestigious enterprises. Collaboration with the consortium members is a key part of IVI's research and development process.

## Research and Development: Open Innovation and Design Science Research

The research and development process in IVI is based on the principles of open innovation, originally proposed by Henry Chesbrough [7] and extended to Open Innovation 2.0 by the EU Open Innovation Strategy and Policy Group [8]. In this approach, IT professionals across multiple industries, together with academic researchers jointly define the research agenda, perform the research, and validate the results. This collaborative, non-competitive way of sharing information and insights greatly accelerates the generation of new approaches, tools and techniques, helps to disseminate new practices among a diversity of organizations and to collate experimental results, and enables participants to quickly identify what works and what doesn't, and in what circumstances. It also provides IVI with an essential feedback loop that ensures that its research continues to be both relevant and rigorous.

The core research paradigm used by IVI is design science research [9][10][11]. Design science research 'creates and evaluates IT artefacts intended to solve organizational problems' [12], the main goal being to develop knowledge that professionals and practitioners can use to design solutions to problems experienced in their field [13]. While behavioural science dominated twentieth century information systems research, design science research is today becoming more mainstream, with IVI a leading adopter. A fundamental goal of design science in information systems research is utility – that is, that the resultant artefact should be useful in addressing a real-world problem or challenge. IVI addresses utility by making pragmatic validation an integral part of its research approach.

Research in IVI is overseen by a Steering Board, which includes both industry leaders and academic researchers. Research is conducted in an iterative and staged approach, in which artefacts and theory are generated and verified, using both inductive and deductive processes. Research work is carried out by workgroups that include industry-domain experts and academic subject-matter experts. Each workgroup is facilitated by a dedicated IVI researcher who manages the research direction within the workgroup, and the resultant research output is codified into standard artefacts.

## The Origins of IT-CMF

In 2000, when Intel Corporation embarked on a programme of transformation of its IT function, they found that there was no comprehensive, integrated, CIO-level framework available [14]. Over the following years, they developed a maturity framework approach that proved to be highly successful. That approach, and the lessons learned from their experience of applying it, were captured in Prof. Martin Curley's book, *Managing IT for Business Value* [15].

When IVI was established in 2006, the Institute adopted the maturity framework from Intel Corporation, and continued to further develop and refine it. Since then, IVI has substantially enhanced and extended the framework with further research and feedback from users, to make it relevant to decision-makers in any industry (public or private) who need to manage key information technology capabilities to improve agility, innovation, and value.

IVI has also helped incubate a global professional-services ecosystem to satisfy the demand for IT-CMF training and consultancy. Certification programmes based on IT-CMF are available internationally; these equip suitably qualified individuals and organizations with the skills necessary to apply the framework to improve organizational performance.

## What is IT-CMF?

Organizations that manage their IT capabilities better perform better [16]. However, many organizations regularly struggle to manage their IT capabilities in a systematic way. The IT Capability Maturity Framework™ (IT-CMF) enables decision-makers to identify and develop the IT capabilities they need in the organization to deliver agility, innovation and value for the organization.

### Comprehensive Scope and Focus on Business Value

An analysis in 2011 of over 150 IT management tools revealed a significant gap in the available offerings, in that there was no framework that covered all IT domains and exhibited a significant value focus – see Figure 1 [10]. While each individual management tool or framework had the possibility of adding value in their specific area of focus, the complexity and inefficacy of using so many tools presented a challenge for organizations wishing to use them.

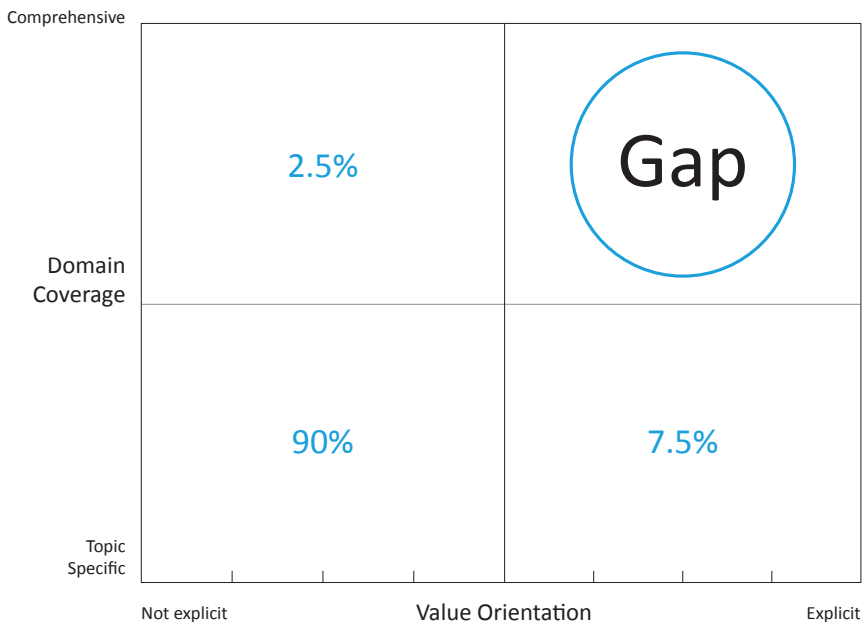


FIGURE 1. IT MANAGEMENT TOOLS: VALUE ORIENTATION AND DOMAIN COVERAGE

The lack of a holistic approach to managing IT for business value was similarly identified in a summary analysis of key academic papers on information systems research [17]. This failed to find a single paper dealing with business value as a significant or central theme.

Until IT-CMF, there was no single integrated enterprise IT approach for designing, operating, and supporting the increasingly integrated global computing and communications environment, particularly from a business value perspective. IT-CMF is explicitly designed to cover a range of IT capabilities needed in an IT function to deliver agility, innovation and value for the organization. It is also flexibly designed to allow new capabilities be captured and represented as they emerge.

### IT-CMF and Other Industry Frameworks

There are a number of frameworks available to managers and practitioners that address the needs of specialist niches or specific aspects of managing IT. None, however, cover the full breadth of a CIO's responsibilities, nor do different frameworks integrate with one another seamlessly to provide a comprehensive solution. Many aim to optimize specific or local areas, without truly appreciating the possible unintended negative consequences for other areas of the organization.

By contrast, IT-CMF aims for comprehensive coverage of the components (or critical capabilities) needed to address a CIO's responsibilities. It leverages the concept of dynamic capabilities [18], by providing a mechanism not only for developing the capabilities, but also for enabling them to be reconfigured as necessary to adapt to changing circumstances and strategies. It provides a portfolio of options from which CIOs and other senior managers can design an improvement programme that is uniquely suited to their particular IT capability needs and their business environment.

