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DIGITAL INFORMATION DESIGN

A PRACTITIONER GUIDE

Improving business performance through better use of information and technology

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Van Haren PUBLISHING

Digital Information Design (DID®)
A Practitioner Guide

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1. BUSINESS INFORMATION MANAGEMENT

1.1 INFORMATION MANAGEMENT

To execute a strategy, you first need to build a foundation. Enterprises function better when they have a sounder foundation for that execution. They have taken actions and measures that secure efficiency and enable them to reliably execute the core operations of the enterprise. An enterprise needs to transact business at the right time, at the right place, and with the right information. To effectively manage the enormous amounts of data available in the digital world of today, we need business information management (BIM). Failure to meet the demands of those needing the data, your customers (both internal and external), results in a negative customer experience.

The proliferation of data, by which we mean the huge amounts of electronic 'information' and the never-ending push to make all information digital, means IT is integral to success. Paper will not disappear just yet, though the business world (and government) increasingly drives everyone to electronic access and delivery of data.

A rough definition of **information management** is the management of the information services comprising functionality, data and technology. Information management in general is considered to be the collection and management of information from one or more sources and the distribution of that information to one or more sources. In this book, the scope also includes technology since it is increasingly difficult to separate this from information and data gathering; and the construction and operation of software applications that process data.

Forget 'business information' and 'IT'; most information is now held as bits and bytes in massive data warehouses. Pretending that business information is a protected species is failing to recognize the dependence (good or bad) on technology.

BIM is the management domain responsible for all of the tasks and activities that are aimed at governing, defining, improving and supporting the use of the information services needed for running the business and achieving the enterprise goals. Most often, IT is the delivery mechanism for how business information is captured, processed and stored; using IT means that information services are based on IT need. The importance of these activities demonstrates that BIM must be strategic and underlines the recommendation that every enterprise needs a Business Information Management Coordination, also called Coordinator (BIMC).

Success in the modern world depends on IT. Financial drivers have increased the move to outsourcing and business success might be the result of successfully outsourcing IT (or elements thereof) and retaining a business function to manage the business/IT interface, or it may wholly rely on 'in-house' management - or any combination in between.

IT deficiencies can stop your business operating effectively. In times of change, you must still operate because of the need to run your business on a day-to-day basis; operation often depends on managing small scale changes that frequently get in the way of long-term thinking.

In 2005, the ASL BiSL Foundation created an operationally-focused first version of the BiSL framework, based on the practical principles of ITIL, to manage day-to-day issues. DID expands this guidance into the critical areas of strategy and design of digital information management. This book focuses on practitioners and expands DID Foundation guidance in the areas of applying and implementing BIM on both a tactical and strategic level.

The guidance will cover all aspects of operational management and strategic management, from operational management through to data governance and strategy. The new guidance has been merged with operational practices current in the BIM world.

To be agile in the sense that the term DID should be used in the context of best practice, it means that you still need to know what you are doing and the potential pitfalls which enable you, as an expert, to decide which elements of best practices are most relevant, which can be put aside and how to accelerate improvements without causing chaos and rework.

1.2 BUSINESS SERVICES ARE IT-DRIVEN

How many business services can you identify that are neither entirely dependent on IT, nor at the very least IT-driven, where the critical elements of strategy and design have been overlooked and where the daily management of data therefore suffers?

Business information services produce and use 'business information' to achieve business goals and to provide a good experience for those who need to make use of data. Business goals differ from one market sector to another and are markedly different between government and private sector enterprises. What is common to both is that IT is used to collect, process and store most of the data and turn it ultimately into knowledge; in the majority of cases IT is also needed to keep it safe. Think about 'the right to be forgotten[1]' and the consequences of when the securing of data is overlooked. In the modern age most people are unaware of the value of their data and how social media businesses make money from their data[2].

The capabilities associated with managing any digital information assets of an enterprise or government body, are many and diverse. Increasingly, however, enterprises take the view that information is an asset of the enterprise and should, therefore, not be treated differently to the financial resources, capital equipment and building/estate assets of the enterprise. Digital assets, properly deployed and employed, create additional value with a measurable and demonstrable return on investment.

BIM is about the governance, strategy, improvement and operation of information services from a business perspective. The purpose is to help you manage business information and technology securely and efficiently, control IT and to integrate it within your business, precisely when you may feel you have other things on your mind.

Hence BIM should encapsulate the capability of the enterprise to set up an expert interface between all business information activities and the users and suppliers of that information. The capability ensures strategic design for the governance and management of the BIM organization and will require a BIM coordinator (or team)

1 In May 2014, the European Court of Justice ruled against Google in Costeja, a case brought by a Spanish man, Mario Costeja González, who requested the removal of a link to a digitized 1998 article in La Vanguardia newspaper about an auction for his foreclosed home, for a debt that he had subsequently paid. The court ruled in Costeja that search engines are responsible for the content they point to and thus, Google was required to comply with EU data privacy laws: https://en.wikipedia.org/wiki/Right_to_be_forgotten

2 See for example Shoshana Zuboff, *The age of surveillance capitalism: the fight for the future at the new frontier of power*, 2019.

that we will term the **BIMC**, (and after this, we will drop the 'the', unless it is needed to clarify our writing style).

Focusing on business information management provides you with the opportunity to:

- Govern business information management;
- Concentrate on transformative data-driven services;
- Be strategic with regard to the information needs of the enterprise and networked enterprises and to coordinate data and information services design accordingly;
- Address the development of business services that depend on information by controlling the development of digital business services via the coordination of information needs throughout services development using program and project good practice;
- Ensure the required operational functionality will be delivered through the use of good practices to address information and data management, functionality, software and infrastructure support.

The key strategic issues for effective business information management are:

- Portfolio and program management in line with your enterprise strategy;
- Designing business information services that meet business needs (business process developments related to information);
- Organizing your digital information needs (information partner and supply chain developments);
- Selecting appropriate technical (technology…) infrastructure (technology developments);
- If you can't 'do it yourself', finding people you can trust (market opportunities and risks).

1.3 DIGITAL INFORMATION DESIGN FRAMEWORK FOR BIM

To support you in the area of business information management, Digital Information Design (DID) guidance has been developed as a good practice. At the Foundation level (renewed in 2020 by the APM Group to reflect the need to develop strategic thinking about data) we focused on understanding the DID framework and explored the different subjects and key issues to be addressed in a consistent and coherent approach. But to bring the disparate parts together it has to work as a consistent entity. As a consequence, the DID practitioner needs to understand the context in terms of where BIM adds value.

Understanding the context means understanding the processes that need to be in place in order to make something work or function optimally. For example, think

about a laptop, just an unremarkable little flat box that now has more computing capability than the supercomputers of 30 years ago. But this little box only functions because of the wider context in which it operates. Think about the capability grid that needs to be in place, including an operating system that connects to different surrounding assets. See for example the development of supercomputers the size of a credit card. The supercomputer will serve high-performance applications that are constrained by size and weight, such as small commercial robot drones, or high-resolution industrial IoT sensors[3].

Understanding the context of information needs helps you to understand how to execute BIM and add value. DID good practices than enable you to analyze, organize, synthesize, and implement the appropriate solutions.

Applying this knowledge and educating the people in the enterprise how to use the proposed solutions are the essential components that makes you a practitioner. The overarching capability that you need to master is that of **the intelligent customer.** The intelligent customer capability focuses on:

- An understanding of the information processes between demand (customers) and supply (service suppliers).
- A BIM focus on business, data, technology and service.
- A BIM focus on business model, operating model (enterprise architecture), operational model, service design.
- Understanding that the benefits approach appraises the full investment in business information service change and is not simply a validation of the IT components.
- Understanding contractual, performance, technology and customer issues in relation to service delivery.
- Information lifecycle management.
- Understanding functional management, at the strategic, tactical and operational levels.

The intelligent customer concept is not a 'new invention'. It is not a creation of the DID Foundation or the authors of this book, it is in fact a long-standing and well documented best practice created by the originators of the ITIL and PRINCE2 best practices. We have simply followed the guidance of these practices and adapted them for the digital age to improve the operational management of BIM.

3 https://www.techerati.com/news-hub/nvidia-supercomputer-ai-edge-iot/

1.4 MANAGEMENT OF BUSINESS SERVICES

To manage data strategically, the overarching capability can be viewed as a variation of the intelligent customer best practices. As mentioned above, the central topic of this book is the understanding and application of the intelligent customer in coordinating information services, or in other words, the role of the intelligent customer in an enterprise. Tools are provided for the correct application of business information management (BIM) based on the necessary outcomes of these services, which may for example (as a result of total outsourcing or the placement of services in a shared service enterprise) be managed at a distance from the parent enterprise.

Almost all enterprises, other than those working with small pieces of paper (or small brain cells) and notebooks, will sooner or later have to deal with the question of how the tasks associated with the implementation of IT or IT service provision should be organized. This concerns both the supporting services (such as facilities, IT) and (parts of) the primary processes. Some enterprises continue to provide these services internally, others choose to use external service providers. The way in which implementation is organized (and this can be done in many different ways) is called sourcing and the 'source' can be in-house or from a large number of different suppliers.

The reason for sourcing is almost always the need to strengthen the relationship between the client and the service provider following some form of 'out' sourcing. It often appears that problems which existed before the commercialization are still present after the commercialization and sometimes have become even greater due to increased transparency or the lack of substantive knowledge or lack of proper management. The enterprise is then still responsible for managing the agreements, for example in contract form, and for ensuring that its own customer enterprise gets what it needs. In general, most of the time is spent on the sourcing process.

Too often, insufficient time is spent on thinking about the commissioning activity and its consequences. Certainly, when the sourcing process is more difficult than anticipated and is delayed. Only during or after the sourcing process do we become more aware of the necessity to manage the result of the activities that are placed at a distance and to arrange for a more business-like relationship between client and service provider. The enterprise gradually realizes that there is a need for a component or central point that can properly manage questions from the business-related services that are related to quality and costs, both before, during and after the sourcing process. More often than not, this central point relies totally on information and is frequently the least educated in regard to any form of BIM.

Added to this is the fact that the issues of information design and management are generally neglected until IT is engaged to design applications, which illustrates

one of the reasons why so many projects that rely on data capture, processing and exchange either fail completely or fail to deliver as promised. For instance, in the Netherlands the failure rate of IT-outsourcing amounts to 40%[4].

Questions that the enterprise then has to deal with include:

- How to focus on the quality of outsourced services and how do we organize the management function within the enterprise?
- What are the policies regarding digitization, data and information in the business?
- Do we need to manage the design of business information strategically or are we confident it is a task that can be left to IT?
- How do we need to design day-to-day operational data handling?
- How do we organize control and management to maintain the quality of services?
- What does this mean for our employees?
- And how do we deal with cultural change?

These are some prominent questions that are related to the management of business services, perhaps arising as a result of outsourcing or internal charging to make costs transparent. In other words, there is a need for management to control the result of work carried out by internal or external parties. But what is the structure of that management and how do you organize the coordination function in your own enterprise?

1.5 COORDINATING BIM: 'THE INTELLIGENT CUSTOMER'

The word *coordination* has many different meanings, often depending on the context in which it is used. But all coordination functions have similar characteristics:

- Focus on results;
- Ensure that the service is provided;
- Ensure coherence and offer coordination;
- Monitor quality and costs.

BIM coordination is no different. Various labels are used within enterprises for coordinating or assembling services. For example, we hear about the retained enterprise, commissioning, demand and supply bundling and control, contract holder consultation, service management, contract management, demand

4 Delen, G.P.A.J., Peters, R.J., Verhoef, C., & Van Vlijmen, S.F.M. (2016). Lessons from Dutch IT-outsourcing success and failure. *Science of Computer Programming*, 130, 37-68 and Delen, G.P.A.J., Peters, R.J., Verhoef, C., & Van Vlijmen, S.F.M. (2019). Foundations for measuring IT-outsourcing success and failure. *Journal of Systems and Software*, 156, 113-125.

management, management office, intelligent customer function, technical coordination team or service integration team, and vendor control.

Each enterprise, therefore, may use a different name for coordinating and controlling both internal, and remote services, or parts thereof. The term *intelligent customer* is the one used most often to cover the activities and is now so well understood that current publications as diverse as the Guardian and Private Eye use it without any explanation. Although primarily created to assist in managing the complexities of outsourcing, most of the intelligent customer guidance is generally applicable to any strategic management function. In particular, it is applicable where the strategic function is central to the business, as is the case with the issues facing modern business regarding the huge amounts of data that must be processed.

Figure 1.1 helps you understand the position of BIM in the context of the supply and demand of information services needed to manage enormous amounts of data. In this book we have adapted the intelligent customer guidance to suit the tactical coordination and strategic support of all business information activities and processes. We will demonstrate how to use the DID model, and provide guidance on how to build and operate a tactical BIM coordination role as well as perform a strategic support and advisory role.

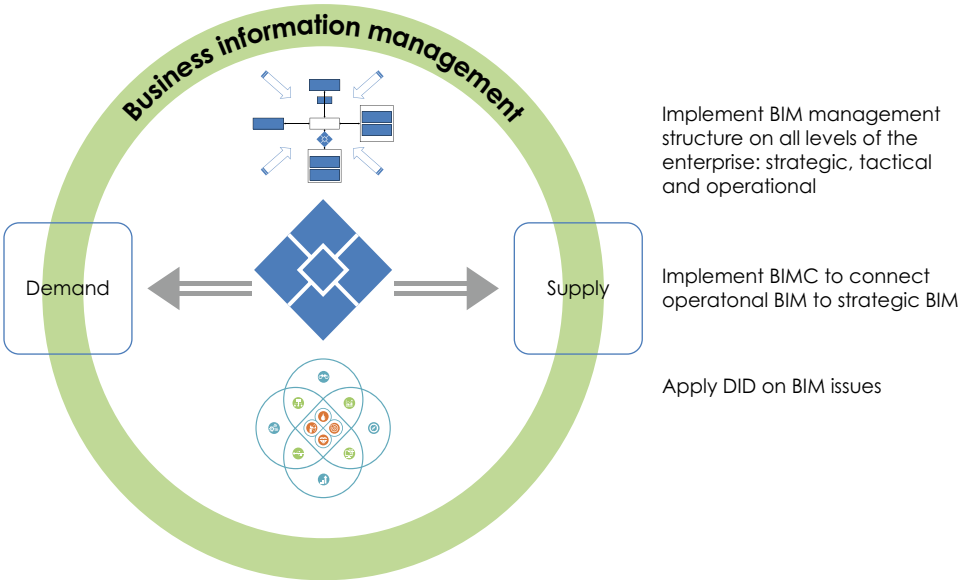


Figure 1.1 Organizing BIM in the context of the supply and demand of information services

As ever, the role can be created in many ways to suit your enterprise; it might be one person or a team of 20 in a purpose-built office as discussed in the next section; it might be a part time role or all consuming. It is up to the enterprise to execute the role depending on its specific needs. We will introduce the role of BIM Coordinator,

BIMC; it is up to the enterprise to decide how best to deploy that role once its value is understood. BIMC might be one person or a team; it is the role that takes all responsibility for business information in the enterprise and where BIM and intelligent customer expertise is to be found.

In all cases, the measures required to fulfill the associated management duties must be enacted as roles in different places, in different departmental units. Effectively coordinating outsourced implementation requires insight into the measures to be taken, into the resulting roles and the coherence of measures and roles within the enterprise. This also is true wherever business information is involved, for example in the supply chain, and leads to an issue in relation to the scope of the intelligent customer function. It is recommended that information and data policies that require DID processes (we believe this to mean all business processes) should be brigaded under intelligent customer auspices to ensure consistency.

Effective coordinating both strategic and tactical information management, on a daily, weekly, monthly or annual basis, is carried out by BIMC. BIMC is the intermediary between the enterprise with its internal customers on the one hand and the suppliers of service on the other. BIMC can be considered as operational management on a tactical and strategic level, and a means of ensuring that operational activities are carried out as contracted or agreed. Effective here does not necessarily mean a fully formal approach. In fact, when an enterprise struck a balance between formal and informal decision making, it increases the odds of IT-outsourcing success[5].

BIMC should be set up with a clear goal: effective management of the results of both internal and remote BIM services throughout the business. This applies both on the demand-side, where demand bundling takes place within the enterprise and demand management, and on the supply-side, where requested services are bundled and managed using internal or external service providers.

1.6 WHO SHOULD READ THIS BOOK?

This book is primarily about the design and functioning of enterprise-wide business information management using intelligent customer principles, with particular regard to digitization. The DID framework is used to describe, position and provide tools for the design of the BIMC function focusing on the enterprise information assets. This framework has been set up to effectively shape BIM within an enterprise, with the aim of ensuring a better use of information and technology in the enterprise.

5 Delen, G.P.A.J., Peters, R.J., Verhoef, C., & Van Vlijmen, S.F.M., *Demystifying a priori ITO-success determinants* (unpublished manuscript, 2023).

This book is part of the DID library and specifically deals with the ability of an enterprise to manage and control data services from a practical viewpoint. The principles are written in such a way that they can be used in various disciplines of supporting services and the primary processes of a profit or non-profit enterprise.

It is, therefore, intended for everyone who is responsible for setting up BIMC (and/or a generic intelligent customer function that will extend control over to BIM) or who is involved in its implementation; this does not only concern the management of external parties.

We offer the readers a range of practical and pragmatic tools for, among other things, the following:

- Strategic vision and principles for making digital business a reality;
- Using best practices to manage enterprise-wide BIM;
- Functional design, request and change management;
- Internal business and IT service relationships;
- Onset of potential outsourcing and gauging the impact;
- Managing any outsourced services;
- Improving the management of any outsourced services;
- Control over the portfolio and transparency in costs;
- Where the intelligent customer function exists, providing a better understanding of the need and value of business information and BIMC.

The book is aimed at DID practitioners, executive management and program and change managers who are responsible for ensuring the veracity of digital business and control of information assets. It is also useful for managers of service providers, service coordinators and advisers. In addition, the book is suitable for students of business administration and business economics in higher education who want to study data management and sourcing issues.

1.7 USING THE BOOK

We assume that readers are familiar with DID Foundation and have already passed the APMG Foundation training. If not, or you need more background, we advise taking a step back to read the Foundation book and take the current APMG exam. If there is no time, then we recommend reading Chapter 2 which gives a quick primer of the DID foundations.

Of course, just reading a book does not guarantee that the same or new mistakes will no longer be made. It is, however, our hope and expectation that with the background and insights provided, the management role or function within an enterprise can be designed simply, more effectively and faster. We use an approach

whereby we do not tell '*what*' you have to do, but rather '*how*' you can use the ingredients of the intelligent customer in your own sensible way.

There is no empirical evidence that ANY IT best practice or method guarantees success (despite almost every one of the major best practices claiming that use of the technology to be promoted will turn water into wine). For instance, Frederick Brooks obtained the Turing Award for his seminal work that there is no silver bullet in the field of software engineering[6]. Next to that, the goal of DID is not to improve success. But the key to success is to be informed, to understand where best practices can help and to use these in context and as appropriate. Which means don't (for example) use DevOps to manage infrastructure or ask a building constructor to design your house or the architect to build it (although in IT this seems all too common by letting programmers turn out code while its design is absent).

Too many claims are made that the latest method 'solves all problems'; unfortunately, it is easier to believe that than it is to engage in proper thought and planning.

So, that ends the easy part. Moving onto Chapter 2, we will set the foundations for BIM and review the DID model.

Following on from this, the book then breaks down into two parts. Part 1 focuses on practitioner guidance for structuring business information management, using DID. In Part 2, we discuss the role of DID as a framework for implementing business transformation.

We address the need for information management in Chapter 3, information as a flow between demand and supply, and how best to deal with this. We look back at the lifecycle of application software development of a business service (together with some examples of appropriate good practices that can be applied during different stages) and discuss the strength of the DID framework, taking your business model as the starting point.

In Chapter 4 we explain how to manage business information in your enterprise, taking into consideration the many stakeholders you may encounter. We also look at a generic BIM decision model and how to apply it, being aware of your needs in terms of information service capabilities. Arising from the decision model, we focus on executing operational management on both a tactical and strategic level using business information management coordination (BIMC). BIMC is explained in Section 4.3.2 whilst in Chapter 5 we discuss how coordination is needed to support the Board and coordinate the activities of the various Executive Committees and also how BIMC acts as guardian of the data elements of the IS strategy. We use

6 Brooks, Frederick, and H. Kugler. *No silver bullet.* April 1987.

the DID framework to describe, position and provide tools for the design of BIMC in relation to the information assets of the enterprise. BIMC fulfils a bridging function between the demand from the enterprise and the supply from the service providers. BIMC takes over the needs of the business/LoB and translates this into assignments for information suppliers. In Chapter 6 we discuss how you can structure BIMC in your enterprise and what tasks can be part of it, or must be coordinated and managed by BIMC.

Chapter 7 focuses on how to implement BIM. The first question when implementing BIM is typically where to begin. There are two primary approaches you can choose: bottom up or top down. In this chapter we address both to help you to start. You should keep in mind that we are not postulating huge management structures and overheads, instead we are discussing options and the actual staff numbers will depend on the degree of automation already present in the enterprise and identified business needs.

This will conclude Part 1 of this book. In Part 2 we provide several examples of how to introduce BIM or improve BIM using DID guidance.

BIMC will need to be closely involved with creation of the Information System strategy (IS strategy). The Information Systems strategy covers ALL aspects of IT, not just the technology. In Chapter 8 it is demonstrated how you can set up an IS strategy which typically comprises five phases, all of which (to a greater or lesser extent depending on the data strategy, digital transformation, or just getting information properly managed), require BIM input. In Chapter 9 we show how you can implement BIMC and what the roadmap for BIMC can look like.

Creating a BIM strategy means clarifying, creating and refining the strategic vision, strategic issues, strategic themes and the candidate programs and/or projects that will go forward subject to approval. In Chapter 10 we explain how to create and manage a BIM strategy using an agenda of strategic themes. In Chapter 11 we cover an actual example of identifying an ideal opportunity to kick-starting BIM and how it leads to making the enterprise aware of the added value of BIM. Gathering the necessary people and collaborating together to improve business information management in your enterprise is a great way to work. In the final chapter we offer some thoughts on exploring the DID framework as a useful model to use in a boot camp

Throughout the book you will find several case studies that have been experienced by the authors. Closing the book you will find two appendices, an overview of terms and definitions in Appendix A, and an image of the DID canvas that is used in the final chapter included in Appendix B.

Key points:

- ✔ **Information management:** the management of the information services comprising functionality, data and technology.
- ✔ Business information management (BIM) is the management domain responsible for all of the tasks and activities that are aimed at governing, defining, improving and supporting the use of information services needed for running the business and achieving the enterprise goals.
- ✔ BIM is the capability of the enterprise to set up an expert interface between all business information activities and the users and suppliers of that information.
- ✔ BIM is essential to ensure a positive customer experience when using IT because information processing depends on the proper identification of need, use, dependencies, storage, security and disposal/archiving.
- ✔ The capability BIM ensures strategic design for the governance and management of the BIM organization and will require a BIM coordinator (or team) that we will term the **BIMC.**
- ✔ The DID framework is used to describe, position and provide tools for the design of the BIMC function, focusing on the enterprise information assets.
- ✔ The DID framework has been set up to effectively shape BIM within an enterprise, with the aim of enabling better use of information and technology in the enterprise.

2. DIGITAL INFORMATION DESIGN (DID)

In order to provide context, we will recap some more of the basics from the DID Foundation publication. First, let's be clear about BIM: this is the combination of activities performed or undertaken to acquire, store, organize, maintain, retrieve, use and distribute information needed to meet the demands of businesses, day-to-day and in the future. BIM focuses on the organization and management of information on paper, email, telephony, and in the modern world from a wide range of electronic sources.

Increasingly, business information is reliant on IT systems that make it easier to manage the information. But, as technology progresses, we find ourselves with more information than we need or use to run our business. BIM in the enterprise is focused on the need to prioritize, assess, secure and store what is necessary.

Even installations of technical equipment require data; information about how to configure hardware; the software that will be needed to run the infrastructure; the middleware. And where to build the data center. And what about the building plans? Information should be considered as being everywhere and used everywhere. Information management might focus on any aspect of IT, not just the obvious 'data' being used in business services. Building a data center is a business to some vendors and they need data to do that correctly. Think again about the totality of the customer experience.

Enterprises must deal with unprecedented forms of change in the way they conduct their business. These changes are often initiated by IT and IT is almost always influenced by changes in the business. Business information management is a crucial task for this.

Business information management (BIM) is about governance, strategy, improvement and operation of information services from an enterprise perspective. Regardless of how the BIM function is organized, whether in a line of business (LoB) unit or an IT service unit, one of the keys to success is that experts in business

information management have knowledge of business processes and the way in which IT supports them. It is virtually impossible to find an information service that is not integrated with or dependent on IT, regardless of whether the delivery of the services is internal or external.

Digital Information Design (DID) is the new generation of BIM guidance, named to reflect an agile, modern world.

DID has been developed to manage and control information needs within enterprises. DID focuses on information-driven business services. The DID framework describes the activities that are required to establish and operationalize BIM responsibilities. The model supports efficiency and improvement through better use of information and technology in the enterprise.

The DID model has been explained extensively in DID Foundation[7]. In this chapter we summarize the structure and components of the DID framework and how to use it.

2.1 THE DIGITAL INFORMATION DESIGN MODEL

2.1.1 The DID framework

The DID model has been described as resembling a rotor, or propeller – which is a useful metaphor for how it is used to drive improvement and change, and by others as a flower, where the components can be described as petals and stamens. Whatever your opinion, it is designed to be simple to remember and comprehensive enough to enable you to recall the essential design concepts for BIM. All of the major components are gathered in groups of four (like DNA, the components will be joined together in different ways by different people and enterprises, but they will always be common).

The DID model comprises three groups of four 'elements': the first group describes a general operating model with four activity domains (Governance, Strategy, Improvement and Operation); the second group consists of what are, in essence, the drivers of the business model comprising four components (Need, Value, Mission and Capability) and the third group makes up the enterprise architecture, combining four perspectives (Business, Data, Services and Technology). The customer experience is driven by understanding the drivers; the perspectives ensure that different customer groups influence design as it should be while the domains provide the focus for how the services must be built and operated.

7 Johnson, B. and Rouw, L.P. (2021), *Digital Information Design; Foundation, Improving business performance through better use of information and technology*, Van Haren Publishing, 's Hertogenbosch.

DID recognizes that business is driven by specific and generic motivational factors, the Mission of the enterprise and the Capabilities needed to fulfil the goal and the Need and Value of the services that will be required for the enterprise to operate efficiently. The DID model for BIM is constituted by four domains: Governance, Strategy, Improvement, and Operation. Each domain and its associated activities can be viewed from four perspectives: these are the perspectives of Business, Data, Services and Technology. See Figure 2.1.

Figure 2.1 The DID model

Draw the model for yourself

When you first see the model, it can look a little intimidating. It has been designed though, to be simple to memorize because, as described above, like DNA everything in the model is in groups of four. Think of the DID model as a flower with four petals. Each petal represents a domain, and area of organizational interest that has specific processes and activities which overlap with the other petals. Where the petals overlap, the perspectives (four of them) on a particular activity become important. In the middle of the flower, the four stamens (for the botanists among you) illustrate the drivers that direct business change. Once you have this image in mind, you can draw it from memory and quickly become familiar with the terms used in the model.

Within the DID model, symbols are used to represent domains, perspectives and drivers (see Table 2.1).

Table 2.1 Symbols used in the DID framework

Element	Symbol	Meaning
Domain: operating model		
Governance		Formal management oversight of how the enterprise is managed in terms of hierarchies, authority, roles and responsibilities. Governance is depicted as goggles to oversee all areas.
Strategy		Definition of the information strategy, and coordination of business information services. Strategy is represented by a compass that helps you find your way.
Improvement		Analysis, specification, realization, testing and deployment of new and/or changed business information services. Improvement is represented by three rising lines to show increasing improvement.
Operation		Support for those using information services when carrying out their activities within the business processes, for the operational management of the information services supplier, and for providing and monitoring the operational services. Operation is depicted as the machinery of the enterprise, hence three connecting gears are used.
Perspective: architectural model		
Business		The perspective focused on the business processes and the lines of business within an enterprise. Business is represented by a simple organization chart.
Data		The perspective focused on the data and information necessary for running the business and attaining the enterprise goals. Data is represented by a histogram.
Service		The perspective that is focused on the services required to acquire the necessary information for running the business and reaching the enterprise goals. Service is represented by the outcome of the application as viewed through a screen.
Technology		The perspective that is focused on the technology needed to acquire the necessary information for running the business and achieving the enterprise goals. Technology is represented by a connector.

Element	Symbol	Meaning
Driver: business model		
Need		The resources needed by the business to fulfil its mission. In the context of business information management, the need for business information services. Need is represented by a drop of water, as water is a basic ingredient of life.
Capability		The organizational ability to perform business activities. Capabilities require investment in time and effort to develop. Capability is represented by a person to indicate the effort that is needed to direct the arrow to the desired target.
Mission		A statement of the enterprise's digital identity and purpose, and a picture of the objectives and overall goals, from which KPIs and CSFs can be inferred. Mission is represented by the bullseye to indicate meeting the enterprise goals.
Value		The benefits that the business derives from business information services. Value is symbolized by a diamond; remember that you value diamonds but you need water.

Your task is to ensure that the mission of the enterprise with regards to business information (whether digitization is the goal, or simply improving business functionality by making data an asset to be managed) can be achieved in a structured way. You begin by considering the drivers.

2.1.2 Drivers: business model

The four business information **Drivers** are in the heart of the model: Need, Mission, Value, Capability.

Figure 2.2 The four drivers of DID

These four drivers (Figure 2.2) are the driving forces within DID and they make explicit the tension that exists between **Need** and **Value,** and **Mission** and **Capability**. The digital output of the enterprise is determined by the business requirements and related perception of the value that should be closely related to the mission of the enterprise. The drivers are the core underlying principles that apply generically to

each of the activity domains. The four drivers make up the business model of the enterprise.

Need & Value

Need is a direct reflection of what the business must have whilst Value relates to the (real or perceived) benefit that would result from having the information service. Need and Value relate directly because if something has no value, why would it be needed? And even when something is needed by a specific stakeholder, it is questionable whether it really delivers value. Value should be paramount; if an information service is not valued, or value cannot be demonstrated, then it is highly likely it is not needed. An example is where the Need and Value elements help you to link the issues of practical use and necessary improvement. This is to ensure that an information service is working as it should, is completely understood and if it is not providing value then the focus should be on change for the better. Understanding the Need and Value is key to designing a service that can be used effectively.

Mission & Capability

The driver 'Capability' will help you to determine the resources (time, money, business and IT people) that you will need to fulfill the Mission. Mass investment in IT is NOT the Mission or the goal. IT must be deployed to support the business vision of its data assets.

Mission and Capability are directly related because to fulfill the enterprise Mission, many capabilities must be in place to drive success; and if a Capability is not needed then it has no value in relation to achieving the enterprise Mission. The Mission should focus on output and outcome (benefits), allowing the key Capabilities to be identified and put in place to meet the information requirements. When evaluating the need for BIM, we focus on the digital Mission of the enterprise and on the BIM Capabilities (and related resources) needed to realize the information services required for the enterprise Mission.

The 'Mission' element will provide guidance about formulating the enterprise Mission (in terms of Business, Data, Service and Technology perspectives). BIM Capabilities will be needed to assure that the portfolio of information services is governed, managed, changed and operated in a purposeful way.

2.1.3 Domains: operating model

The **Domains** (Figure 2.3) for the management, development and operation of targeted information services are identified as: Governance, Strategy, Improvement and Operation. **Governance** is about activities related to research, monitoring, hierarchy formation and policy formulation. The domain of **Strategy** is mainly focused on the portfolio and lifecycle, while the focus of **Improvement** is on changing existing or creating new information services. **Operation** concerns the

daily use and operation of business information services. The four domains together represent the scope of business information management (BIM), and in combination they represent the **operating model** of the enterprise.

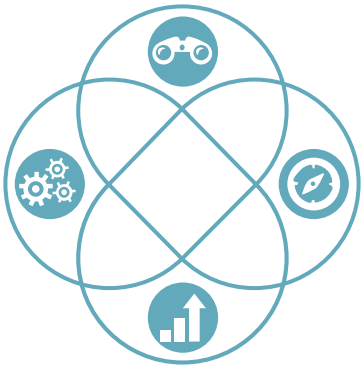


Figure 2.3 The four domains of DID

2.1.4 Perspectives: enterprise architecture

In the middle of the model you will find the DID enterprise architecture. The enterprise architecture shapes the business information model of the enterprise. Four **Perspectives** (Figure 2.4, the overlaps) are the focus for essential components of IT and business; the model emphasizes that equal attention is paid to the **Business** context in which information and technology are used, the required **Information** (**Data)**, the **Services** to make available the data and the underlying **Technology** as applications and infrastructure. The four perspectives represent the different aspects of the enterprise architecture for the information-driven services. The four perspectives must constantly be taken into account to ensure a balanced result.

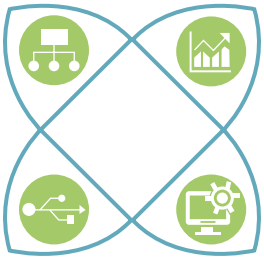


Figure 2.4 The four perspectives of DID

Together, the four domains, the four perspectives and the four drivers form the 12 elements of DID.

By constantly monitoring the coherence between these four perspectives with each other and with the enterprise management concepts, Mission, Need, Value and Capability, the effectiveness of business information management within the business is safeguarded.

2.2 THE PLAN-DO-CHECK-ACT CYCLE AND DID

Within the DID model one can find the PDCA cycle on different levels. Starting in the Governance domain, policy is planned that is subsequently translated into strategy and actions (do) which have to match and align with improvement in operations (check) before they can be implemented (act). Based on continuous monitoring, the policy and strategy should be adjusted to ensure continuous improvement. On a different level, processes in each domain should also be improved using the same approach. For example, looking at governance processes in the Governance domain one can use the same cycle to improve them.

The operation model also reflects the service lifecycle or work system lifecycle. A work system is a natural unit of analysis for thinking about systems in organizations[8]. As a consequence, the DID model reflects the dynamic view of how business information services change over time.

Mini PDCA cycles exist everywhere (Thought of a good policy? Plan it, build it check it, put it into action – there is an entire PDCA cycle in the Governance domain).