IT-CMF builds on the maturity model conceptualization adopted by the Software Engineering Institute for the Software CMM model [19][20], but as well as focusing on process and capability maturity, IT-CMF also focuses on outcome maturity – that is, on the specific business outcomes expected at different levels of capability maturity.

### What IT-CMF Provides

IT-CMF provides the basis for systematically and continually improving the performance of the IT function in an organization, and for measuring progress and value delivered. It enables organizations to devise more robust strategies, make better-informed decisions, and consistently deliver increased levels of agility, innovation and value.

IT-CMF offers:

- ▶ A holistic business-led approach that enables performance across the IT function to be managed consistently and comprehensively.
- ▶ Support for the development of enduring IT capabilities with a primary focus on achieving business agility, innovation and value.
- ▶ A platform and a common language for exchanging information between diverse stakeholders, enabling them to set goals, take action and evaluate improvements.
- ▶ An umbrella framework that complements other frameworks already in use in the organization to drive cohesive performance improvement.

The IT Capability Maturity Framework (IT-CMF) is currently used by hundreds of organizations worldwide, and is fast becoming the de facto standard for the management of IT in large organizations [21].

# Core Concepts of IT-CMF

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This section outlines the core principles and philosophy underpinning IT-CMF. A good understanding of these concepts will help the reader to navigate the remaining chapters of this book, and to see how IT-CMF improves management of IT for better agility, innovation and value.

## What Is a Capability?

A capability is the *quality of being capable*, to have the capacity or ability to do something, to achieve pre-determined goals and objectives. Collectively, capabilities coordinate the activities of individuals and groups – linking individual actions into seamless chains of actions, leading to repeatable patterns of interaction that become more efficient and effective as they are practised and internalized. An organizational capability refers to an organization's ability to '*perform a set of co-ordinated tasks, utilizing organizational resources, for the purposes of achieving a particular end result*' [22].

Capabilities must work in a consistent manner. Having a capability means that the organization can perform an activity repeatedly and reliably. Organizations build their capabilities progressively in a cyclical process of trial, feedback, learning, and evolution. Organizations must be able to realign their resources in response to changes in strategy or the environment in which they operate. They must be able to embrace change, quickly innovating and reconfiguring resources to capture and exploit new, unforeseen opportunities. This is often referred to as 'dynamic' capabilities. IT-CMF facilitates this flexibility and responsiveness, and enables an organization to purposefully create, extend or modify its resource base to address rapidly changing circumstances [23].

Dynamic capabilities include the ability to search, explore, acquire, assimilate, and apply knowledge about resources and opportunities, and about how resources can be configured to exploit opportunities. Organizations with such capabilities have greater intensity of organizational learning, and are able to leverage feedback cycles more effectively, and thereby continually build stronger capabilities.

## IT Capabilities

An organization's ability to orchestrate IT-based resources to create desired outcomes is a product of its IT capabilities. In IT-CMF, an IT capability is *the ability to mobilize and deploy (that is, integrate, reconfigure, acquire and release) IT-based resources to effect a desired end, often in combination with other resources and capabilities* (adapted [16]). Resources, in this context, can be either tangible (including financial, physical/infrastructural, human) or intangible (including software, data, intellectual property, branding, culture).

## Relationships between Capabilities, Competences, and Processes

Business processes are sequences of actions that organizations engage in to accomplish specific tasks. They represent how an organization's resources are exploited, and can be thought of as the routines or activities that an organization develops to get something done [24][25]. Business processes require the competences of individual employees and groups for their effective execution. In turn, business processes help individual employees and groups develop competence in particular ways of working [26]. Processes and competences are thus mutually dependent and reinforcing.



Many organizations focus on process management, which has value, but may not equip them to respond to changing business strategies or environmental forces. While effective and efficient processes are critical for business operations, these processes must be regularly evaluated, modified and matured in anticipation of and in response to changing forces to deliver sustainable value [27].

Capability management provides the vital link between the business's strategy and environment and its business processes. It gives the organization *the ability to create patterns of learning and adjustment to establish and maintain synergetic relationships between competences (people), processes (routines), and resources (assets) to accomplish a desired end.*

## Business Value

IT-CMF defines business value as *the contribution that IT-based resources and capabilities make to helping an organization achieve its objectives* [15]. Those objectives may be internal or external to the IT function; IT's greatest potential, however, lies in business enablement across the wider organization – that is, the organization's IT capability plays an important role in developing other business capabilities [16]. It is the resource configurations created with or enabled by IT capabilities that deliver value, rather than the IT capabilities themselves [28]. In addition, IT capabilities are just one part of the value creation process – they often need to be combined with non-IT-based resources and capabilities to fully realize value. IT-CMF helps organizations to continually enhance their capabilities to ensure that the resource (re)configurations are always aligned in support of business strategy and in response to environmental forces.

## Design Patterns

Each organization has a unique starting point and a unique operating context. What works in one organization may not necessarily work to the same extent in another. The particular context can limit the efficacy of a given practice, even when it is applied in similar, but subtly different, problem and/or organizational situations. In recognition of this, IT-CMF is not a rigid, one-size-fits-all framework, but uses the flexibility of design patterns to allow an organization to effectively codify, adopt and share those practices that are most appropriate for them and are most likely to improve their overall performance.

The concept and use of design patterns originated in building architecture in the late 1970s, and were later adopted in software engineering and other disciplines as a way of dealing with recurring challenges. A design pattern *describes a problem which occurs over and over again in our environment, and then describes the core of the solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice* [29]. Design patterns describe general reusable solutions and templates for dealing consistently and reliably with commonly occurring problems. The patterns are such that they can be applied in many different situations.

The various elements in IT-CMF are design patterns that can be combined in myriad ways: each organization can identify the patterns (critical capabilities, capability building blocks, practices, metrics, artefacts, etc.) that best address their particular needs, objectives and environment, and will enable them to deliver agility, innovation and value. Recognizing that each organization is different, the framework avoids an overly prescriptive approach, and instead provides guidance on good practice while enabling each organization to overcome its contextual challenges flexibly.

## Maturity

Maturity frameworks are *conceptual models that outline anticipated, typical, logical, and desired evolution paths towards desired end-states* [30], where maturity is *an evolutionary progress in the demonstration of a specific ability or in the accomplishment of a target from an initial to a desired or normally occurring end stage* [31]. Maturity-based approaches for managing IT have been widely adopted – for example, the Software Engineering Institute’s (SEI) Capability Maturity Model Integration (CMMI) is extensively used in the domain of software quality [19][20].

For each of the capabilities in the framework, IT-CMF defines five maturity levels, each of which characterizes a different level of efficiency and effectiveness. This facilitates a modular, systematic and incremental approach to capability improvement, by helping organizations to gauge how advanced they are in each area of activity, and identifying the actions they can take to improve over time.

While the definition of maturity levels is specific to each capability, the broad common characteristics of the five maturity levels, in terms of approaches, scope, and outcomes, are as shown in Table 1. (These are examples only – a wide diversity of maturity pillars is supported throughout IT-CMF.)

TABLE 1: GENERAL MATURITY LEVEL HEURISTICS

Level	Approaches Quality of routines / practices or activities	Scope Breadth of coverage / focus	Outcomes Predictability between actions and consequences
<b>1 – Initial</b>	Approaches are inadequate and unstable.	Scope is fragmented and incoherent.	Repeatable outcomes are rare.
<b>2 – Basic</b>	Approaches are defined, but inconsistencies remain.	Scope is limited to a partial area of a business function or domain area; deficiencies remain.	Repeatable outcomes are achieved occasionally.
<b>3 – Intermediate</b>	Approaches are standardized, inconsistencies are addressed.	Scope expands to cover a business function (typically IT) or domain area.	Repeatable outcomes are often achieved.
<b>4 – Advanced</b>	Approaches can systematically flex for innovative adaptations.	Scope covers the end-to-end organization / neighbouring domain areas.	Repeatable outcomes are very often achieved.
<b>5 – Optimizing</b>	Approaches demonstrate world-class attributes.	Scope extends beyond the borders of the organization / neighbouring domains.	Repeatable outcomes are virtually always achieved.

# The Architecture of IT-CMF

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## Overview

IT-CMF is structured around four *macro-capabilities*, each of which embraces a number of *critical capabilities* (CCs) that can contribute to agility, innovation and value.

Each critical capability is made up of a number of *capability building blocks* (CBBs). The framework defines the different *maturity levels* for each CBB, and provides *evaluation questions* to assess their current state.

For each CBB, IT-CMF provides a series of representative practices to drive maturity, along with the outcomes that can be expected from implementing them and the metrics that can be applied to monitor progress (*Practices-Outcomes-Metrics*, or POMs).

The framework looks at typical *challenges* that the organization might face in attempting to develop maturity in each capability, and suggests *actions to overcome* them. And it identifies additional *management artefacts* that can be used in the development of maturity.

These elements are all described below.

## Macro-Capabilities

At the top level, IT-CMF is structured around four key strategic areas, or macro-capabilities, for the management of IT [32]:

- ▶ Managing IT like a business.
- ▶ Managing the IT budget.
- ▶ Managing the IT capability.
- ▶ Managing IT for business value.

The effective management of technology within an organization focuses on these four macro-capabilities, all of which should be aligned with the overall business strategy, the business environment within which the organization operates, and the IT posture of the organization.

### 1. Managing IT like a business

To optimize the contribution of technology to the organization as a whole, the IT function needs to be managed using professional business practices. This involves shifting the focus away from technology as an end in itself towards the customers and the business problems to which IT can provide solutions. The Managing IT Like a Business macro-capability provides a structure within which the IT function can be repositioned from a cost centre to a value centre.

### 2. Managing the IT budget

There are many challenges associated with managing the IT budget, including, for example, unplanned cost escalation, the cost of maintaining legacy systems, and management reluctance to invest strategically in new technologies. The Managing the IT Budget macro-capability looks at the practices and tools that can be used to establish and control a sustainable economic funding model for IT services and solutions.

### 3. Managing the IT capability

The IT function was traditionally seen as the provider of one-off IT services and solutions. In order to fulfil its role as the instigator of innovation and continual business improvement however, the IT function has to proactively deliver – and be seen to deliver – a stream of new and improved IT services and solutions. This macro-capability provides a systematic approach to adopting that role, by effectively and efficiently maintaining existing services and solutions and developing new ones.

### 4. Managing IT for business value

Investments in IT must be linked to overall business benefits. This means that the investments should not be viewed simply as technology projects, but as projects that generate business value and innovation across the organization. The Managing IT for Business Value macro-capability provides a structure within which the IT function provides the rationale for investment in IT and measures the business benefits accruing from it.

Together these four macro-capabilities operate in a continuous feedback loop to optimize the way in which IT is managed [32].

- ▶ *Managing IT like a Business* sets the direction for the overall IT capability.
- ▶ In *Managing the IT Budget*, the strategic direction is translated into an IT budget to fuel activities and programmes.
- ▶ *Managing the IT Capability* is the production engine, where two primary activities are performed: maintaining existing IT services and developing new IT solutions.
- ▶ *Managing IT for Business Value* ensures that these activities and programmes deliver value.

Performance is fed back into *Managing IT like a Business*, to validate that the IT budget is being converted effectively into business value. This may result in tactical or strategic adjustments that feed through the cycle again [33]. (See Figure 2).

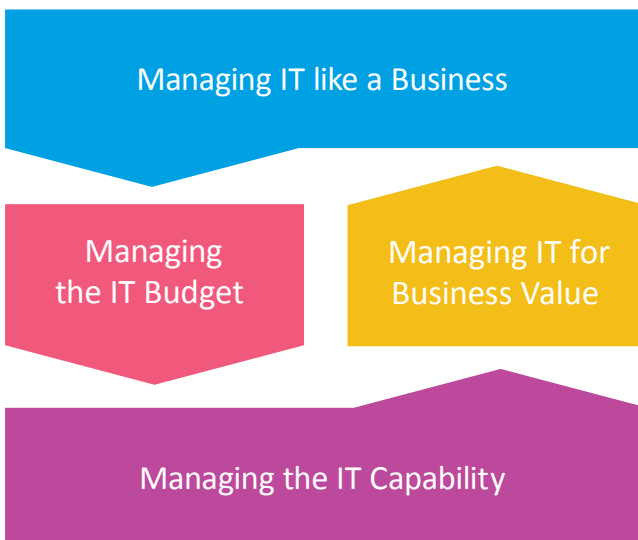


FIGURE 2: IT-CMF'S MACRO-CAPABILITIES

The macro-capability feedback loop in IT-CMF ensures that the organization continually focuses on the IT capabilities needed to meet the challenges and opportunities presented by the changing business and operating environment.

**Macro-capability strategies**

When an organization is planning its capability improvement programme, it is helpful to decide on its strategic objectives in relation to each of the four macro-capabilities of IT-CMF, as depicted in Figure 3. This will help to identify the critical capabilities that the organization needs to focus on. Other factors that must be taken into account include IT posture, problem context, industry trends, business strategy, business context, and so on. (For further discussion of this topic, see [14][32].)