It is important to remember that strategic, tactical and operational activities will mirror PDCA-like processes even if the enterprise is agnostic about the Deming cycle. Thus, if you like and endorse the use of the Deming cycle you will not mind the references; if you are a non- believer (heretic!) don't get too concerned, just accept that unlike aliens who abduct mid-western farmers in the USA for research on typical earthlings, PDCA does actually exist. As with all other good practices, adopt or adapt it or ignore it depending on the circumstances in your own particular enterprise.

2.3 USING THE MODEL TO SUPPORT ANALYSIS

Consider the DID-model as your looking glass that you use to forensically examine business information management in your enterprise to help you to focus on the topics and analyze challenges at hand.

To help you explore the domains and understand the topics and issues as discussed in the DID Foundation book, we have summarized them in Table 2.2. Consider the topics that are a result from the 'overlapping petals' as anchors to support and guide you in your analysis. And use the results of the analysis to propel improvement.

8 S. Alter (2013), Work System Theory: overview of core concepts, extensions and challenges for the future, *Business Analytics and Information Systems*, Paper 35. http://repository.usfca.edu/at/35.

Table 2.2 Topics and issues that are discussed in DID Foundation

Plan	Do	Check	Act
1.1 Business Governance	2.1 Business Strategy	3.1 Business Improvement	4.1 Business Operation
• Responsibilities and policy making • Business change governance and P3O[9] • Standardization policies • Knowledge management	• Enterprise vision for BIM • Business architecture • Agenda of strategic themes • Portfolio of improvements	• Business requirements • Description of information service offerings • Testing: user acceptance • Training and documentation	• User support • Service desk • Communication and training • Authorization
1.2 Data Governance	2.2 Data Strategy	3.2 Data Improvement	4.2 Data Operation
• Data exchange policies and contracts • Data governance committee • Master data management policies • Identity and access policies	• Information/data architecture • Information service lifecycle • Key performance indicator (KPI) models • Master data management (MDM) and models	• Data requirements • Enterprise data environment • The cost of information quality • Automated and non-automated information	• Master data management • Implementation quality plans • Data quality • Operating the data environment
1.3 Service Governance	2.3 Service Strategy	3.3 Service Improvement	4.3 Service Operation
• External executive relationships • Sourcing policy • Service portfolio policies • Service integration	• Service portfolio management • Sourcing strategy • Service architecture • Service integration	• Build a service organization • Service requirements • Assembly • Service validation	• Service support procedures • Service measurement • Service monitoring • Operational supplier management
1.4 Technology Governance	2.4 Technology Strategy	3.4 Technology Improvement	4.4 Technology Operation
• Technology policies • Guidance on technology-related topics • Shared technology • Technology driving change	• Importance of the technology strategy • Technology integration • Information technology infrastructure • Joint procurement	• Deployment • Non-functional requirements • Testing: automated testing • Technology watch	• Availability • Partner and supply chain liaison • Suppliers • Incident management

9 P3O stands for Portfolio, Programme and Projects Offices. P3O is universally applicable guidance to help organizations build support structures that enable the successful delivery of their portfolios of change programmes and projects.

In Figure 2.5, we position the topics from Table 2.2 as anchors on the model. The numbers in the DID model refer to the name of the cells from Table 2.2

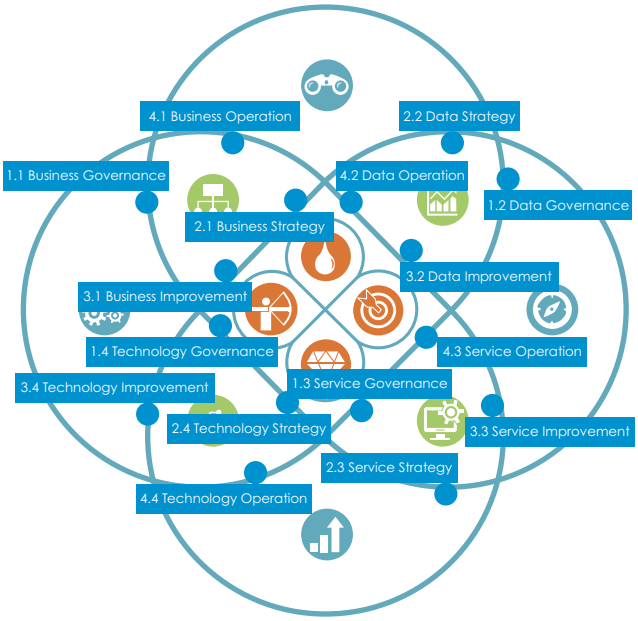


Figure 2.5 DID model, topics applied to domains, shown as 'anchors'

In navigating the DID model and using the anchors as references you can easily find the themes and issues that need to be addressed. Throughout the book you will find many examples. And specifically in Part 2 of this book we show how you use an 'anchor' to find the right location within the DID model and start the analysis.

DID helps to interpret, categorize, demonstrate coherence in the context, show the needs and involvement of stakeholders, and ask the right questions in relation to the way the enterprise is (or should be) structured.

The DID model can be applied in the following four ways:

1. As an aid to analyze in which management domain certain issues play, or to understand why certain issues are not fully resolved, so that insight is gained into possible solutions (moving counterclockwise around the model).
2. To shape and further develop and improve information management issues, for example, the customer experience, or improved security within the enterprise (moving clockwise).
3. From mission and vision to design and layout: from 'inside to outside'.
4. Practical and direct application (kick-starting): 'from the outside in'.

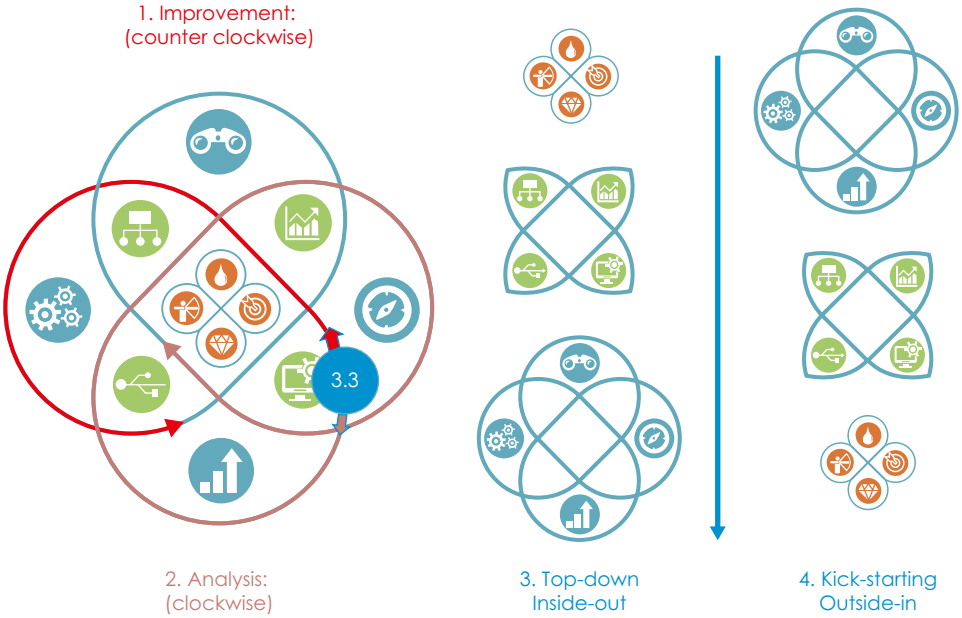


Figure 2.6 Four ways to apply the model

Navigating the model often begins counterclockwise. It can seem a little awkward in the beginning as it seems counterintuitive, but it will become apparent that navigating counterclockwise following the line on the DID. For example, the red line on the model; what works depends of the situation and issue in an enterprise. But always keep in mind the drivers that should focus the line of inquiry.

A number of experienced BIM consultants also adopt a very simple approach of filling in the domain perspectives to identify responsibility. This approach may be simple but if you do not have time for the navigation/anchor analysis, a quick and simple approach can still prove very useful.

Where BIM is not actively supported (in other words at a very low level of maturity) or is still in its infancy (perhaps activities take place that are recognizably BIM but are not labelled as such), you will have to work pragmatically and you will focus on the domain in which you (and others) are active, or from which an information issue arises 'outside in'. From this management domain, you need to consider the four perspectives and use them to assist you in asking the right questions (and finding the appropriate answers).

2.4 DRAW DID FRAMEWORK YOURSELF

The framework has no beginning or end, and there is no hierarchy between the activities of information services design and management; however, there is coherence. This is the core of the DID model.

To draw the DID model yourself, you can compare the DID model with a flower (or perhaps a propeller if you prefer). The twelve elements of DID are arranged in three layers, each comprising four generic concepts. DID is based on the principle that business is motivated by specific and generic management concepts: Mission, Capability, Value and Need. In the model, these are located as 'stamens' in the middle. Within DID, four domains are recognized: Governance, Strategy Improvement and Operation. These are the outer petals. Each domain can be viewed from the four perspectives: Business, Data, Services and Technology, which are the inner petals.

To draw the framework, we first start with the outer four domains. We begin (see the first picture in Figure 2.7) with Governance and go through the four improvement steps (plan, do, check, act) by drawing the four other domains, as in steps 2 to 5 in Figure 2.7.

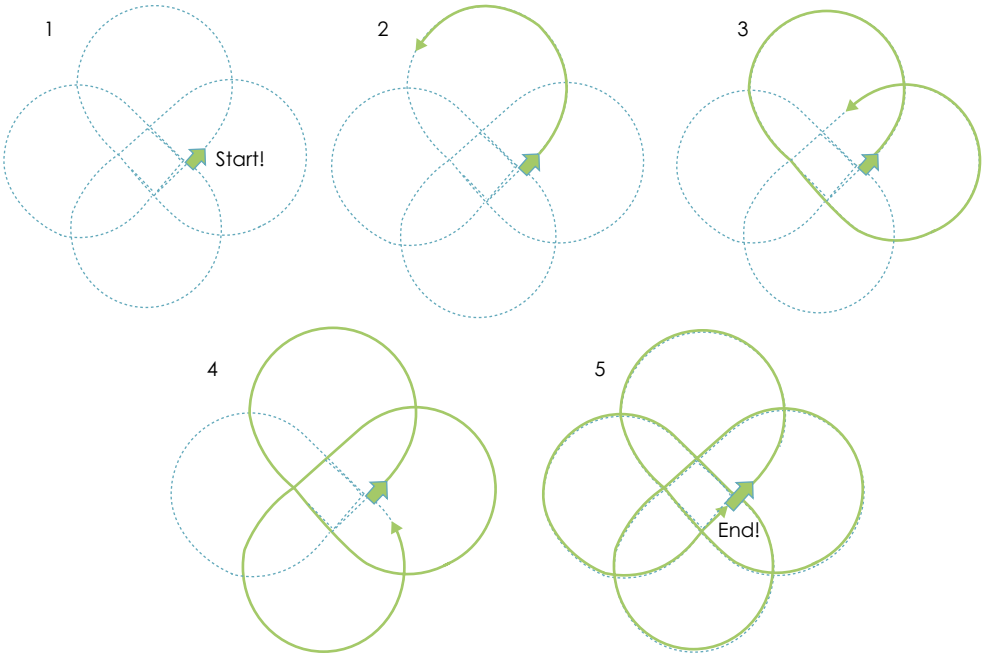


Figure 2.7 Draw DID yourself, five steps to draw the operational model

Make sure you overlap each domain. When completed, you can place the four symbols in each domain: Governance, Strategy, Improvement and Operation (Figure 2.8).

Drawing the model is nothing more than a demonstration of ease of use.

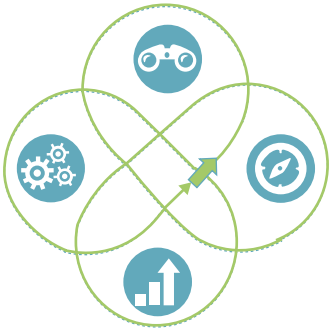


Figure 2.8 Operation model in the DID model

Four subsets have been created where each of the four domains overlaps the other. These four together form the enterprise architecture. Place the four corresponding symbols as shown in the drawing (Figure 2.9).

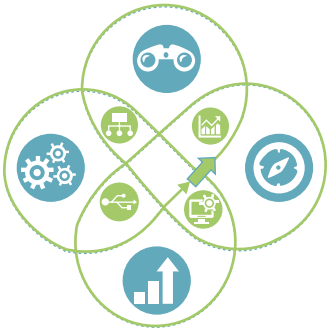


Figure 2.9 Enterprise architecture added

Finally, in the middle box (resulting from the overlaps created in the drawing) you can place the symbols of the business model, which completes the DID framework design, see Figure 2.10.

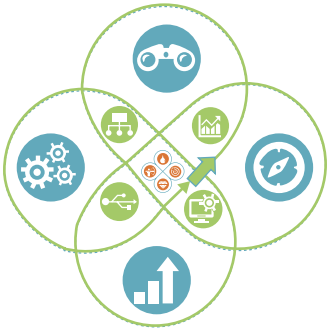


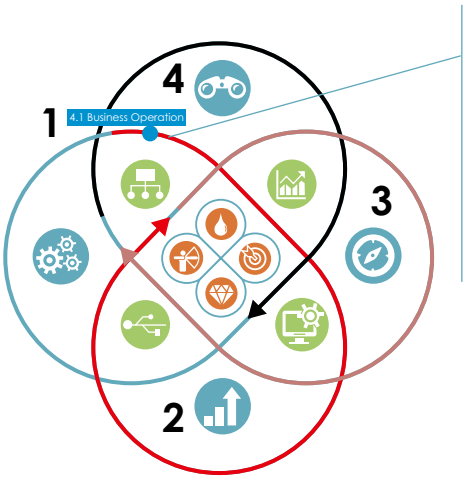
Figure 2.10 The DID model completed

By drawing the model a few times from different starting points, you will internalize the model and its concepts much more easily.

2.5 AN EXAMPLE OF HOW TO USE THE DID FRAMEWORK

In order to show you how to use the DID framework we offer you an example analysis of 'user support in business operation' from the Foundation book. User support as an activity can be found in the DID model within Business Operation: the 'operation' (anchor 4.1) is the responsibility for monitoring effectiveness and identifying any problems.

The first step in this case is the analysis. The question is: have we adequately organized user support at the operational level? The analysis focuses on being able to deal with questions quickly and effectively and to resolve them in a standardized and efficient manner, or if there is a need to forward them to other departments within the enterprise.



Business Operation - possible questions:
Are user questions well received and processed?
Do we understand the daily activities and related questions of our users?
Are you providing a customer liaison function?
Is customer support from IT well organized?
Is the relationship between the IT help desk and operational information management clear?

Figure 2.11 Analysis of user support and the service desk

User support and the service desk are focused on business operation. With regard to BIM, it is possible to build a step change for improvement in efficiency by implementing a service desk for BIM (sometimes called Single Point of Contact-Information Management – SPOC-IM – a name that describes precisely the function!). It is necessary to check whether issues have been sufficiently covered at the operational level and then consider what this means in relation to the other domains of the DID model.

Analysis goes counterclockwise around the DID model. Initially the focus is on whether the specific topic on the DID model has been identified. If not, we must take a step back to assess which principles should be used to ensure that all issues have been identified. Then we enter the information in the column of business improvement. Questions we should ask ourselves (starting at 1 in Figure 2.11) are:

1. Do we know which services we offer? Is the service department correctly organized? How does the SPOC-IM interact with the IT help desk (i.e. does it cover the DID Operation domain)?
2. Is there a quality system in place for continuous improvement? Are improvement plans in development or ready to be deployed (DID Improvement domain)?
3. Is the strategy and its related actions on how to deal with business operation concerning information management, specifically explicit in terms of user support? Are levels of ambitions or a roadmap available and supported by management (DID Strategy domain)?
4. Do we understand the policy guidelines concerning business support? Is there policy and governance on good information service management, information processing service level management and contracting? What are the guidelines when flawed information design causes information issues and incidents (DID Governance domain)?

Key points:

- ✔ DID recognizes that business is driven by specific and generic motivational factors, the Mission of the enterprise and the Capabilities needed to fulfil the goal and the Need and Value of the services that will be required for the enterprise to operate efficiently. This is the business model.
- ✔ The DID model for BIM is made up of four domains: Governance, Strategy, Improvement and Operation. This is the operating model.
- ✔ Each domain and associated activities can be viewed from four perspectives: these are the perspectives of Business, Data, Services and Technology. This is the enterprise architecture.
- ✔ The framework has no beginning or end, and there is no hierarchy between the activities of information services design and management, but there is coherence. This is the core of the DID model.

- ✔ DID helps to interpret, categorize, demonstrate coherence in the context, show the needs and involvement of stakeholders and ask the right questions in relation to the way the enterprise is structured.
- ✔ The DID model can be applied in the following four ways:
  - As an aid to analyze in which management domain certain issues play, or to understand why certain issues are not fully resolved, so that insight is gained into possible solutions (moving counterclockwise around the model).
  - To shape and further develop and improve information management issues within the organization (moving clockwise).
  - From mission and vision to design and layout: from 'inside to outside'.
  - To address specific issues such as improving security, enhancing the customer experience or improving the usability of business applications.
  - Practical and direct application (kick-starting): 'from the outside in'.