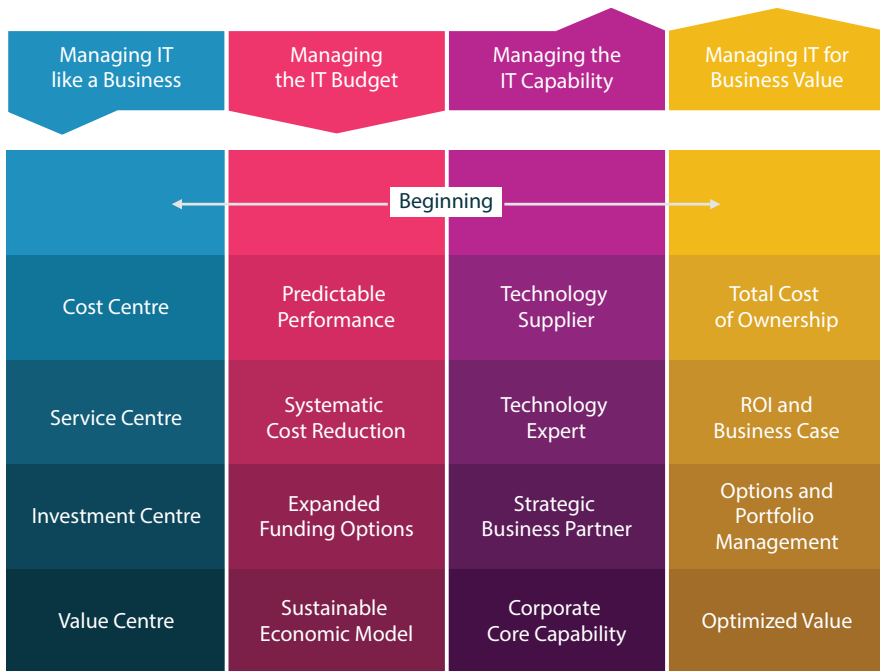


FIGURE 3: MAJOR STRATEGIES OF IT-CMF’S MACRO CAPABILITIES

**Critical Capabilities**

IT-CMF’s four macro-capabilities encompass a modular library of 36 critical capabilities (adapted [33]) – see Figure 4. Critical capabilities are key management domains that need to be considered by an organization when planning and delivering IT-enabled business value and innovation.



FIGURE 4: IT-CMIF'S MACRO-CAPABILITIES AND CRITICAL CAPABILITIES

# How IT-CMF Critical Capabilities Are Presented

The numbered chapters in this book (1–36) each relate to a particular Critical Capability (CC). In their layout and information design, these chapters are presented in a consistent manner, with the same content structure and headings. As you begin to use the book, you will become familiar with this structure and will find it easy to navigate through the different Critical Capabilities (CCs).

The structural components of each chapter are set out below.

## 1. Overview

The Overview provides the contextual background for each Critical Capability (CC), outlining the following in each case:

- ▶ **Goal:** The general purpose or end-state towards which the CC is directed.
- ▶ **Objectives:** Specifics regarding what the CC provides or enables. These provide the focus and the direction for the capability improvement effort.
- ▶ **Value:** How the effective management of this CC can contribute towards the organization's pursuit of business value – that is, what it delivers in a business context.
- ▶ **Relevance:** The importance of the CC in a business context.

## 2. Scope

The Scope defines the area that the CC deals with, in each case providing:

- ▶ **Definition:** a formal definition of the CC, its primary subject matter and the activities that it covers.
- ▶ **Other Capabilities:** activities that might be expected in this CC, but are covered in other CCs.

## 3. Understanding Maturity

This section describes the different levels of maturity associated with the Critical Capability (CC). It takes in a number of areas as described below.

### Recognizing Excellence

This is a brief description of what performance in the CC might look like when it is operating well, and how good performance can be recognized. The main characteristics of high performance are summarized here.

### Maturity at the Critical Capability (CC) Level

This provides a top-level summary of the CC across five successive and incremental levels of maturity. It describes the essential characteristics of the CC at each level. In doing so, it presents a picture of the transition from one maturity level to the next.

### Maturity at the Capability Building Block (CBB) Level

This section describes the capability building blocks (CBBs) – the key components of the CC that enable its goals and objectives to be achieved efficiently and effectively. These are grouped into higher-order logical categories that are particular to each CC. For each CBB, there is a brief description of what it does, and an outline of the five progressive levels through which it passes as it matures. CBBs serve as the basis (the building blocks) upon which the CC's maturity is developed.

## How to interpret maturity levels

The maturity levels described in the CCs and the CBBs are generally applicable in different contexts, but an individual organization may find that it does not fit neatly within any one level – it may, for example, exhibit characteristics of two or more maturity levels. Deciding which maturity level best describes the organization’s current state depends on taking a common-sense approach that considers where the majority of the organization’s time, resources and effort are being spent.

The maturity levels summarize the main characteristics that are generally observed at each level, but, for reasons of practicality, not all characteristics may be described.

Maturity levels are additive – each lower level provides the foundation for the next higher one, and capabilities are progressively enhanced in progressing from one level to the next. It can thus be unwise (and may not be possible) to skip levels – for example, to attempt to progress from level 1 directly to level 5. With proper planning, however, progress through the levels can be accelerated.

The maturity level that an organization should aim for depends on many factors, such as the organization’s IT posture, business strategy, industry environment, current maturity, and so on. It may be unrealistic or inappropriate for every organization to automatically aim for maturity level 5 in every capability.

## 4. Improvement Planning

This section encourages the reader to reflect on their own organization’s level of maturity in relation to the CC, and suggests some representative practices that might help them to develop.

### Capability Evaluation

This consists of some high-level questions that help the reader to determine their current and desired maturity levels in relation to the CC. Each question has associated with it a series of corresponding maturity statements from which the organization selects the one that most closely matches their situation. In conjunction with the CBB maturity descriptions, these questions and answers can inform improvement planning discussions and help drive improvement across the areas under investigation.

### Practices-Outcomes-Metrics (POMs)

This is a series of representative *practices* at each maturity level that an organization might adopt to help it stabilize its current maturity or progress to the next level of maturity. Each practice is accompanied by an *outcome* that states what benefits might result from following the practice, and one or more *metrics* against which the organization can gauge whether or not it has been successful in its efforts. The practices listed are indicative or representative, and are not exhaustive or mandatory – depending on organizational circumstances, alternative practices may yield the same results. Each organization should select the POMs that are most appropriate to their maturity circumstances and on which time, resources, and effort can be expended to maximum effect.

While the POMs are each described in association with a particular maturity level, this should not be seen as exclusive – it may be appropriate for an organization to implement, to a limited extent, POMs that are beyond its current maturity level. The key is to understand which POMs should command the majority of the organization’s time, effort and focus in pursuit of capability improvement.



As with maturity levels, POMs are cumulative, in that lower-level POMs provide the foundation for adopting and succeeding with higher-level POMs.