PART 1: ORGANIZING BUSINESS INFORMATION MANAGEMENT

3. PRACTITIONER GUIDANCE FOR STRUCTURING BIM

3.1 THE NEED FOR INFORMATION MANAGEMENT

How often do you discover that business characterizes the service delivered by IT as being useless, incomplete, unfit for purpose or worse in that it has become so expensive that development has been cancelled, resulting in the waste of large amounts of money and causing much embarrassment to boot?

Essentially, we would argue that the primary cause of dissatisfaction is that the supplier is often unaware of the different data needs of the businesses that make up the enterprise. Whether IT-based or not, the party responsible for developing services was either not informed about how lines of business are linked (so that the interests of the enterprise are thus served as a whole) or did not discover all of the requirements before proceeding to build the services. And very often developments somehow fail to recognize many of the interfaces within the enterprise between the different stakeholders.

An excellent example is how the UK built a 'world beating' test and trace system for the Covid 19 pandemic using expensive (and in fact inexperienced) consultants who had no clue how the National Health Service operated. £22 billion later, the application remained unfit for purpose, failed to deliver on its primary purpose of tracking the scale of the disease and coupled with an *entirely* unreliable testing component succeeded only in making sure that any recorded data was *entirely* useless[10].

Trying to fix a data nightmare with best practice focused on IT will do nothing useful. Although not always the case, in general the business information services that create substantial business value are most often demand-driven, being custom-made for specific purposes regarding enterprise business. These make your business

10 https://committees.parliament.uk/committee/127/public-accounts-committee/news/150988/unimaginable-cost-of-test-trace-failed-to-deliver-central-promise-of-averting-another-lockdown/

unique, standing out, and are often the cause of prosperity. On the other hand, business services with low business value are most often supply-driven commodity services such as HR or payroll. Not that these commodity-driven services, are unimportant, try running your enterprise without a payroll service! Often, they are someone else's core business, and typically they are the candidates for sourcing so that your enterprise can focus on its unique selling points.

Case study: The need for sourcing policy and secure information chain partnerships

Background
A Dutch company, launched by a landscape architect, has expanded over the past 25 years into a medium-sized company active in garden design, construction and maintenance, project work such as parks and district development, management activities such as landscaping and land, road and water works. The company contracts with individuals, companies, municipalities and other institutions (hospitals, ministries, cooperatives). In recent years, the focus of the work has shifted to design and projects for land, road and hydraulic engineering and landscaping in district and urban development (for example the emergence of charging stations for electric vehicles). The company became a link in partnerships between, among others, real estate entrepreneurs, investors, government organizations and architects. Information exchange between the different partners and customers is a huge problem and a priority.

Strategy and impact of planning to expand the business
The company decided to focus on design and development activities and to manage peaks in business more flexible by partially outsourcing the work. The goal was a more transparent cost structure, more flexibility and better access to specific expertise. Gradually, implementation was almost completely taken over by specialized realization partners, including (on occasion) consortia.
However, several large projects quickly ran into problems. The problems appear to have been caused by poor electronic exchange of data with contractors and subcontractors, and poor communication and information exchange between the various parties tasked with carrying out the work.

As ever, customers were not interested in the cause of a problem, they want the problems to be solved. The risks to the business were clear; the company always remains liable, even if subcontractors appear to be underperforming.

Management was aware that the business was so successful because of the practical way of working, based on its own experience to creatively solve new business opportunities. Before expanding, the chain of command was short

between customer and contractor; it was a small group of people that often took time to lunch together or have a coffee break together during which they formulated strategies and plans. Outsourcing part of the leg-work led directly to a poor customer experience.

Just in case you think that data issues are being over-played, here are a few clues about the data that is needed nowadays by the company:

1. Certificates dealing with the origin of soil/sand/tarmac.
2. Certificates that the material is clean (not polluted, e.g. with poison, petroleum, nuclear waste).
3. Reporting obligations when you are digging in public spaces (in the Netherlands: KLIC notification).
4. Administration of soil/polluted material removed from sites.
5. Digital maps of sub-soil infrastructure e.g. telephone cabling, glass fiber, cable TV, electricity, gas, water, sewerage, etc.
6. Administration of purchased agrochemicals/pesticides.
7. Reporting obligations for administering agrochemicals/pesticides on certain parcels of land.
8. Reporting to madaster.com (the Land Registry and Mapping Agency for materials) for use and reuse of materials

And many more. . .

BIMC assessment and advice

Now you know that landscape companies are not simply a few economic migrants paid a minimum wage to push a lawn mower, you know why an external BIMC expert identified that operational knowledge had all but disappeared over the years. Issues that once were communicated quickly, instead developed and festered over time before senior management became aware. Furthermore, management had changed focus, and was more and more focused on profit statistics, not on the content of the work. Management also preferred outsourcing, rather than employing permanent staff, resulting in lack of transparency, flexibility and specialist expertise and, of course, awful customer service. Insufficient thought was given to the organization of implementation activities in a changing environment and what this would mean. It was also clear that without BIM, important knowledge that should have remained in-house was being lost.

Once aware of the issues, senior management realized they needed to look at BIM. Since BIMC as a physical or conceptual unit did not exist in the company, management decided to engage BIM experts on how to implement DID and BIM. BIMC would be needed to act and become involved to ensure that the quality of information services was guaranteed and to secure the information chain partnership and supply chain partnerships.

3.2 INFORMATION FLOW AND INFORMATION LIFECYCLE

Before we focus solely on BIM we need to understand two basics:

1. That information flows between a business and its suppliers (i.e. demand and supply) and using BIM we should aim to manage these flows.
2. And second, that information flows are part of information services which have a lifecycle and the information needs and availability of data will vary between the different phases of the lifecycle.

3.2.1 Information flows between demand and supply

A service can be defined from two perspectives: the demand-side and the supply perspective. This basic premise is illustrated in Figure 3.1. Although the perspectives differ, the outcomes should match. Suppliers will often focus on the development and the maintenance of the output that is asked for. Meanwhile, business (or demand as it is called) is focused on attaining the outcomes and all parties anticipate that the output should be predicated on those outcomes. Of course, this is not an easy thing to do but, often as a result of inattention, suppliers sometimes forget (or perhaps do not know how) to define services from the perspective of customer needs and responsibility. In the end this can lead to mistrust, misunderstanding, and the rise of 'Shadow IT' where customers 'find' IT services on the web and simply download them (raising security issues for incumbent suppliers of IT) and ultimately to outsourcing if it becomes apparent to the business that the money spent on IT does not seem to deliver the required value.

Figure 3.1 Demand and supply (or supply and demand if you prefer)

From a BIM perspective, you can address the gap in understanding by looking at the way in which processes might be categorized and the areas of the business and IT communities that have most control over, or input to those processes. Thus, before getting into ANY discussion with IT about which lifecycle you should adopt, or if ITIL applies more than say, PRINCE2, why not nail down what services are actually needed by the business and what capabilities need to be provided to deliver and deploy the business information services as well as to run and control the operational infrastructure?

Someone may wish to know about all of the major activities necessary to manage a particular capability, for example contract management. Well, contract management impinges on many other capabilities, do you know what they are?

Only BIM can demonstrate a thread that weaves through every possible component of the imagination and then the building, delivery and running of a business information service.

3.2.2 From business vision to operation

To further recap on certain essential strategic DID Foundation discussions, Figure 3.2 illustrates a simplified lifecycle of the development of a business service, together with some examples of appropriate good practices that can be applied during different stages[11] . The illustration amplifies the components for those seeking more detailed explanations. Most often in the past a business service was designed by identifying the need and scope, and also possibly by undertaking a pilot study to obtain requirements, and then drawing up specifications of applications that would provide an output in line with what (usually) the IT- based business/systems analysts believed was required. Magic (sometimes called coding) then happened and with luck, the services were trialed with those who were the intended audience before they were released into the wild where, too often, waiting users failed to get the results they expected.

Make no mistake, BIM is only one of the vital pieces in the complex jigsaw puzzle of the lifecycle of business service development. It is, however, of utmost importance because it focuses on the information needed to transact business without which there would be no business.

One of the authors attended a strategic meeting of an enterprise that worldwide, largely owns the coffee market. A senior IT vice president stood up and told the assembled great and good that without IT, there would be no worldwide 'Celestial-body dollars'; after a short interval it was pointed out that without the opportunity to sell coffee there would be no need to invest massive sums in IT.

This (non-apocryphal) homily serves only to prove one thing; worldwide business does depend on IT, but without something to sell, who would care about the IT (unless selling IT is at your core)? Very often, the information needs of the enterprise were left to IT specialists who never roamed in the wilds of the business. Following the creation of 'the IT strategy', much wailing and gnashing of teeth would often ensue because information had been overlooked, misunderstood, or not identified. The list goes on, and changes would be made to strategies and plans and, for certain, you all will have come across examples of what went wrong.

Some information will be processed via in-house developed software using both Agile and traditional methods and no doubt many and diverse programming

11 Rouw, L. P. de, & Johnson, B. (2017). *Collaborative Business Design: Improving and innovating the design of IT-driven business services*. IT Governance Ltd.

languages, and some software may be commercially sourced or whatever; demand and supply is the point here. Thus, you must first understand just where you exist in the big picture of IT-driven business services and their design and build.

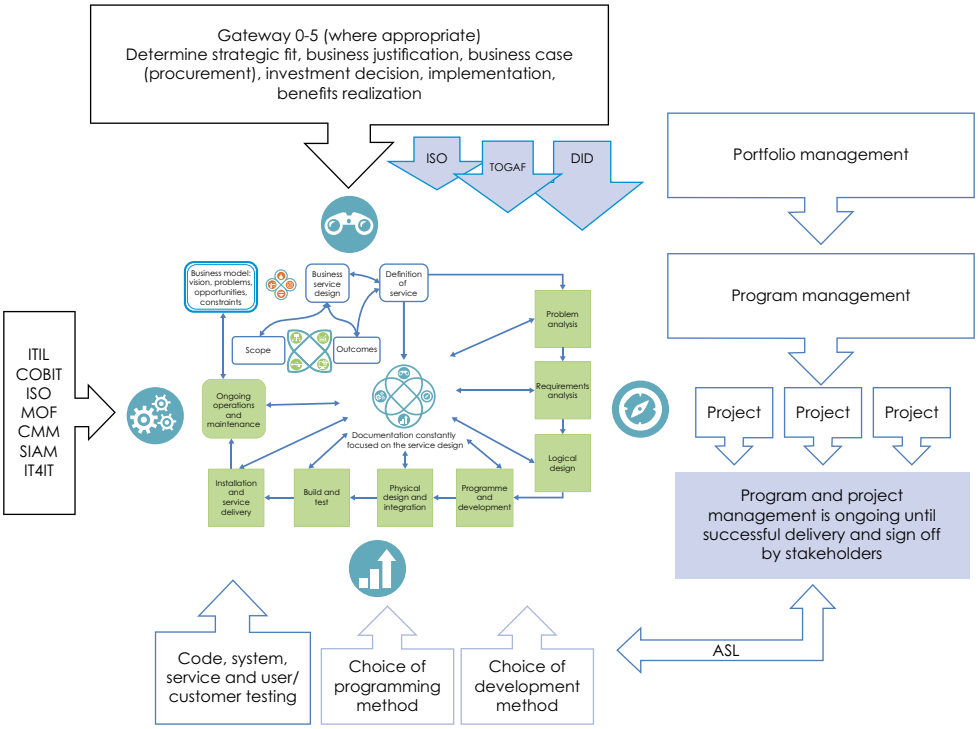


Figure 3.2 A simplified generic development lifecycle

Figure 3.2 is key to understanding operational management with regards to BIM. As a practitioner you will be involved in every stage, to a greater or lesser extent, with the remit to make sure that the right business information is available and is being processed with the proper outcomes. IT people will focus on IT; business heads will focus on business. It is unlikely that either will understand the full impact of automation/digitization of information on business needs and IT processing and it is your task to ensure that they learn to do so.

Business services must be planned; let's take 'Traffic Management in the UK' (see Section 3.4) as an example. The business (or sadly, more likely a small tribe of consultants), will produce various policy and strategy documents about scale, scope and budget and then hand it over to IT to identify the IS/IT strategy. Who did the data analysis or who will do the data analysis to identify every information requirement and every outcome? Needless to say, the analysis is needed BEFORE everything goes into production, but more often 'ready, fire, aim' is the applied `method'.

Generally speaking, once a service was released, operations and infrastructure management would claim dominion over service management using ITIL; largely because ITIL had been used for many years and not much else existed to help. ITIL essentially became used as a bible and the fundamentals of ITIL are repeated (day-to-day management of incidents, requests, problems and changes) in the first version of DID and are well understood.

ITIL is one of a number of IT good practices that you need to ensure that a service operates as it should, and in Figure 3.2, we illustrate an example of how any generic services development model is supported by **many** frameworks. In advance we apologize to those who miss the appearance of their favorite framework or standard, but at least it gets the point across in one picture. Hundreds of standards, frameworks and methods exist, all of them good and all with a place. But remember the point that an IT best practice is focused on IT, not on a Line of Business.

In the context of BIM, we have identified the well-known methods, not necessarily the one (or more) with which you are familiar. And where many choices exist, we have not gone crazy with listings. For instance, a good example is project management where methods such as PRINCE2 or the PMBoK Guide are both are excellent. However, PRINCE2 is our choice because it was created by the same enterprise that created ITIL and many other good practices, including the intelligent customer.

The leading companies of today have integrated business and IT in such a way that it becomes impossible to separate them. Such integration goes way beyond mere 'business-IT alignment', or whatever that term was supposed to mean. Most of these enterprises, like Uber and AirBnB began with an IT 'green field'. In the majority of businesses however, business transformation is more about transforming the enterprise as it exists into a digitally focused enterprise. You can argue the labels though broadly speaking, business transformation can be evolutionary or revolutionary. Business Process Re-engineering (BPR) is only the beginning of major levels of transformation; digital transformation is, however, definitely the new black.

Large degrees of alteration or improvement require a structured approach and the DID framework is designed to facilitate that. Providing a coherent structure, DID can be used to assist you in the process of transforming your existing enterprise into a digital enterprise where business and IT are fully integrated.

3.3 THE BUSINESS MODEL AS STARTING POINT

The strength of the DID framework is that it takes your business model as the starting point. Therefore, when thinking about the transformation of your business or simply transforming how you manage data, you should ensure everyone is clear about the

enterprise business model, the operating model, the enterprise architecture and the service definitions using the model as 'the looking glass'.

The drivers are designed to represent and visualize your business model. The step following visualization is to describe your enterprise architecture in detail, in order to provide context, using the four DID perspectives: Business, Data, Services and Technology. Combining your business model and your enterprise architecture helps to derive design statements of the business services (digital or otherwise) that you need and value. The drivers and perspectives are used to stimulate your thinking.

In a 'green field' enterprise, you begin by thinking about Mission and Capability (what you need for your enterprise to kick-off), and the services that will be needed and valued in that context; at this time you also think, or get an expert to think, about the four perspectives to ensure that you have a clear and holistic vision. After that, you have the simple tasks of ensuring good governance, creating strategies, improving plans, developing and testing services and bringing everything together in a well-designed set of architectures that prove you can walk on water.

Following this sequence of activities provides a logical progression from defining the services and then the capability through to establishing your operating model. The DID model allows you to structure the translation of your business model into an information model.

In a brown field situation (which, let's be honest, most will be) we have to accept that an enterprise is subject to all manners of change: the name changes, the enterprise is acquired (or acquires others) or is divided up into smaller parts. However, the business processes usually remain stable (e.g. a bank is still a bank; an insurance company still sells insurance; utility companies still sell water, gas and electricity). The business processes may be automated or improved but they generally remain the same.

In such cases the DID model can be applied in two ways, considering 'new' digital projects as 'green' – or at least, not entirely brown – and second, looking at which component of the model is most appropriate to the current situation. For example, if your enterprise is in dire need of improving digital services, look at the needs of operations first.

3.4 SUCCESS OF BIM AND THE ROLE OF PRACTITIONERS

Practitioners (advanced level thinkers in the BIM world) will need to amplify the described meta-processes to ensure that the spectrum of the model is covered, from Governance to Operation, which necessitates defined Planning and Control.

To fully manage the scale of data issues and to understand BIM in your enterprise, you will also need to expand policies and guiding principles and create steering boards and directives.

The success of BIM – as well as the general quality of the BIM processes – is largely connected with the extent to which enterprises coordinate the various business information management activities with one another. Experience shows this is not always well coordinated. Perhaps the most important contribution of DID is to ensure that from the start of a program to transform the business, or focus on digitization, or to improve BIM, an efficient connection exists between the various business information management activities.

By focusing on quality and integrity, BIM activities will ensure that information services can be developed according to need and value, they will be operational on time, and therefore supply customers with the expected benefits. Delayed information service implementations can cost the customers their anticipated benefits. The generic benefits can be summarized as follows:

- Allows the users to deliver a better business service to their own customers;
- Delivers higher user productivity over and above the gains from improved availability because they meet the needs of the business and the users and avoid the need for users to run duplicate manual or other systems.

In addition, the reduction in information services failure costs may lead to a reduction in the overall cost of IT and a subsequent reduction in any cross charges made by IT suppliers.

Case study: Helpdesks and business knowledge

The London Underground 'Tube Map' (or Subway, or Metro) is a perfect example of a picture where complex interactions are reduced by creating a model of relative simplicity. A Subway map illustrates complex transportation opportunities in a simple graphical form, enabling individuals to consider many possible routes to a destination. Complexities are eliminated by simplifying decision-making, focusing only on the outcome needed, *"I need to travel from a to b''*, and the benefits that will be accrued, *"The journey will be 20 minutes shorter by travelling from a to b through c''*.

Anyone can use it except for those challenged by finding their way out of their front door armed only with a map, a compass and big arrow pointing to the front door, marked 'FRONT DOOR'. Or, of course, technophiles who only ever use satnav, or Google maps; the ones shouting the same command over and over again because they think technology is infallible, while the rest of us have simply looked at the large signpost in the middle of the street that is clearly

marked with the destination being bellowed by the aforementioned myopic technophiles.

Anyway, you (or most of us) can address the gap between business expectations and IT proposals using the Tube map as an analogous approach to looking at and thinking about the way in which business-led activities relate to IT activities that are at the heart of business services. Those dealing with business customers might wish to be able to identify and group the capabilities most interesting to that community.

One can imagine the Tube map as a schematic illustration of moving from one side outside to inside and to the other side from inside to outside the business identification of a service or product, through the minefield that is IT, and on to eventual delivery and deployment. Each of the individual routes shown on our completed picture describe the main 'station stops' and dependencies but that does not mean every enterprise will wish to carry out the same processes in the same way. Underpinning the capability map is, of course, the potential for automation and the certainty of some form of technology support. The degree of automation and support will of course vary too.

Business knowledge

In the map you will find several zones, ranging from outside to the center, just as in real life. The outer zone is the 'real world', the reality of business. The inner zone is IT, a reality that some of us consider the alpha and omega of everything, IT at the center of the universe, which can inevitably lead to all kinds of misunderstandings.

The colored lines are the 'tracks', major capabilities we see in every enterprise; for example, business and IT capacity, budgeting, planning programs and projects, change management, contract management and so on.

Think about the knowledge required in each zone; now think about who identifies the need for a service desk, buys one that they think is the best fit and, generally, is ITIL compliant; now think about how the information in the database for that new service desk is identified and stored. Think about what it is used for. Also think about how IT has absolutely no idea of the intricacies of business information processing and the dependencies and the outcomes; and now finally consider the 64 million dollar question, why does the business always moan that the service desk personnel have no idea about what they need or want?

You guessed; well, we hope you did. IT is concerned with populating the data about the things they know about. But how can they populate the service desk with business information when they have never worked in any LoB?

Using the map

The 'stations' are examples of the most common phases required to fulfil a capability; for example, looking at enterprise capacity management, considering business goals, performance, resources (people, time and money), IT infrastructure, etc. The stations are not going to be the same for every enterprise, although many will be common, but the overall capability will exist everywhere.

An example could be that a traffic incident starts with a call and then goes through the IT Traffic Management Information System (Figure 3.3) to a solution which includes all manner of activities required to manage the incident. Of course, because of all the intersections, other parties will need to be informed and special activities must be undertaken.

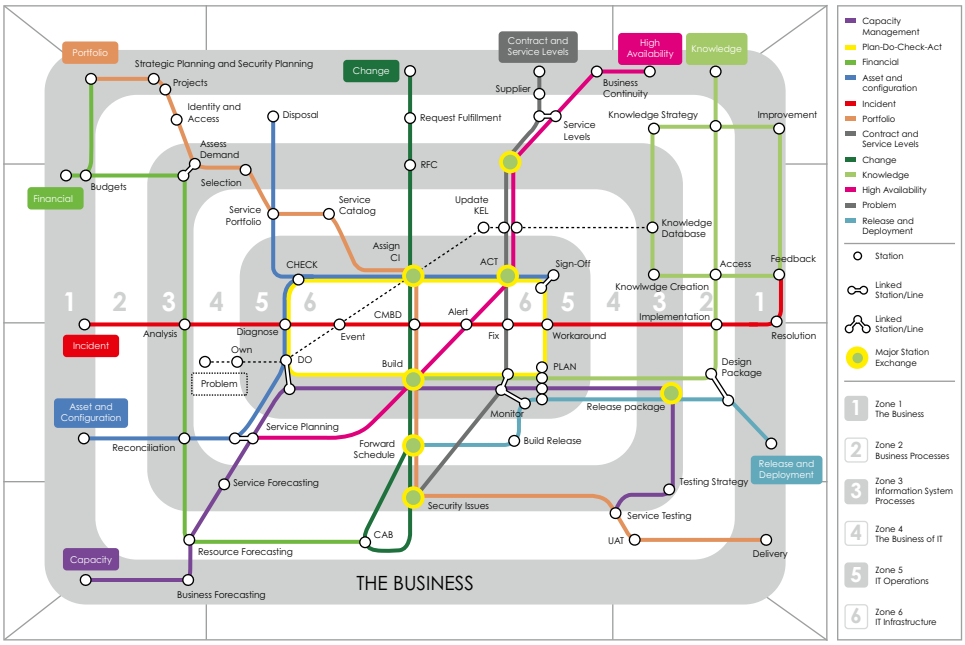


Figure 3.3 Navigating from the business zone to the IT factory

The knowledge needed and captured by the business is located way outside of the zones recognized or understood by IT. This means that business knowledge needs to be captured by people who understand business, business information services, and IT. And if IT cannot do this task because of ignorance (in the true sense) of business, and the business LoB has no involvement, then BIMC, i.e. you, must take over.

Subway maps (or come to that any bus route map) work the same, no matter where they are located. Whether in NYC, or London, or Tokyo, all achieve the same thing; you look at a big, complex picture of destinations, identify your destination and the best way to get there, and then once you are on a specific track, you travel through a series of stations until you get where you want to be. Our map is the same in this respect and differs only in that it is likely you have several destinations that you need to reach in order to improve the way in which your enterprise manages its IT-dependent business capabilities.

In a general commuting situation, you probably would not notice the crossing from zone one, via zone two to zone three. But in our IT-driven situation where business and IT-worlds collide, this crossing is a struggle. Commuting is largely instinct, based on experience; if a problem on your track is reported, you are smart enough (unless map reading is not your strength) to consider and evaluate alternate tracks that will get you to your destination. Designing a service, however, is not instinctual.

The Subway map can be used as a powerful concept to help everyone in a business to understand how major business changes can be better supported to achieve program goals. As with all destination maps, there are many ways to get to the place you want to be; the reality is that the destination may be common but the route we choose will be different because we want to see, or in the case of a capability, achieve, different things. More detailed versions of the same Subway map can be made to assist program management.

Key points:

- ✔ A service can be defined from two perspectives: from the demand-side and from a supply-side.
- ✔ Information flows between business and supplier (i.e. demand and supply) and with BIM we aim to manage these flows.
- ✔ Information flows are part of information services that have a lifecycle and the information needs and availability of data will vary between the different phases of the lifecycle.
- ✔ The DID framework takes your business model as the starting point. Therefore, when thinking about the transformation of your business or simply transforming how you manage data, ensure everyone is clear about the enterprise business model, the operating model, the enterprise architecture and the service definitions using the model as 'the looking glass'.
- ✔ Practitioners (advanced level thinkers in the BIM world) will need to amplify the described processes to ensure that the spectrum of the model is covered, from Governance to Operation, which necessitates defined Planning and Control. To fully manage the scale of data issues and to understand BIM in

your enterprise, you will also need to expand policies and guiding principles, and create steering boards and directives. For example, look at all of the processes described in ITIL; they have been 'adopted' by ASL and BiSL for many years and most remain relevant to BIM practices, but only if they are used appropriately and are not simply hammered into the enterprise as a 'a solution'.

✔ The success of BIM, as well as the general quality of the BIM processes, are largely connected with the extent to which enterprises coordinate the various business information management activities with one another.

4. MANAGING BUSINESS INFORMATION

4.1 STAKEHOLDERS RULE

Looking around you will find yourself surrounded by stakeholders, as shown in Figure 4.1, internally (employees, owners, suppliers, etc.) and externally (customers, government, the trades union, etc.). BIM governance is key to managing multiple stakeholders in order to create BIM value.

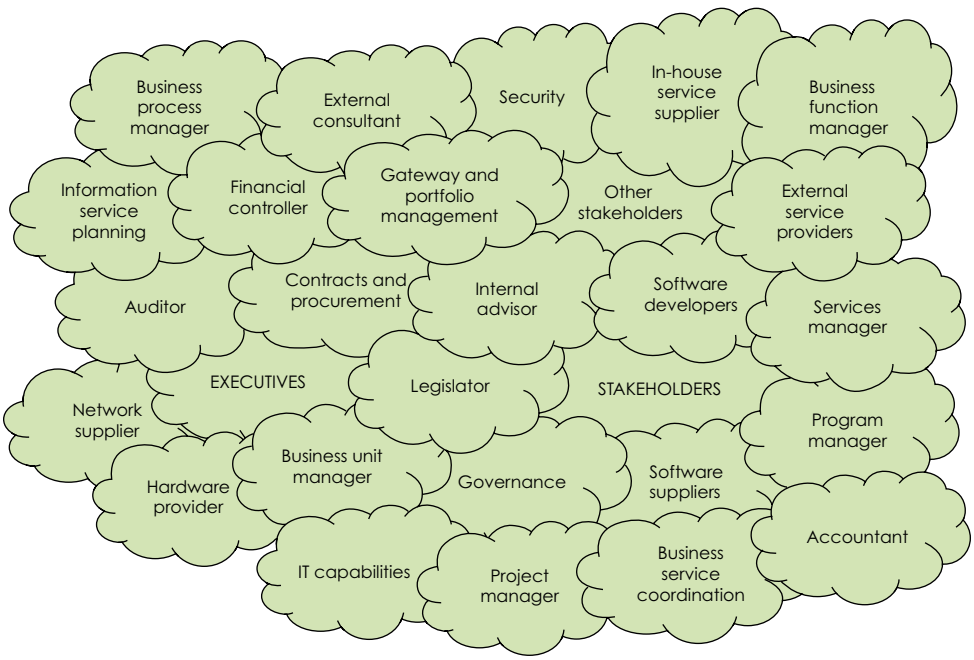


Figure 4.1 Possible stakeholders in an enterprise

Networked enterprises are based on cooperating and competing units with different interests. The relationships between these parties are characterized by simultaneous cooperation and competition. In other words, in some activities the emphasis is on

cooperation, and in other cases competition is dominant and the individual interests of units play a greater role. The interdependence between the parties is evident.

BIM, in a networked environment, necessitates greater vigilance because of the shared data; it also has implications for privacy and therefore governance policies. That is not to say that either data sharing or privacy is unimportant in the stakeholder approach, only that the degree of complexity and issues of interdependence in a networked enterprise will most likely be approached using different instruments, such as contracts.

4.1.1 Executive management (the Board)

Executive management has final responsibility for the performance of the enterprise as a whole. There are various topics to decide upon or issue guidelines about. Consider, for example, strategic issues such as digitization, information sharing, outsourcing decisions, housing considerations, salary levels, supply chain concerns, privacy and security.

The attention of executive management is often focused upon the potential of negative publicity. For example, cybersecurity where there is the increasing threat of hackers on corporate networks. Because of this threat, the security and management of the network and the data is increasingly regarded as a primary issue for the organization. Think of the emerging C-level TLA's like Chief Security Officer, Chief Privacy Officer, etc.

BIMC has a role to play in the formulation and implementation of an information and data policy and strategy. It contributes to strategy formation by issuing policy advice to the Board and subsequently converts the adopted strategy into strategic plans. Examples include either coordinating or creating contributions to (depending on how the role is instantiated) governance planning and policy development, information planning, safety plans, housing plans, outsourcing plans and transition plans.

4.1.2 The business/line of business (LoB)

In addition to policy and strategy decision-making, general management can also be regarded as the most important stakeholder for BIM because they own the budget. The budget is primarily intended for the basic services that are standardized for everyone in the enterprise. Beware that in some organizations it turns out that almost anyone is an IT-decision-maker in that they can spend money on IT; in such cases the number of decision-makers should be capped to those who should own the budget, if only to prevent island solutions that many enterprises are ridden with. Here BIM can be instrumental, for instance, to make an inventory of the current IT-landscape, i.e., the software asset portfolio.

General management determines the content and quality of basic services and also decides whether the purchase/delivery of services is standardized. The agreements that the management of the enterprise makes with external businesses about the services are specified in either contracts (where external parties are involved), contract agreements, or service level agreements (SLA).

In addition, general management are often budget holders for a specific category of information services. BIMC can act on behalf of the business and support them with their strategic and tactical responsibilities, though the customer remains ultimately responsible for success or failure. In such cases BIM may also be a complex issue, depending on whether or not data is important in other areas of either the information partner or supply partner chains. Consider as an example if (in the UK) the Prison Services held a budget for processing data about inmates; the Police, Courts, Probation Service and many other enterprises would each benefit from having access to the information held and no doubt it would be in the public interest. Consider now the issue of data sharing and the current UK legislation regarding privacy. Then stir in GDPR and you open a can of worms with commensurate cost and complexity.

Insofar as they do not belong to designated business and user groups, all businesses can purchase/use the basic services that have been agreed on with general management. The delivery then takes place at the established service levels and against the (financial) conditions agreed with the management.

It may be that, for some businesses, the basic service provision does not apply or does not adequately meet their needs. In that case, businesses can make separate agreements *via* the management of the enterprise regarding additional services and different service levels. The control function is advisor to general management in all situations. A condition for deviating from agreements is that the (additional) costs are borne by the business, unless the management decides otherwise.

4.1.3 Users

Users receive/purchase services and products from the suppliers, or have permission to use the services of the internal departments of the enterprise. They must, however, remain within the agreements made with general management. There is no individual coordinated relationship between users and the executive management of the enterprise, but indirectly the satisfaction of the users regarding the service provision is of great importance for the management of the enterprise.

4.1.4 Service providers

Within market-oriented enterprises, the relationship between customers and contractors (service providers/suppliers) is established on the basis of agreements regarding, e.g., price and quality. The market mechanism implies that if no

agreement can be reached on price and performance, the relationship between client and contractor is in fact not established.

Case study: Business continuity and data integrity[12]

Why BIM is a security issue

On a regular basis we read in the news about cyberattacks on critical business IT infrastructures, such as power plants, the UK NHS and celebrity nude photo archives. Such infrastructures rely on Industrial Control Systems, (ICS) and/or Supervisory Control And Data Acquisition (SCADA) networks, except for celebrity nude photo archives that rely on the celebrities not using Facebook or whatever to store the photographs that most likely were not a good idea in the first place.

ICS are used to monitor and control industrial processes. ICS are usually managed using SCADA systems that provide a user interface for operators to monitor and control physical systems. ICS/SCADA devices are used in many sectors, including critical infrastructures, e.g. power distribution systems, water treatment and sewage facilities, manufacturing facilities, communication facilities, and transportation systems.

Vulnerabilities on ICS/SCADA devices pose a significant threat to industrial networks, particularly those associated with critical infrastructures. Unavailability or failure of critical infrastructures or compromised data used by operators could have serious consequences. Unreliable operation of such systems could disrupt the infrastructures environment, harm the long-term operation of the responsible enterprise, or in the worst scenarios actually threaten human lives. More and more incidents are being reported.

Security, especially with critical systems, is a hot topic on the agenda and therefore executive managers want to know whether all mitigation measures, possible and logical, have been taken. The Board and BIMC must understand that in a connected world it is vital all information systems, networks and users should be protected against the threat of cyber-attacks.

The incidents involving ICS/SCADA systems are a consequence of their evolution. ICS/SCADA devices systems originally were restricted to being accessed by operators within the infrastructure of the enterprise, isolated from the Internet. Service protocols used in these ICS/SCADA devices were, therefore, designed

12 Ceron, J.M., Chromik, J.J., J.J.C. Santanna, J.J.C., Pras, A., (2019), 'Online Discoverability and Vulnerabilities of ICS/SCADA Devices in the Netherlands', Universiteit Twente, in opdracht van het Wetenschappelijk Onderzoek en Documentatiecentrum (WODC), https://repository.wodc.nl/bitstream/handle/20.500.12832/2369/2861_volledige_tekst_tcm28-401175.pdf?sequence=2&isAllowed=y.

with functionality as their main goal. It is now desirable for system operators to be able to remotely connect and control the ICS/SCADA systems from any location at any time *via* the Internet. This evolution has several benefits: it facilitates the interoperability of systems and reduces the infrastructure and maintenance costs. However, the ICS/SCADA protocols lack built-in security. Hence, ICS/SCADA devices have been inadvertently exposed on the public Internet without proper security measures, facilitating not only ill-intentioned users (hackers) in gaining access to the devices and potentially causing severe incidents, but also allowing accidental mistakes to be made by people who are coincidentally scanning parts of the Internet.

Cybersecurity

Add your Alexa, Siri or other connected device to cybersecurity problems while we are discussing enterprise issues – do you really think your data is safe? Anyway, cybersecurity units will monitor and assess online discoverability and vulnerability of the enterprise ICS/SCADA devices. This is carried out by setting-up a measurement and logging infrastructure, to detect possible scanning and attacking attempts at the earliest stage possible.

To improve the protection of such infrastructures, a number of measures to secure these devices and reduce the chance that attacks have been trialed with a degree of success. These measures are well-known and easy to implement.