**Addressing Typical Challenges**

This deals with general organizational challenges that may arise in attempting to develop maturity in the CC. For each challenge, there is a brief description of the context in which it is likely to occur, and a statement of the action that needs to be taken to meet or overcome the challenge.

**Management Artefacts**

These are artefacts that management might use to develop maturity in the CC. Although artefacts can be useful in more than one CC, in many cases they tend to be CC-specific. They include a range of tools, templates, documents, software applications, and other tools that have the potential to help practitioners develop their organization's capability.

## 5. Reference

There is a reference section at the end of each CC chapter as described below.

**See Also**

Capabilities are very often interdependent, and can rarely be improved in isolation. The maturity of the current CC may be constrained by the level of maturity in other CCs that have close and important relationships with it. When designing a capability improvement programme, the organizational context needs to be taken into account, and the related capabilities that are critical in that context identified. The CCs listed in the See Also section are the most likely candidates for consideration, but others should also be considered, depending on the organization's problem context and desired objectives.

**Further Reading**

This is a bibliography of material that relates directly to the current CC.

**Notes**

This is a list of published items referenced in the text of the chapter.

## Notes

- [1] British Computer Society, 2004. *The challenges of complex IT projects. The report of a working group from the Royal Academy of Engineering and the British Computer Society*. London: The Royal Academy of Engineering.
- [2] Bloch, M., Blumberg, S., and Laartz, J., 2012. Delivering large-scale IT projects on time, on budget, and on value. McKinsey & Company. Available at: <[http://www.mckinsey.com/insights/business\\_technology/delivering\\_large-scale\\_it\\_projects\\_on\\_time\\_on\\_budget\\_and\\_on\\_value](http://www.mckinsey.com/insights/business_technology/delivering_large-scale_it_projects_on_time_on_budget_and_on_value)>.
- [3] Pavlou, P.A., and El Sawy, O.A., 2010. The 'third hand': IT-enabled competitive advantage in turbulence through improvisational capabilities. *Information Systems Research*, 21(3), 443–71.
- [4] Granados, N., and Gupta, A., 2013. Transparency strategy: competing with information in a digital world. *MIS Quarterly*, 37(2), 637–42.
- [5] Keen, P., and Williams, R., 2013. Value architectures for digital business: beyond the business model. *MIS Quarterly*, 37(2), 643–8.
- [6] Ross, J.W., Beath, C.M., and Goodhue, D.L., 1996. Develop long-term competitiveness through information technology assets. *Sloan Management Review*, 38(1), 31–42.
- [7] Chesbrough, H.W., 2003. The era of open innovation. *Sloan Management Review*, 44(3), 35–41.
- [8] Curley, M., and Salmelin, B, 2014. Open innovation 2.0: a new milieu. In: *EU Open Innovation 2.0 Yearbook*. Luxembourg: European Commission.
- [9] Curley, M., 2012. The emergence and initial development of a new design pattern for CIOs using design science. In: *Practical aspects of design science* (Communications in Computer and Information Science Series, Volume 286). Berlin: Springer.
- [10] Curley, M., Kenneally, J., and Dreischmeier, R., 2012. Creating a new IT management framework using design science: a rationale for action and for using design science. In: *Practical aspects of design science* (Communications in Computer and Information Science Series, Volume 286). Berlin: Springer.
- [11] Helfert, M., and Curley, M., 2012. Design science in action: researching and developing the IT-CMF. In: *Practical aspects of design science* (Communications in Computer and Information Science Series, Volume 286). Berlin: Springer.
- [12] Van Aken J.E., 2005. Management research as a design science: articulating the research products of mode 2 knowledge production in management. *British Journal of Management*, 16(1), 19–36.
- [13] Hevner, A., March, S., and Park, J., 2004. Design science in information systems research. *MIS Quarterly*, 28(1), 75–105.
- [14] Curley, M., 2006. The IT transformation at Intel. *MIS Quarterly Executive*, 5(4).
- [15] Curley, M., 2004. *Managing information technology for business value*. Hillsboro, OR: Intel Press.
- [16] Mithas, S., Ramasubbu, N., and Sambamurthy, V., 2011. How information management capability influences firm performance. *MIS Quarterly*, 35(1), 237–56.
- [17] Whitman, M., and Woszczyński, A., 2003. *Handbook of information systems research*. Hershey, PA: Idea Group Publishing.

- [18] Teece, D., and Pisano, G., 1994. The dynamic capabilities of firms: an introduction. *Industrial and Corporate Change*, 3(3), 537–56.
- [19] Humphrey, W.S., 1988. Characterizing the software process: a maturity framework. *IEEE Software*, 5(2), 73–9.
- [20] Paulk, M.C., Curtis, B., Chrissis, M.B., and Weber, C., 1993. Capability maturity model for software (Version 1.1). Software Engineering Institute. Available at <<http://resources.sei.cmu.edu/library/asset-view.cfm?assetID=11955>>.
- [21] Costello, T., Langley, M.A., Botula, K., Forrester, E., Curley, M., Kenneally, J., Delaney, M., and McLaughlin, S., 2013. IT frameworks. *IEEE IT Professional*, 15(5).
- [22] Helfat, C.E., and Peteraf, M.A., 2003. The dynamic resource-based view: capability lifecycles. *Strategic Management Journal*, 24(10), 997–1010.
- [23] Teece, D.J., 2007. Managers, markets, and dynamic capabilities. In C. Helfat, S. Finkelstein et al. (eds.), *Dynamic capabilities: understanding strategic change in organizations*. Oxford: Blackwell.
- [24] Nelson, R.R., and Winter, S.G., 1982. *An evolutionary theory of economic change*. Cambridge, MA: Belknap Press.
- [25] Porter, M.E., 1991. Towards a dynamic theory of strategy. *Strategic Management Journal*, 12, 95–117.
- [26] Dosi, G., Nelson, R.R. and Winter, S.G. (eds.), 2000. *The nature and dynamics of organizational capabilities*. Oxford: Oxford University Press.
- [27] Carcary, M., Doherty, E., and Thornley, C., 2015. Business innovation and differentiation: maturing the IT capability. *IT Professional*, 17(2), 46–53.
- [28] Eisenhardt, K.M., and Martin, J.A., 2000. Dynamic capabilities: what are they? *Strategic Management Journal*, 21(10/11), 1105–21.
- [29] Alexander, C., Ishikawa, S., and Silverstein, M., 1977. *A pattern language*. New York, NY: Oxford University Press.
- [30] Becker, J., Niehaves, B., Poppelbus, J., and Simons, A., 2010. Maturity models in IS research. In: *Proceedings of the 18th European conference on information system*. Available at: <[http://www.researchgate.net/publication/221408759\\_Maturity\\_Models\\_in\\_IS\\_Research](http://www.researchgate.net/publication/221408759_Maturity_Models_in_IS_Research)>.
- [31] Mettler, T., 2009. A design science research perspective on maturity models in Information Systems. St Gallen: Institute of Information Management. University of St Gallen, CH.
- [32] Curley, M., 2007. Introducing an IT capability maturity framework. In J. Cardoso, J. Cordeiro and J. Filipe (eds.) *Enterprise Information Systems*. Berlin: Springer.
- [33] Curley, M., 2008. *The IT capability maturity framework: A theory for continuously improving the value delivered from IT capability*. Ph.D. National University of Ireland, Maynooth.