Monitoring whether devices are discoverable and vulnerable is an important first step in protecting the ICS/SCADA but there are obvious measures that should be in place. These belong to the so-called 'usual suspects' that secure the infrastructure from unwanted access. Think about the following:

- ✔ Limit the access of ICS/SCADA devices from the Internet;
- ✔ Install software updates in a timely manner, change the default TCP/UDP port numbers;
- ✔ Use techniques to restrict network traffic on ports and protocols associated with ICS/SCADA services;
- ✔ Harden the device configuration by disabling functionalities and services that are not used by the managers and operators;
- ✔ Maintain an up-to-date list of software and hardware that is running on your infrastructure;
- ✔ Monitor the manufacturer's vulnerabilities;
- ✔ Keep other systems that interact with the ICS/SCADA devices secure and ensure that they run the latest software versions;
- ✔ Enforce strong passwords, do not save them in the clear, instead use hashing and salting;
- ✔ Avoid unauthorized access;

- ✔ Ensure that the default passwords of ICS/SCADA devices are changed etc.;
- ✔ Be aware of social engineering attacks.

Role of BIMC

For BIMC, which is concerned about data quality and data integrity it is paramount that measures are in place to avoid any such incidents and that proper recording and reporting can take place. But no matter how sophisticated technical security measures have been taken, it is imperative to focus also on the so called 'human infrastructure'. The importance of understanding social engineering and its impact are important. As a consequence measures are not only technical but also need to focus on so-called 'soft' measures. Users and operators must be trained to be aware of the risks and correct procedures. Together with the IT department's cybersecurity unit, BIMC must cooperatively assess business continuity and make sure that 'hard' and 'soft' instruments (technical tools, training and procedures/work processes) are optimized to minimize any continuity risk.[13]

4.2 MAKING BIM POSSIBLE

The stakeholder approach emphasizes the importance of investing in relationships with those who have an interest in the stability of these relationships. Those stakeholders within the enterprise or in the environment of the enterprise who have an effect on the enterprise or are affected by the objectives of the enterprise. They will try to influence your strategy and your actions to execute BIM, sometimes for the good, sometimes for the bad. And even for the ugly.

When considering the value of information and the strategic importance of IT, it is clear that executive management must be aware of the fact that information services and the underlying technological infrastructure are integral to the digital future of the enterprise. Quality of information is mandatory to make the best use of information and communication technology; and the quality of IT influences the quality of information management.

Specific attention and oversight should be implemented to ensure the integrity of essential data. By setting up a BIM governance framework BIM value creation for the enterprise is managed. And in order to be clear about the policies needed to ensure data integrity, a BIM decision framework should be in place.

A BIM decision framework should not operate in a vacuum. It originates within the overall governance structure of an enterprise. Business governance focuses on the

13 Hadnagy, C., Social engineering: *The art of human hacking*. John Wiley & Sons, 2010.

direction, and the control and execution of the business plan and strategies by the CEO and their team. As a consequence, BIM is an integral part of the management of the enterprise, thus BIM governance should focus on the direction, control and execution of BIM plans and strategy. Enterprise governance drives business governance and all functional governance including BIM.

Ensuring proper governance of information services is paramount. That means managing the different interests of all stakeholders, setting a structure for formal oversight in terms of hierarchy, roles and responsibility and making sure that the right decisions can be made within a planning and control system. Such a decision framework within your enterprise must address at least four functions:

1. Managing information and data.
2. Identification of business requirements.
3. Guidance of the intelligent customer capabilities.
4. Requirements for IT.

4.2.1 Managing information and data

Firstly, managing information flows, structuring information and the associated data dependencies and work methods must be coordinated between strategic suppliers, business partners and users of information and data in the ecosystem of information and data. Therefore, BIM governance should apply also to relationships with parties outside the enterprise, such as suppliers and partners in the information demand and supply chain.

4.2.2 Identification of business requirements

Secondly, we need to identify the business requirements for business information services in the business planning stages. It involves deciding how business operations are to be carried out and what information, and therefore what information services, are required to support them. Strategic planning for information systems is primarily the responsibility of business managers who must specify their information needs clearly. Information service analytical studies can be used to identify opportunities for improving business operations. By analyzing business processes, information flows and processing, the cost and quality of information systems can be greatly improved. How often though, does a business analysis undertaken by IT encompass the need for, and value of, data?

It is important that a distinction is made between development, implementation and management, and between strategic, tactical and operational management. Think about topics at the strategic level such as vision formulation, policy making and good commissioning, taking initiatives, solving problems and breaking stalemates. Determine what can and cannot be done as a generic service; e.g. manage the financial frameworks and monitor whether the system is functioning properly. Questions at the tactical level are about the description of the (mutual) roles and

tasks involving compliance with policy/innovation/advisory management, customer management, contract management and control (performance) management. Questions at the operational level focus on the correct functioning of IT on a daily basis in accordance with agreements. In terms of content, this concerns the actual provision of products and services and the use of systems in which the (mutual) roles and tasks of users and customers, and the IT suppliers are all fixed.

4.2.3 Guidance about the intelligent customer capabilities

Thirdly, how many business managers find it frustrating to deal with IT? Identifying these information requirements depends upon an understanding of the value of information to the business and on an understanding of what opportunities are available through the use of IT. That said, how many business managers are capable of so doing without expert guidance? More importantly, by developing a better understanding of how and why the business uses the information and its value, the service level requirements and their relative business priorities can be better understood. This leads to a better match between the IS service provided and the business needs. So, we have used BIMC as the term for guidance in setting up a tactical structure. BIMC teams should comprise individuals from a mixture of backgrounds (business, IT and even consultants) as this is the best approach to staffing a group for IS planning and advising executive management.

4.2.4 Requirements for IT

Finally, the information needs of the business activities define the requirements for IT services. By analyzing the use of the information, the service priorities can be defined. The requirements should be expressed in business terms before any technical solution is considered. So, focus on the need of the business (for example: "we need to manage our assets in real time" instead of "we want to use software-package A or B where we can manage our assets"). By defining the requirements in this way both users and the (IT) Service Managers can be sure that the service requirements stated **are** business requirements.

Understand how your sourcing strategy is executed. Questions that are addressed relate to standardization and bundling, the significance of supply in terms of IS/IT services by a service integrator, independent suppliers or an eco-system, the generic (data) services that necessitate repositories and the use of architectural principles. It also should give you an insight with regards to generic and specific IS needs. This should clarify the topics within the business services where cooperation and sharing are logically required and those business services where cooperation is not necessary.

4.3 A GENERIC BIM DECISION FRAMEWORK

These key topics should be part of a generic decision structure as shown in Figure 4.2. It illustrates how business managers, IS planners (governed by some form of BIM board/IS Steering Committee, the ISSC) and Program Directors, translate the policies of the Management Board (guiding principles) into purpose and direction for the managers of IT services.

The diagram is drawn from best practice and reflects the complexity of departmental (or often multi-departmental) program and project planning. It is not, however, meant as an organization chart or indeed as a hiring guide. To effectively understand BIM within your own enterprise and set up a suitable governance framework, you must be aware of how demand and supply has been organized. Only then can you organize the intelligent customer capability for BIM. Any instantiation of these various boards/committees must be in line with the needs of the enterprise, the size and impact of the program and the commensurate risks.

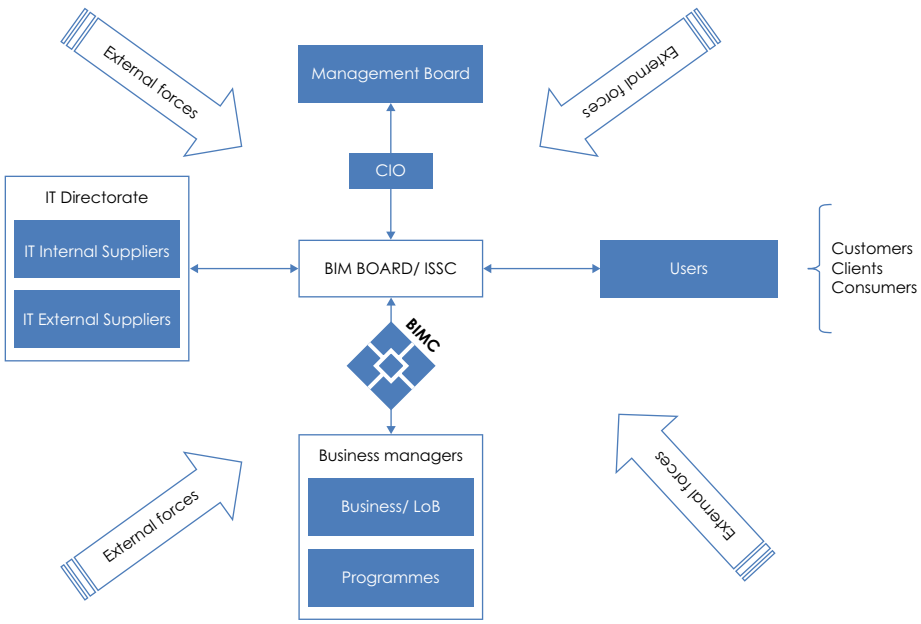


Figure 4.2 BIM roles/responsibilities in the management framework

4.3.1 Business management

Business managers develop business plans for their respective areas of responsibility - which are likely to require IT services. These plans must be agreed upon by both business managers and the IT Directorate, particularly the IT Services Organization. Where the delivery of IT service has been outsourced, the Service Control Team

(SCT) will be responsible for agreeing on the changes to the requirement with the service provider. The agreed-on requirements are encapsulated as service level agreements (SLAs).

Some business plans require co-operation across business areas and these should be formed into business programs. Best practice recommends the appointment of a Program Board and Program Director for each program. Programs are derived from business plans and strategy which they are designed to implement. Implementation is by means of a collection of projects some or all of which may have an IT component. A Program Director represents the enterprise or business and ensures it obtains its expected business benefits from the program. The Program Director is supported by a program organization which includes the Program Manager.

Of course, in smaller enterprises several roles can be combined and, depending on the scope, a program and a project can be the same! A project is focused on a specific result within time and budget (output). A program is focused on added business value and benefits (outcome). For smaller enterprises, benefits and costs are much more closely linked, hence projects should look much more like programs.

An Information Systems (IS) strategy in support of business needs should be developed by an IS Steering Committee (ISSC) or BIM Board. The ISSC reports to the management board and is responsible for setting the enterprise information management/services strategy.

The strategy MUST be informed by the inclusion of a business information strategy. The business information strategy is a BIMC responsibility and cannot be abrogated. The ISSC should be led by business managers and requires the involvement of the IT Directorate. Most often it fails because no one is responsible for overall BIM The IS strategy provides an overall framework for business plans and business programs which affect those business processes which rely on information.
Ultimately the Management Board is at the top of the enterprise and (hopefully) generates the business strategy and business plans. They are the ultimate customers for the IT Services Organization.

4.3.2 BIM Coordination (BIMC)

BIMC supports the BIM Board/ISSC, coordinates the activities of the various Executive Committees with those of the Board and acts as guardian of the data elements of the IS strategy. We use the DID framework to describe, position and provide tools for the design of intelligent customers for the information assets of the enterprise. The DID framework has been set up to effectively shape business information management within an enterprise with the aim of achieving better use of information and technology in the enterprise and therefore higher returns.

Business information management is concerned with the **effective** management of business information. Think portfolio and program management in line with the enterprise strategy; the design of information services that meet business needs; agility, transformation and improvement of business information services; selecting the right technical (technology) infrastructure and deploying the right competences at the right time.

Within the enterprise, BIMC fulfills the role of the professional representation of the business that coordinates the executive information services on the result of the desired services, ensures compliance with contracts and the control thereof, and controls costs simultaneously with professional performance. BIMC should therefore be responsible for demand bundling and is the delegated client. The term is 'delegated', because someone from the Board or general management is always responsible for the supporting services and has mandated this responsibility to BIMC.

BIMC is positioned between the customer enterprise and the supplier(s), internally and externally. It is the intermediary who, as a delegated client, ensures that the client's needs (or the needs of the business) are well served by clear formulation of the needs and the translation thereof into purchased and delivered information services.

The core function of BIMC is being the intelligent customer capability of the enterprise so that the correct specification for a business information service can be drawn up; the value is actually obtained as a result of the benefits that the information service provides in implementation. The scope and nature of resources that are available internally (or that originate externally but are managed internally) are necessary to both improve and perform day-to-day activities.

With regards to digitization, the data, information and knowledge necessary for the enterprise almost certainly will arise from many sources and a capability to manage and control the entirety is needed in order to be effective (BIMC). The function of BIMC is particularly necessary where outsourcing has taken place and data is shared, so that expertise about the business information (and business information services) within the enterprise is retained.

The ability to properly execute BIMC comes about through a combination of roles such as service manager, SLA manager, contract manager, relationship manager and customer management; often the relationship role is an essential part of one of the other roles, and given the importance of data, it is recommended that it is the role of BIMC.

We recommend that BIMC is a concept that can be a physical department or a virtual group of information managers that work together to coordinate IT

management from the business perspective. They can either be positioned within business units or independently. BIMC constitutes operational management. As to where BIMC is positioned in the enterprise, depending on the agreed scope of the function, it can focus on any or all of the strategic (for example some CIO office), tactical (for example within the businesses) or operational information and digital activities within businesses, or at the internal/external supplier side.

Program and project plans are maintained by the Project Support Office (PSO), should one exist, on behalf of the managers. Depending on how you are organizing your BIM governance and your BIMC, you could make the Project Support Office (PSO) part of BIMC. Larger enterprises often create a PSO, whilst smaller enterprises may create virtual offices or vest all responsibilities in a one person.

A PSO is a temporary or permanent organizational unit that provides a portfolio of services to support project teams that are responsible for a defined group of projects. Depending on your favorite practice you may decide to call it something different.

The IT Services Manager should be represented at meetings which discuss and review these plans where the provision of IT services or the development and operation of IT infrastructure are involved. The IT Services Organization should obtain copies of relevant plans from the PSO.

4.3.3 IT department (or directorate)

The IT department is responsible for the IT components which meet the IS strategy. It is normally chaired by the IT Director. This role directly manages and oversees technical infrastructure components (the computer center(s), hardware, middleware and operating software) and is common in larger enterprises.

The IT department is responsible for the IT infrastructure, the provision of IT services and, often, the development of new applications. The IT Directorate must provide assistance to business managers in producing IS plans. To give effective assistance, IT Directorate (and BIMC) staff must concentrate on the information and business issues and not on possible IT-based solutions.
The IT Services Manager is responsible to the IT Director for ensuring that IT services meet the customer's needs both now and in the future. To do this, the IT Services Manager must clearly understand the customer's current requirements and have some understanding of how they will develop in the future. This can only be achieved by understanding, in detail, the business use and value of the various aspects of the IT services provided, in the customer's terms.

Keep in mind that the IS strategy and its data needs may require changes in the IT infrastructure, and lead to an IT infrastructure renewal program.

For new system development projects an IT Planning Unit (ITPU) can be set up, which supports the IT department. The ITPU can also be used to support IT Services Organization activities.

The ITPU must interface with other planning functions that share the same aim of delivering, managing and controlling effectively the enterprise investment in IS. The ITPU must interface with:

- Those responsible for the corporate IS strategy;
- Those responsible for the IS strategy for particular business areas;
- The PSO, if the organization is large enough to warrant a separate PSO;
- Individual IT Services Organization planners.

The development of new software may be undertaken by the enterprise itself, or it can be procured from external suppliers. More guidance is available in the old but still relevant IT Infrastructure Library (ITIL) Software Lifecycle Support module if you have that in your collection. Alternatively, you can use updated versions of that guidance in ITIL version 3 about Information Lifecycle Support and Wisdom, Knowledge, Information and Data Management, as well as in guidance encapsulated in PRINCE2.

4.3.4 Users

Regardless of the industry sector, branch or government department where services or products are offered, it is essential that you know and understand your customers. Your customers are represented by their users. User focus (in a perfect world) is always on providing maximum value for customers. Hence, user needs and wishes originate from the outside world and are less dominated by the proposals or ideas of the IT department, or through enterprise strategic actions or capabilities. The relationship with the customer, through the users, is an essential part of the demand-side of BIMC. The right to exist of BIMC is partly determined by their ability to translate the needs of users in a way that fulfils customer outcomes and therefore enterprise outcomes. Remember the focus on outcomes is key to guiding decisions on investment and transformations.

4.3.5 External forces

BIMC, IT and other parties with BIM interests must understand the market forces that impact external innovations. Developments that are innovative can influence any enterprise. These might be changes in the desires of customers, but also other factors such as changing legislation. Market developments may be favorable or adverse. Market trends in the environment should be analyzed and their impact understood: think about which are opportunities for the enterprise and which are likely to be problematical. Trends arise partly because of general developments such as changing demographics, technology advancements, legislation etc. and partly because of the behavior of stakeholders.

Stakeholders, as we discussed earlier, are individuals and groups who influence the enterprise one way or the other; examples include customers, employees, stockholders, founders, suppliers, unions, competition, local societies and society in general. And, of course, politicians. It is important to distinguish between internal and external stakeholders; internal stakeholders are individuals or groups, such as employees or those that possess stocks. External stakeholders are all other individuals or groups that influence the enterprise. For instance, creation of a mobile app for an external app store may well lead to the owner of the store demanding changes or features that do not match the objectives of the creators.

Competitive forces emerge from the behavior of external stakeholders, rival practitioners, customers, suppliers, potential entrants to the market and substitute products that lead to rivalry between different parties. The rivalry that results from these forces defines your environment and shapes the nature of competitive interaction within your sector.

Trends in the environment can also influence how the enterprise operates. Determination of important trends is based on the nature of the development or innovation, the perceptions of people in the enterprise and the expected consequences of the development. Typical questions that can be asked include the following:

- Which demographic trends are relevant and can be perceived in society that might impact the enterprise? Focus on trends in the build-up of data about births, deaths, illness, aging; emigration, immigration; local/regional/national/international perspectives.
- What are the relevant ecological trends? Focus on trends in the environment, natural events, climate, supply of raw materials etc.
- What are the relevant social trends? Focus on trends about individualization, globalization, boycotts, education, etc.
- Which relevant technological trends can be identified? Focus on trends in scientific developments, IT innovations using combinations of materials and applications, information-communication technology, use of robots, and so on.
- What are the relevant economic trends? Focus on trends in competition and competitive forces, market developments, currency, inflation, macro-economic systems, financing, owner relationships and market mechanisms.
- Which relevant political trends can be seen? Focus on trends in legislation, control; democratic; culture, values and norms; increasing or decreasing levels of government.

The recognition of external developments depends on the nature of the innovations and the powers of observation of the people in the enterprise tasked with 'technology watch', along with the expected consequences of the developments. You will soon discover that there is rarely agreement about the interpretation of innovations and their potential benefits.

For BIMC, an important task is to understand the different outside and inside forces and how they impact the enterprise.

4.4 BIM PLANNING AND CONTROL

Information services planning should be conducted within the formal management framework. This does not mean unnecessary hiring of many management positions, top-heavy process design or unnecessary overheads; formal management recognizes that enterprise-wide BIM requires policy and strategy otherwise data will be scattered, duplicated, error prone and unmaintainable. All management structures should reflect three things: the importance of enterprise-wide data, the impact of failing to keep up-to-date with information needs and the requirement to be agile in the face of building the BIM capability without compromising risk.

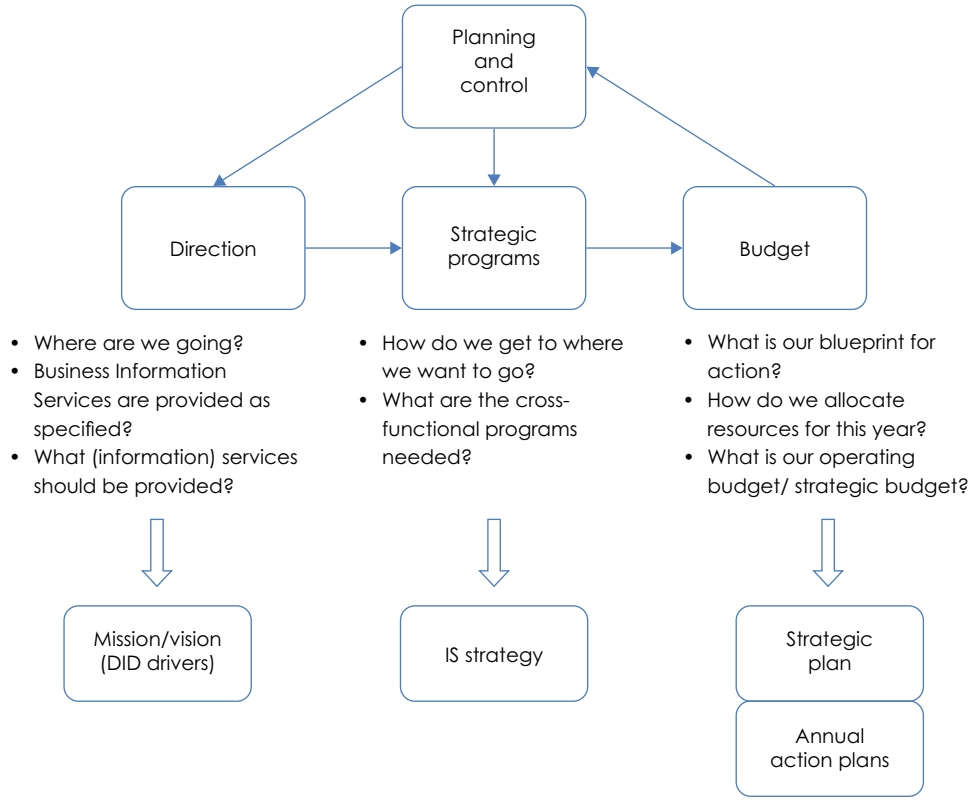


Figure 4.3 Typical planning and control within the BIM decision framework[14]

14 Adapted from: Freeman, R.Edward (2010), *Strategic Management, a stakeholder approach*, first edition 1984, digital printed 2010. Cambridge University Press.

The aim of planning and control is to provide information to ensure that business services are provided as specified, to time and within budget. Planning and control should be treated as a total, coherent and logical set of activities which may be carried out across physical boundaries such as internal organizational structures, separate companies, or a number of individuals. It is important to look at the whole process to ensure that it is complete and consistent across boundaries.

The effective delivery of information services to an enterprise business community is closely linked to how effectively its IT Services Organization is managed. Meeting cost, time and functionality targets is paramount and a reactive, unplanned approach to IT service provision will almost certainly have a negative impact on the customers, the parent organization and the IT Services Organization itself. The only effective approach is to operate proactive information planning and control.

The implementation of a system to plan and control the provision of information services will help any IT Services Organization to support the successful achievement of the appropriate business driver(s). In addition, there are benefits to be gained by different parts of an organization from the introduction of planning and control in the Business Services Organization.

The main benefits should be:

- To the parent organization: greater efficiency and effectiveness through better informed planning of future requirements for IT service provision, resulting in reduced costs.
- To the customers: improved delivery of the required levels of IT service.
- To new IT service requirements: more effective response.
- To the IT Service Management Team: improved information with which to manage change more effectively.
- To the IT Services Organization: improvements in their own effectiveness and efficiency.

Good planning and control should, however, not be seen as a measure of overall success or indeed failure for that matter. Adequate plan accuracy is just hygiene of programs and projects, be they IT-intensive or not. Success is a multidimensional notion where sometimes the need for more budget than anticipated is not a problem at all, whilst in other cases it can be a major problem[15].

15 See: G.P.A.J. Delen, R.J. Peters, C. Verhoef, S.F.M. van Vlijmen, Lessons from Dutch IT-outsourcing success and failure. *Science of Computer Programming*, 130 (2016): 37-68. And G.P.A.J. Delen, R.J. Peters, C. Verhoef, S.F.M. van Vlijmen, Foundations for measuring IT-outsourcing success and failure. *Journal of Systems and Software*, 156 (2019): 113-125.

4.5 INFORMATION SERVICE CAPABILITIES

Key to the management of resources is management of the organizational capabilities needed to ensure that there is a valued requirement for an information service and that the value resulting from the benefits of it being in place can actually be realized. **Organizational capability** is the engine of the enterprise: the capabilities that are available internally (or that may be sourced from the wider world) are essential to bring about both improvements and to run day-to-day operations. There is a tension between capability and what the enterprise wants (**Mission**) because the mission cannot be achieved if capability is short. Balancing what the enterprise **Needs** and the availability of Capabilities is essential, hence the importance of the management decision board to carefully consider the proposed projects and **Value** that must be realized.

The importance of organizational capabilities cannot be understated so we will recap some basic material from the DID Foundation book. Organizational capabilities will, of course, differ from sector to sector and must be identified in plans and documented. Figure 4.4 provides a generic overview of organizational capabilities to be found in a modern enterprise. Supporting generic information/data capabilities can then be placed in context.

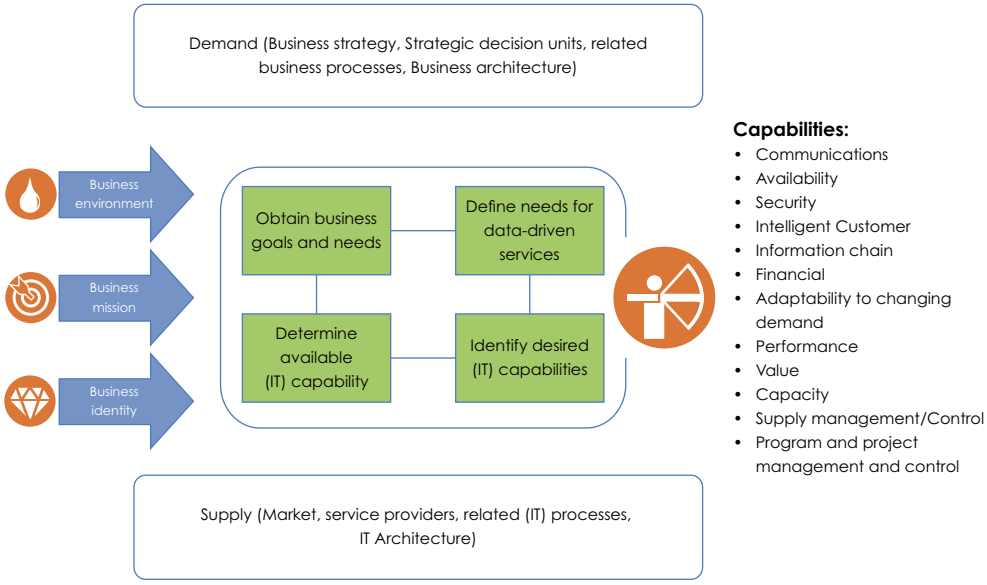


Figure 4.4 From Mission to Organizational capabilities

Once again you can see that all four perspectives of business, data, services and technology will apply and will need to be considered when evaluating organizational capabilities.
Information service-specific capabilities that should be given most attention include:

- **Capacity management:** Mapping out of expectations regarding the necessary capacity (in units of measurement that can be widely understood and justified) and activities ensuring optimal use of IT resources. This capacity, with regard to information services, requires a knowledge of estimation techniques, one of the most well-known being Function Point Analysis (FPA). Of course, we realize that nowadays the Agile community uses story points and its variants, but the estimation accuracy of these metrics is not up to par with function points[16]. For instance, function point counts are a reliable metric[17]. For story points, such reliability is not feasible if only because each team can develop its own counting mechanism.
- **Financial management**: Over-arching financial management for IT services is concerned with helping the business to assess whether its (IT) supplier is doing the best it can with the money it has. The business needs to understand the true costs of providing services and manage these costs professionally. Financial management implements IT accounting and budgeting processes, and often charging processes for services, allocating IT expenditure to services and recovering the costs of those services from the business customers to whom they are provided. The management of information services is no different and can be considered as either a subset of the entire discipline or (where the information service delivery is costed to include **all** components of the delivered service) it can be viewed as *the* service. The difference is in the detail; be clear about the financial aspects you wish to manage, control and report about.

  Budgeting enables an organization to predict the cost required to run IT services for a given period. You should make sure that actual spend can be compared with predicted spend at any point. The intention is to reduce the risk of overspending and to ensure that revenues are available to cover predicted spend (where charging is in place).
  IT accounting enables an organization to account for the money spent in providing IT services. The goal is to calculate the cost of providing IT services to both internal and external customers. Activities will include performing cost-benefit or return-on-investment analyses and identifying the cost of changes.
  Charging enables an organization to recover the costs of the IT services from the customer of the service by operating the IT organization as a business unit if required. This is considered to be a means of influence over user and customer behavior.
  The overall scope of financial management of IT services is taken to cover hardware, software, people, accommodation, external services (e.g. outsourced

16 T. Little, C. Verhoef, To Estimate or #NoEstimates, that is the Question, 2016, http://www.toddlittleweb.com/Papers/Estimates%20or%20NoEstimates%20HICSS%202016-06-15.pdf
17 P. Kampstra, C. Verhoef, Reliability of function point counts, 2016, http://www.few.vu.nl/~x/rofpc/rofpc.pdf

application development), and transfer costs (e.g. IT services buying PCs on behalf of a business customer).

- **Availability management**: These are the activities ensuring current and future availability of the applications that underpin services for the users. Availability is widely misunderstood, it has three components: confidentiality, integrity AND availability. This means that BIM is responsible for policing the integrity of the information services. And is not just a label for trying to assess spurious measures such as 99.9999% availability.
- **Information security management**: Both complementary to the availability components and also a vital 'standalone' process. Think cybersecurity (or lack of it), data breaches and thefts and don't forget about big tech roaming your data on social platforms to make a profit out of it.
- **Business continuity management**: Establishing measures to ensure that information services can continue to function according to expectation, or with an acceptable level of risk to the underlying information. This includes, for example, measures such as protection against fraud or sabotage, being prepared for emergencies such as total IT service collapse, or the necessity to maintain either parallel services and/or system processing.
- **Business process development:** Over the long term the goal is to support business processes efficiently and effectively. BIM must be capable, therefore, of translating any change in the business process (as can be inferred from Figure 4.4, whether because of market influences, partner or supplier influences or simply innovation), so that information services are improved (or designed and assembled) to fulfil the need.
- **Information chain partner management:** Often a single decision maker is missing in the information chain between enterprises (and sometimes within the enterprise). BIM should accept the responsibility of this role to ensure value chains set at LoB levels are coordinated and managed internally and externally. Agreements will almost certainly need to be in place to manage the various interests. Keep in mind that some information partners are not voluntarily sharing; information exchange may be mandatory because of legislation or simply an imperative, for example in following an individual through the process of being arrested, jailed and paroled.

  Establishing enterprise-wide policies will be an important activity. Managing changes and improvements that impact the chain will be a challenge that can be addressed only by having a holistic picture of the need for information and its value. In addition, any developments in quality criteria, security, or even the use of different technologies within the chain, should be monitored and evaluated for both the short- and long-term implications on information services.

- **Supply chain partner management:** Evaluation of the partner supply chain is one side of the coin; evaluating how your enterprise interacts (or could interact,

or even *should* interact) with suppliers and partners is another objective of management. From a business and data perspective it is clear that information services might be improved if value is identified in the supply chain that can be used in the enterprise. Once more policy will be key in order to meet goals and, in the case of suppliers, is more likely to emphasize the capability of managing contracts and SLAs.

- **Relationships**: Irrespective of the size of a customer organization or whether relationships are formal and contractual or informal, the effective management of relationships is vital if customers are to make the right choices and get the best value from their investment in information services. If there is a good relationship, a contract, once agreed, should assume the role of a reference document. However, it is important that a contract clearly defines what is to be supplied, when, how, at what price and the allocation of responsibilities.
- **Supplier relationships**: To ensure that relationships with suppliers are effective and worthwhile, an enterprise first needs to set clear objectives for these relationships which take account of the future direction and policies concerning information services as set out in their strategy. Existing 'formal' relationships with suppliers, and the internal administrative procedures that support these relationships, should be evaluated to determine how effective they actually are.[18]

  Formal relationships need to be planned, maintained and regularly reviewed if resources are to be used efficiently and effectively. Informal relationships are also important but need not be controlled to the same extent.
  Relationships in general are likely to be more effective when there are fewer contact points to maintain, hence one argument for centralizing a BIMC. Enterprises should review the number and frequency of their contacts with a view to reducing them to a minimum and ensuring that the communication paths within each organization are effective.

  Measuring the quality of a relationship between a customer and suppliers is largely subjective, but this is no surprise since relationships depend to a large extent on the skills and attitudes of the people involved to be successful. Unless the right people are given responsibility, poor relationships can result and the consequences might well be significant in terms of loss of business efficiency.
- **Supplier management:** Customers have a number of general expectations of a supplier including delivery of the required information services of the right quality, on time (and at a reasonable price), providing value for money, rather than simply the best price (of course it is possible for the best price to reflect best value for money but the one does not always go hand-in-hand with the other).

18 Too formalistic is not helping (but also not hindering) in success, but a balance in-between formal and informal helps in increasing the odds of a deal.

Other expectations include the delivery of the information services (or goods) to proceed smoothly, a clear contact point within the supplier who has the required level of authority to be able to commit to the delivery of the goods and services and, of course, no surprises.

Any issues should be raised at an early stage and any problem raised should be accompanied by one or more potential solutions wherever possible, together with a clear escalation route for resolving difficulties and, as a last resort, a clear disputes procedure.

- **Intelligent customer capability**: Practicing an intelligent customer capability enables the enterprise to achieve a common understanding between customer and service supplier(s) of service expectations and possible achievements. BIMC focuses on the tactical coordination and strategic support of all business information activities and processes. Activities are as below:
  - Use service quality monitors as a basis for demonstrating ongoing value for money and service improvements.
  - Manage ongoing change and the effect on relationships with partners and suppliers.
  - Assure consistency in the use of information services and IT, and compliance with standards and conformance with procedures, making the user community aware of how to exploit the information services to best effect.
  - Preserve suitable flexibility in service arrangements, including in contracts, in order to proactively deal with unexpected changes and demands.
  - Establish suitable baselines from which to track performance relating to service delivery and service improvement.
  - Understand and influence the factors that preserve and enhance relationships to achieve maximum business benefit.
  - Ensure that the benefits approach appraises the full investment in business information service change and is not simply a validation of the IT components.
  - Ensure that IT contingency and business continuity plans are kept up-to-date.
  - Make sure the relation does not become too formal in order to raise the odds for successful deals.
- **Technology oversight:** We have mentioned the issues of technology oversight. Technology changes faster than ever could have been imagined a few years ago; however, that does not mean your enterprise always has to go for the newest and shiniest options, you must address both risk and opportunity. Enterprises such as Uber and AirBnB were built on technology and did not have the legacy (in both technology and thinking) that constrained its use. Some would add they did not entirely think-through a number of potential (and now all too real) pitfalls. For instance: Facebook started out as a PHP-program but due to the huge amount of users they should have used C++. Since their IT-landscape was already too large to start anew, they had to engage into a conversion project and initially they worked on HipHop, a translation from PHP into C++, later on this approach has

been further refined[19]. Clearly establishing a capability to evaluate the potential of new technology will inevitably pay dividends. BIMC will not undertake this role, though it should influence decisions.