# Managing IT like a Business

To optimize the contribution of technology to the organization as a whole, the IT function needs to be managed using professional business practices. This involves shifting the focus away from technology as an end in itself towards the customers and the business problems to which IT can provide solutions. The **Managing IT Like a Business** macro-capability provides a structure within which the IT function can be repositioned from a cost centre to a value centre.

## Contents: Managing IT like a Business

<b>Critical Capability</b>	<b>Description</b>	<b>Page</b>
<b>01</b> Accounting and Allocation (AA)	Define and manage the policies, processes, and tools used for calculating the costs of IT services and distributing them across the organization.	19
<b>02</b> Business Planning (BP)	Produce an approved document that provides implementable detail for the IT strategy, setting out the IT function's tactical objectives, the operational services to be provided, and the financial and other resources and constraints that apply in the coming planning period.	29
<b>03</b> Business Process Management (BPM)	Identify, design, document, monitor, optimize, and assist in the execution of both existing and new organizational processes.	45
<b>04</b> Capacity Forecasting and Planning (CFP)	Model and forecast demand for IT services, infrastructure, facilities, and people.	59
<b>05</b> Demand and Supply Management (DSM)	Manage the IT services portfolio in such a way that there is a balance between the demand for and the supply of IT services.	71
<b>06</b> Enterprise Information Management (EIM)	Establish effective systems for gathering, analysing, disseminating, exploiting, and disposing of data and information.	83
<b>07</b> Green IT (GIT)	Minimize the environmental impact of IT operations, and make the best use of technology to minimize the environmental impact of organization-wide operations.	103
<b>08</b> Innovation Management (IM)	Identify, fund, and measure technology-driven business innovation, which can be applied within the IT function, to the organization's operations, or to the organization's products and services.	119
<b>09</b> IT Leadership and Governance (ITG)	Galvanize employees towards a common strategic direction and value proposition, and establish appropriate IT decision-making bodies and processes.	137
<b>10</b> Organization Design and Planning (ODP)	Manage the IT function's internal structure and its interfaces with other business units, suppliers, and business partners.	153
<b>11</b> Risk Management (RM)	Assess, prioritize, handle, and monitor the exposure to and the potential impact of IT-related risks that can directly impact the business in a financial or reputational manner.	167
<b>12</b> Service Analytics and Intelligence (SAI)	Define and quantify the relationships between IT infrastructure, IT services, and IT-enabled business processes.	185
<b>13</b> Sourcing (SRC)	Evaluate, select, and integrate IT service providers according to a defined strategy and sourcing model.	199
<b>14</b> Strategic Planning (SP)	Formulate a long-term vision and translate it into an actionable strategic plan for the IT function.	215

# AA

# 01. Accounting and Allocation

## 01.1 OVERVIEW

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### Goal

The Accounting and Allocation (AA) capability aims to allocate the consumption of IT services to business units and to calculate the associated costs for chargeback/showback purposes.

### Objectives

- ▶ Promote better understanding of the cost drivers for IT services.
- ▶ Enable business units to fund directly the provision of new IT services that might not otherwise have occurred because of a limited IT budget.
- ▶ Motivate managers across the organization to make sound economic decisions – for example, by subsidizing newer systems and imposing additional charges for the use of legacy systems.
- ▶ Encourage users to avoid expensive IT activities when slightly less convenient but far cheaper alternatives are available.

### Value

The Accounting and Allocation (AA) capability assigns costs of IT services proportionally and transparently to the users of those services, improving cost awareness and responsible usage behaviours.

### Relevance

IT functions regularly have to deal with reductions to their budgets, while at the same time maintaining ongoing operations, managing costs, and meeting an often fluctuating demand for IT services from other business units. For these reasons, strong financial management of the IT function is essential to ensure that funding for IT is based on the business demand for and usage of the services it provides [1]. When trying to fund IT services through the recovery of costs, IT leaders need to present strong financial data relating to the costs of the services they provide – otherwise, they run the risk of alienating their peers across the organization.

By developing an effective Accounting and Allocation (AA) capability, an organization is able to improve visibility into IT cost drivers and to assign costs to business units transparently and in proportion to their consumption. This enables the IT function to meter demand and to place funding for IT services on a sustainable footing.

## 01.2 SCOPE

### Definition

The Accounting and Allocation (AA) capability is the ability to define and manage the policies, processes, and tools used for calculating the costs of IT and distributing them across the organization. The Accounting and Allocation (AA) capability covers:

- ▶ Establishing policies for measuring the consumption of IT services by business units in the organization, and for the chargeback/showback of associated IT costs to those units.
- ▶ Managing how the chargeback/showback for IT service consumption is allocated.
- ▶ Influencing the demand for IT services.

### Other Capabilities

The following are addressed by other capabilities of IT-CMF:

For...	Refer to...
Determining sources of IT funding and planning IT funding levels	17. Funding and Financing (FF)
Understanding costs associated with IT services	36. Total Cost of Ownership (TCO)

## 01.3 UNDERSTANDING MATURITY

### Recognizing Excellence

When the Accounting and Allocation (AA) capability is well-developed or mature:

- ▶ Service usage and cost recovery policies are transparent and communicated to relevant stakeholders.
- ▶ Costs of IT services (including essential, subscription, and discretionary services) are accurately and fairly allocated to business units based on usage.
- ▶ There is automated and centralized management of cost information from federated Human Resources (HR), Enterprise Resource Planning (ERP), and other financial systems of record.
- ▶ IT accounting and allocation is used in strategic decision-making – for example, for investment planning, and for balancing between the variable and fixed costs associated with the provisioning of IT services.

## Maturity at the Critical Capability Level

The following statements provide a high-level overview of the Accounting and Allocation (AA) capability at successive levels of maturity:

- |         |   |
|---------|---|
| Level 1 | There is limited or no transparent allocation of IT consumption and associated costs to business units. Costs are typically allocated as overhead costs and are not linked to consumption.  |
| Level 2 | Transparent allocation of IT costs to business units is emerging for the largest IT projects and services only. Basic IT accounting is introduced. Fixed annual costs are allocated to business units based on an estimate of resource usage.   |
| Level 3 | Transparent allocation of IT costs to business units covers most IT services. The accounting framework is aligned across IT and accepted by Finance. Charges are allocated based on units of IT resources consumed, with some charges manipulated to drive desirable user behaviour (such as lower charges to encourage off-peak usage of network servers). |
| Level 4 | Transparent allocation of IT costs to business units covers all IT services. The accounting framework is fully embedded in corporate systems. IT service fees are based on consumption of services as stated in the services catalogue. Fees are comparable to 'market' prices.   |
| Level 5 | Accounting and allocation enables business units to fully understand the costs of the IT services they consume, and enables them to optimize costs for their particular business units – for example, using metrics for unit price, volume, and quality.  |

## Maturity at the Capability Building Block (CBB) Level

The Capability Building Blocks (CBBs) associated with the Accounting and Allocation (AA) capability fall into two categories:

- ▶ Category A: two CBBs associated with **Model Development** – these determine the scope for the accounting and allocation of IT costs.
- ▶ Category B: two CBBs associated with **Deployment** – these determine how the accounting and allocation of IT costs should be applied and overseen.

These are described below, together with a summary of the different maturity levels for each.



## Category A: CBBs Associated with *Model Development*

### CBB A1: Cost Coverage

*Determine the scope of IT services (for example, essential, subscription, and discretionary services) whose costs are allocated to business units.*

- Level 1        There is limited or no allocation of IT service costs to business units.
- Level 2        Cost allocation policies are applied only to a limited number of key IT projects and services.
- Level 3        Cost allocation policies are applied across the majority of IT projects and services.
- Level 4        Cost allocation policies are applied across all IT projects and services.
- Level 5        Cost allocation policies are continually reviewed and optimized for business environment conditions.

### CBB A2: Accounting Policy and Cost Recovery Model

*Develop policies for calculating costs associated with the consumption of IT services, and develop a model for cost allocation and recovery.*

- Level 1        Policies and cost recovery models, if they exist, are based on a simple overhead cost allocation approach.
- Level 2        There is a defined accounting policy and a cost recovery model, both of which are accepted by Finance. However, they are not yet fully operational.
- Level 3        A standardized accounting policy and cost recovery model are fully operational and used by Finance and some other business units.
- Level 4        A comprehensive accounting policy and cost recovery model are fully operational across the entire organization.
- Level 5        The model for cost recovery is continually optimized to enable business units to fully control their costs.

## Category B: CBBs Associated with *Deployment*

### CBB B1: Decision-Making Transparency

*Manage data on usage volumes and associated costs to provide visibility to inform decision-making across business units.*

- Level 1        There is little or no availability of empirical data on which cost allocation or IT consumption decisions might be based.
- Level 2        There are high-level details of usage and cost projections for a limited number of key IT services to support decision-making, but these are not available at the business unit level.
- Level 3        Detailed usage data and unit costs are available for many IT services to support decision-making at the business unit level to enable cost reduction.
- Level 4        Comprehensive details of usage trends and unit costs are available for all IT services to support decision-making at the business unit level on investment prioritization.
- Level 5        The transparency of usage and cost data is continually reviewed in light of previous decision-making outcomes, and is regularly compared against relevant peers.

**CBB B2: Governance and Communication**

*Apply appropriate oversight and communication approaches to ensure that business unit stakeholders understand and have buy-in to cost allocation and recovery policies.*

- |         |   |
|---------|---|
| Level 1 | Governance and communication on cost allocation is non-existent or ad hoc.  |
| Level 2 | An informal governance forum is emerging with participants mostly from the IT and Finance functions. There is growing communication on cost allocation to a limited number of key business unit stakeholders.               |
| Level 3 | A central governance forum is fully operational with participation from the IT function, Finance, and other business unit stakeholders. Communication with stakeholders relating to cost allocation is planned and regular. |
| Level 4 | Business unit liaison roles and sub-committees support two-way communication between the IT function and the whole organization to promote the idea of shared responsibility for controlling IT costs.                      |
| Level 5 | Governance and communication relating to cost allocation and recovery are regularly reviewed for improvement based on feedback.   |

## 01.4 IMPROVEMENT PLANNING

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### Capability Evaluation

Two summary assessment questions are set out below, along with the typical response associated with each level of maturity.

***How transparently are IT costs allocated across the business?***

- |         |  |
|---------|--|
| Level 1 | IT cost allocation is limited or does not occur.   |
| Level 2 | Costs are allocated transparently for a limited number of larger IT services. Some costs are allocated using basic IT resource data, while other costs are estimates.  |
| Level 3 | Costs are allocated transparently for a growing number of IT services based on IT resource usage data. Charges may be manipulated to drive desired consumer behaviour. |
| Level 4 | Costs are allocated transparently for nearly all IT services, using historical business consumption of IT service data.  |
| Level 5 | Costs are allocated transparently for all IT services, using near real time business consumption of IT service data.   |

***How integrated is the IT service accounting system with strategic and operational decision-making?***

Level 1	IT accounting seldom provides input to operational and strategic decisions.
Level 2	IT accounting provides defined high-level inputs to operational and strategic decisions for a limited number of IT services.
Level 3	IT accounting provides standardized inputs to operational and strategic decisions for most IT services.
Level 4	IT accounting provides comprehensive inputs to operational and strategic decisions for all IT services.
Level 5	The effectiveness of IT accounting integration into operational and strategic decision-making processes is continually reviewed.

**Key Practices-Outcomes-Metrics (POMs)**

Some useful POMs for developing the Accounting and Allocation (AA) capability are summarized below.

**Level 2 POMs**


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Practice	Apply a cost allocation model to a prioritized list of IT services.
Outcome	Resource management is improved since IT accounting can track IT assets, expenses, and capital expenditures using transparent accounting logic.
Metric	Percentage of IT services covered by the cost allocation model.
Practice	Introduce governance of IT costs in collaboration with the Finance function.
Outcome	The IT function benefits from the Finance function's expertise.
Metric	IT function participation in an IT–Finance forum or governance body.
Practice	Report costs associated with the consumption of IT services.
Outcome	Business units can begin to understand usage patterns and cost drivers.
Metric	Percentage of IT costs that are covered by IT cost accounting and the cost allocation model.

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**Level 3 POMs**


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Practice	Expand the tracking and reporting of usage statistics to a wider scope of IT services using the accounting and cost allocation model.
Outcome	Business units gain better understanding of the relationship between IT consumption and IT costs when usage trends and unit costs are visible. Users are encouraged to adopt sustainable usage behaviours.
Metric	Percentage of IT costs charged back (or shown back) to business units.
Practice	Promote a standardized IT accounting and cost allocation model for formal adoption by corporate Finance.
Outcome	IT cost control can be more readily managed within existing corporate financial systems.
Metric	Yes/No adoption by corporate Finance.

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Practice	Promote participation of stakeholders from IT, Finance, and other business units in governing cost accounting and the allocation model.
Outcome	Individual business units have a better understanding of IT consumption costs.
Metric	Percentage of business units represented in the governance forum.

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#### Level 4 POMs

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Practice	Promote responsible business unit behaviour by incentivizing desired IT service consumption patterns.
Outcome	Business units have more control over managing the costs of their IT service usage.
Metric	Percentage of IT services whose consumption patterns are influenced by incentivization schemes.

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Practice	Make accounting and cost allocation a key component of the IT services catalogue, providing customers with full visibility on all charges.
Outcome	Business units are fully able to steer IT service usage based on price and on the required quality and volume of service.
Metric	Percentage of services in the IT service catalogue for which unit service costs are provided.

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#### Level 5 POMs

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Practice	Continually optimize cost accounting and allocation to ensure that it covers all IT services and their associated costs.
Outcome	The organization can continually evaluate and compare the costs of providing IT services.
Metric	Percentage of relevant costs charged back (or shown back) directly to business units.

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Practice	Continually ensure that cost accounting and allocation forms a key input to operational and strategic decision-making regarding IT services.
Outcome	Investments to optimize the costs of various IT services will remain aligned to changes in business priorities.
Metric	Percentage of the discretionary IT budget devoted to cost optimization initiatives.

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## Addressing Typical Challenges

Some typical challenges that can arise in attempting to develop maturity in the Accounting and Allocation (AA) capability are set out below.

Challenge	Lack of necessary tools and skills to implement accounting and allocation practices.
Context	Translating data from the Finance function into IT-relevant structures may require integrating disparate data sets and complex formulas.
Action	Implement a pilot cost accounting and allocation project, and build on it to develop a case for automating accounting and allocation processes. The best place to start is likely to be the area that causes the organization the most pain, or costs the most, or where the quickest return can be derived.
Challenge	Resistance from either the IT function or other business unit stakeholders.
Context	IT cost accounting and allocation may be seen as an unnecessary burden on the rest of the business. Initially, IT personnel may perceive the additional workload in a negative way and business units may resent having to pay for IT services.
Action	Encourage the senior management team to raise awareness of how cost accounting and allocation can empower business units to optimize the value they derive from their consumption of IT services.
Challenge	Lack of financial and consumption data to determine IT unit costs and usage.
Context	The investment required to consolidate financial records is not available.
Action	Work with the Finance function to determine a satisfactory level of detail in relation to IT service costs and business unit consumption, such that the effort of collecting the data is worthwhile.

## Management Artefacts

Management artefacts that may be used to develop maturity in the Accounting and Allocation (AA) capability include:

- ▶ An IT accounting model.
- ▶ A chargeback/showback model.
- ▶ An IT services catalogue.

### IT Accounting Model

To generate a usage, chargeback, or showback report, the IT function needs to allocate consumption-based costs to the various business units for each month or reporting period. This requires IT to develop accounting models that can show specific links between the cost of an IT asset or service (the cost per unit of service consumed) and its consumption quantity, and from there calculate the total cost of the units consumed. The transparent and detailed breakdown of IT service provisioning costs is integral to the IT accounting model that enables chargeback/showback to the business units.

## Chargeback/Showback Model

In a chargeback model, users are billed based on their consumption of IT products and services. In a showback model, they are kept informed of their levels of consumption, but are not charged directly. There are a number of different chargeback models, each of which will be appropriate in different circumstances:

- ▶ *Access Charges:* charges are based on the ability to access certain functions, usually for a flat fee. This may or may not be part of a subscription charge.
- ▶ *Subscription Charges:* charges are based on flat fees for various components that may be independently priced – for example, in a service menu. The fee is based on access rather than on usage; functionality and service levels are generally fixed.
- ▶ *Tiered Usage:* charges are based on pre-established ranges of use. If actual usage remains within the contracted tier, then a flat monthly fee is charged. Tiered usage is sometimes included in a subscription package.
- ▶ *Per Unit Usage:* charges are variable, depending on consumption quantity and the price per unit charged.

Whichever chargeback model (or combination) is used, it must be clear that the effort of collecting the data is worthwhile. Ultimately, the chargeback model should encourage purposeful use of IT services and ensure value for money for the organization.

## IT Services Catalogue

The IT services catalogue is a list of customer-facing IT services provided by the IT function to the organization. It facilitates central registration of IT services, the finding and requesting of IT services by consumers, and service fulfilment tracking. Each service within the catalogue typically includes a description of the service, how it can be requested, how to get support, available service level options and associated costs (if applicable), details of who is responsible for the service, plus other information regarding the specific capabilities of the service. Increasingly, IT services catalogues are accessible via online self-service portals – for example, via cloud-based services. They can also be filtered and grouped in various ways – for example, by a particular theme (such as the most popular applications, CRM applications, desktop publishing software), by applicability to specific job functions, and so on. More sophisticated services catalogues may be automated to provide consumption reporting. Generally, as price increases, demand decreases, assuming all other factors remain constant. Therefore, price can be used as a lever to manage demand for IT services within the catalogue as long as the cost recovery principles (that is, the chosen chargeback/showback model) are transparent and business productivity is not constrained.

## 01.5 REFERENCE

### See Also

Other capabilities of IT-CMF that have a particularly close relationship with the Accounting and Allocation (AA) capability include:

Capability	What it provides
04. Capacity Forecasting and Planning (CFP)	Insights on potential future resourcing scenarios for IT services
05. Demand and Supply Management (DSM)	Insights on how demand may react to changes in pricing strategies for IT services
09. IT Leadership and Governance (ITG)	Guidelines as input to establishing accounting and allocation governance
12. Service Analytics and Intelligence (SAI)	Insight into which IT-enabled business processes are driving infrastructure demand and by how much
36. Total Cost of Ownership (TCO)	Direct and indirect cost data on provision of IT services

### Further Reading

Case, G., Du Moulin, T., and Spalding, G., 2007. *Service management strategies that work – guidance for executives*. Zaltbommel NL: Van Haren.

Datar, S.M., Rajan, M.V., Wynder, M., Maguire, W., and Tan, R., 2013. *Cost accounting: a managerial emphasis*. Melbourne, AU: Pearson Higher Education.

### Notes

[1] Ryan, R., and Raducha-Grace, T., 2009. *The business of IT: how to improve service and lower costs*. Upper Saddle River, NJ: IBM Press.