- **Standards oversight**: A management objective to enforce enterprise-wide standards cannot be driven bottom-up. The capability to oversee standards is predicated on them being in place and audited, so it is apparent that another objective within management relating to capability is empowering BIM to set and enforce standards regarding the management of data, data sources, risk, security, quality criteria and re-use.
- **Information portfolio management**: A general policy about the enterprise portfolio will be interpreted by BIM to ensure compliance and to create a policy for managing digital assets. The objectives of the portfolio will include the ability to recognize market trends, technology trends and, of course, information service needs.

In conclusion to this chapter, keep in mind that what is known as 'the intelligent customer capability' provides an expert interface between the lines of business (LoB) and suppliers. It is widely recommended in the UK that the intelligent customer capability should exist wherever outsourcing has taken place so that expertise about the business information (and business information services) is retained within the enterprise.

Therefore, the intelligent customer capability could and should be a BIM responsibility and capability. Having a helicopter view of the four aligned domains provides the opportunity to manage Capability and Mission centrally and to understand repercussions through the domain stack, whilst also managing information up and down the perspective pipelines. In Chapters 4 and 5 we discuss how the DID model and the intelligent customer guidance are fundamentally aligned through their basis in the Deming cycle of 'plan-do-check-act'. The well-researched and practiced principles of the intelligent customer can therefore be applied to BIM where appropriate.

These intelligent customer capabilities can be carried out by BIMC which, as we will see, is a combination of roles including service manager, contract/SLA manager and relationship manager (often the relationship role is part and parcel of one of the other roles). However, depending on the size and complexity of the arrangement, it is possible that multiple roles may be filled by the same individual, or covered by the same team. The role is needed because there will also be a contract manager on the supplier side. Data management is much too important to leave to third parties, as we now will discuss in Chapter 5.

19 https://developers.facebook.com/blog/post/2010/02/02/hiphop-for-php--move-fast/

Key points:

- ✔ The importance of stakeholders: Networked enterprises are based on cooperating and competing units with different interests. The relationships between these parties are characterized by simultaneous cooperation and competition.
- ✔ The stakeholder approach emphasizes the importance of investing in relationships with those who have an interest in the stability of these relationships. These stakeholders within the enterprise, or in the environment of the enterprise, have an effect on the enterprise or are affected by the objectives of the enterprise. They will try to influence your strategy and your actions to execute BIM.
- ✔ BIM is concerned with **effective** business information management.
- ✔ Setting up a BIM governance framework to manage BIM ensures value creation for the enterprise is managed. And in order to be clear about the policies needed to ensure data integrity, a BIM decision framework should be in place. It originates within the overall governance structure of an enterprise. Such a decision framework within your enterprise addresses at least four functions:
  - Managing information and data;
  - Identification of business requirements;
  - Guidance of the intelligent customer capabilities;
  - Requirements for IT.
- ✔ A BIM governance framework comprises the IS Steering Committee (ISSC) or BIM Board. The ISSC reports to the management board and is responsible for setting the enterprise information management/services strategy.
- ✔ The BIM Coordinator supports the BIM Board/ISSC, coordinates the activities of the various Executive Committees with those of the Board and acts as a guardian of the data elements of the IS strategy.
- ✔ Key to the management of resources is management of the organizational capabilities needed to ensure that there is a valued requirement for an information service and that the value resulting from the benefits of it being in place can actually be realized. In other words, the customer gets what they paid for and expected.

5. BIMC AND ENTERPRISE ENVIRONMENT

5.1 BIMC SUPPORTS THE BUSINESS

In this chapter, the various capabilities within the enterprise are translated into specific processes and areas of attention, and those responsible both within and outside the BIM coordination office (BIMC) are connected in a learning cycle (the PDCA cycle) so that BIMC can achieve its objectives. BIMC can only operate within properly defined parameters.

BIM Coordination (BIMC) is needed to support the BIM Board/ISSC and coordinates the activities of the various Executive Committees with those of the ISSC, whilst also acting as a guardian of the data elements of the IS strategy. We use the DID framework to describe, position and provide tools for the design of BIMC regarding the information assets of the enterprise. The DID framework has been set up to effectively shape BIM within an enterprise, with the aim of achieving better use of information and technology in the enterprise and therefore higher or more consistent returns. BIM is concerned with **effective** business information management. Think portfolio and program management in line with the enterprise strategy; the design of information services that meet business needs; agility, transformation and improvement of business information services; selecting the right technology and ditto technical infrastructure plus deploying the right competences at the right time. No less!

Within the enterprise, BIMC fulfills the role of the strategic and tactical professional representation of the business that coordinates the business information services to achieve desired business outcomes, ensures compliance with any related contracts and the control thereof, and controls costs where applicable.

BIMC should therefore be responsible for data demand bundling and is the delegated client. The term used is 'delegated', because someone from the Board or general management is always responsible for the supporting services and will have mandated this responsibility to BIMC.

BIMC is positioned between the customer enterprise (business) and the supplier(s), internally and externally. It is the intermediary who, as a delegated client, ensures that the client's needs (or the needs of the business) are well served by clear formulation of the needs and the translation thereof into purchased and delivered information services.

The core of BIMC is managing the organizational capability of the enterprise so that the correct specification for an information service can be drawn up; the value is actually obtained as a result of the benefits that the information service provides post implementation. The scope and nature of resources that are available internally (or that originate externally but are managed internally) are necessary to both improve and perform day-to-day activities.

With regard to digitization, the data, information and knowledge necessary for the enterprise will almost certainly arise from many sources, and a capability to manage and control the entirety is needed in order to be effective. The function of BIMC is particularly necessary where outsourcing has taken place and data is shared, so that expertise about business information (and business information services) within the enterprise is retained.

The ability to properly execute BIMC comes about through a combination of roles such as service manager, SLA manager (and or eXperience Level Agreement (XLA) Manager), contract manager, relationship manager, and customer management; often the relationship role is an essential part of one of the other roles and given the importance of data, it is recommended that it is the role of BIMC. Sometimes the combined activities of BIMC are known as 'operational management' as opposed to 'technical management'. We prefer business information management coordination on behalf of the business/line of business. But call it Elvis if that suits you.

Commodity knowledge is at the basis of a successful result. Space for the inventive and creative role and involvement of people in the mix of the various ingredients is essential here. The quality of the employee is paramount. The use of generic components is less a law and more a guideline as the office takes shape.

Several perspectives explain the tensions that arises because of the stakeholder's interest. Coordination of BIM should include management of the points below:[20]

1. BIMC people.
2. Understand size of BIMC.
3. Understand tension between supply and demand.
4. Understand business management.

20 We follow the principles of 'intelligent customer capabilities' as defined and explained in: Rouw de, L. P., & Verhoef, C., *Het Regiebureau, kernprincipes voor sturen op resultaat.* 2015, Van Haren Publishing.

5. Understand policy innovation and advisory management.
6. Understand contract management.
7. Understand performance management.

5.2 BIMC AND DOMAIN DEPENDENCIES

BIMC maintains various relationships with the various parties (both external and internal). Sometimes these are instrumental relationships, such as contracts or work agreements. Other relationships can also be identified, such as social, capability, dependency and negotiation relationships. The nature of the services that we discuss here is often secondary and generally supportive of the value chain. A characteristic of this type of work is that it is primarily a cost center for the enterprise. The choice to translate needs into a concrete range of products and services therefore mainly concerns the use and distribution of scarce resources. Consequently, the BIMC team is looking for the optimum balance between wishes and needs, and the services available in the market. But, as discussed, the wishes and needs of business, users and executive management are not necessarily the same. Users want maximum support, regardless of the costs. Business management will explicitly look at the costs in relation to the quality of service. In addition to the realization of the enterprise objectives, management or general management also has other interests in mind, such as social or political interests. This means, for example, selective cost reduction or standardization.

The service providers do, of course, seek to maximize profits. It is up to BIMC to coordinate supply and demand between these, sometimes conflicting, interests in such a way that everyone is sufficiently satisfied (this is known in business literature as 'satisficing'[21]). Steering exclusively towards cost reduction will ultimately frustrate suppliers, which makes them inclined to focus primarily on minimizing their costs. Allowing users and buyers the free choice comes at the expense of the desire for cost control and standardization. Ultimate standardization sometimes disrupts the ability to develop new markets, so that users and customers become dissatisfied. This means that BIMC must find a balance between sometimes equal and sometimes different interests. In practice, this translates into a mixed approach to relationships: on the one hand demand or customer oriented, on the other hand by acting as the guardian and conscience of the enterprise for the services that fall under its responsibility.

Different measures are specified within each DID-domain that BIMC can use to maintain and safeguard the dynamic balance.

21 Simon, HA, (1959), Theories of decision-making in economics and behavioral science, In: *American economic review*, vol. 49, issue 3 (June 1959), pp. 253-283.

5.2.1 Domain: Governance

Remember that the domain formed by the relationships between BIMC, its business/LoB and the executive board is of course Governance. The content of the activities within this domain are of a strategic nature. It concerns the policies and agreements that arise from the enterprise goals, legal frameworks and financial scope and that provide direction (advice, information or guidance) for the development of services in the longer term. Think of architecture, agreements and sourcing policy, portfolio management and policy objectives. BIMC must also be accountable and draw up annual operation plans and investment plans. The role of the team coordinator in the management office focuses on these topics; this role monitors the effectiveness and efficiency of the service.

5.2.2 Domain: Strategy

In this domain the relationships between business/LoB, management and suppliers that relate to the agreements made between functional needs and the range of products and services based on price, time and quality are maintained. This means that BIMC is aware of current (and future) data needs and has translated those into delivery agreements with suppliers. This is done with support from the Purchasing department. BIMC maintains regular contact with the decision-makers in the enterprise, through relationship managers or customer managers, to identify the needs.

Several consultation bodies can be set up for an effective process. Consider, for example, consultations between suppliers and BIMC to discuss SLAs or the quality of the service (performance management). Periodic account conversations with relationship managers are advisable between customers and BIMC, as well as setting up and organizing a separate user platform for large-scale users. Consultation between suppliers and business is also desirable here to create short lines of communication, to obtain clarity and to maintain clarity about the actual need for functionality. The contractual, financial and legal relationships regarding data should continue to go through BIMC at all times.

5.2.3 Domain: Improvement

The domain is predicated on the relationships that BIMC has with customers and users and the management, as well as the designers/builders of services (internal or external). The quality of the service is a result of the agreements that BIMC makes with business and suppliers, and the method of delivery. The Board mainly benefits from the fact that employees can perform their work optimally. Tensions can arise because users are not directly confronted with costs. That is why operational users will be more inclined to maximize their wishes and requirements. Certainly, in times of cost rationalization, the discrepancy between wishes and needs and available options will increase. This makes it all the more difficult for BIMC to influence user satisfaction more directly.

Business satisfaction can, however, be influenced in a number of different ways. In the first place, by ensuring that the service provided by suppliers is good. Secondly, BIMC can regularly manage satisfaction surveys and customer or user panels. Thirdly, it can offer training programs. Fourthly, BIMC can actively involve customers or users in pilots or innovative developments.

5.2.4 Domain: Operation

In this domain the relationships between business/LoB, suppliers and the management office that focus on the actual delivery of the services are maintained, meaning that it also concerns the actual implementation of agreed projects, (and changes) for which tenders have been issued. This also means that the products and services to be supplied are clearly identified and are recorded in a product and service overview. Service management, through use of a service desk/help desk, is the interface through which the supplier ensures that complaints and reports are channeled and resolved. Processes and procedures are to be properly documented and transparent. BIMC is kept informed through reports afterwards. Sometimes BIMC performs audits or manages them. Multiple forms of consultation monitor the operational process, for example operational consultation between business and suppliers and regular progress consultation between suppliers and BIMC.

Following these steps helps to make the responsibilities and the roles in a process concrete. BIMC will work with stakeholders to ensure appropriate consultation about major processes. Depending on the nature of the consultations, these may take place frequently. An example of the various consultations is shown in Figure 5.1.

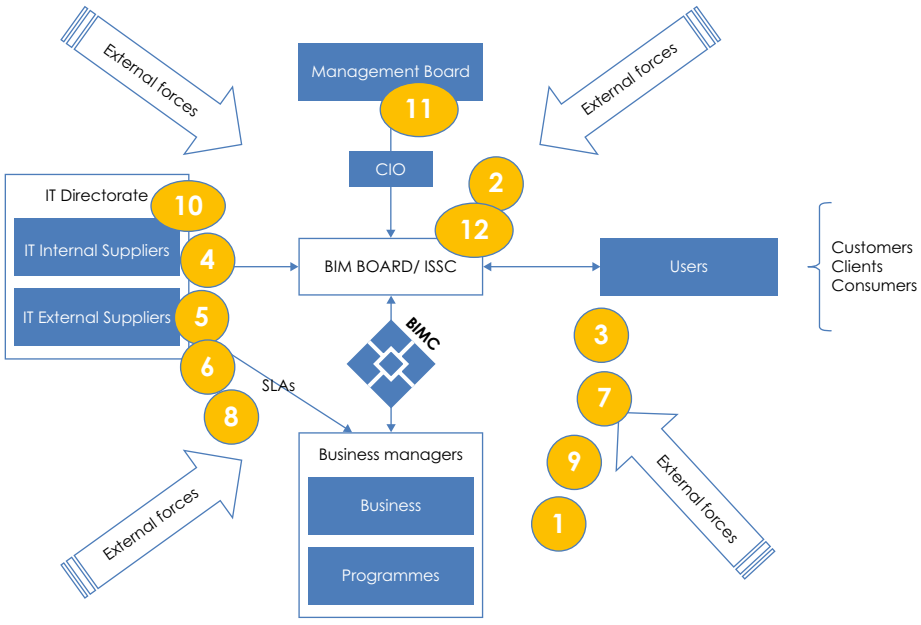


Figure 5.1 Examples of consultations between BIMC and stakeholders

- Consultation 1: Regular consultation with opinion leaders and large groups of users about the quality of current and future support will be needed. User panels can also be organized, or individual conversations can be scheduled.
- Consultation 2: Administrative consultation between BIMC and general management (with the portfolio holder from the general management or owner) on the basis of annual plans, developments, etc., for example three times a year.
- Consultation 3: Management and control of technical/functional services between BIMC and business, sometimes with the management of the most important service providers. Consultation on substantive developments and the consequences for the enterprise, for example twice a year.
- Consultation 4: Management and control of the financial agreements between suppliers and BIMC, for example once a year.
- Consultation 5: Management and control of supplier performance. Consultation between suppliers and BIMC about performance management (reports and such), for example once a month.
- Consultation 6: Management and control of proposals, RFCs and handling. Consultation between the account management of suppliers and BIMC about current user questions: once a week.
- Consultation 7: Control and management (including planning) of the functional requirement. Consultation between user management, BIMC and individual users. Topics covered include service level agreements, plans, needs, reports, etc., for example, four times a year.
- Consultation 8: Management and development of agreements with suppliers. Consultation, coordination and adjustment on the content of the concluded service level agreements, for example twice a year.
- Consultation 9: Management and control of the project portfolio. Consultation about the projects, their progress and coordination, for example once a month. In the event of an escalation, a consultation line is followed: service management, user management, business management, executive management.
- Consultation 10: Service management. Operational consultation between business/users and suppliers about the services that have been agreed within the service agreements/service level agreements, for example once a year.
- Consultation 11: Various consultations with management, experts, BIMC about architecture and strategy.
- Consultation 12: Governance and strategic development. Strategic consultation on the content of the development and management, for example six times a year.

The nature of the aforementioned relationships can be informative, guiding or advising, depending on the purpose, the people involved and the mandate. The choices for the types of consultation, nature and frequency are determined by the needs in the enterprise. These are usually related to the size of the enterprise and the complexity of the topics that BIMC is concerned with. Keep in mind also that

whilst the list may appear long and dull to the point of boredom, the likelihood is that although these discussions are carried out many may not be recorded or formalized.

The way in which the mutual relationships (consultation structures), communication and accountability between service provider, users, business/LoB and general management and BIMC are organized, can be laid down in a governance or control document. Although all four domains must be completed for proper operation, we regularly see that the focus is often on demand bundling and delivery (Strategy and Operation) while the customer environment attaches the most value to governance and quality (Governance and Improvement). For BIMC to be able to mature, we cannot emphasize often enough that the management of BIMC must center on data availability, management, processing and integrity, but must nevertheless also focus on agreements with general management, business/LoB and on user satisfaction.

The BIMC team should also initially arrange critical consultations covering, for example, the periodic governance consultation, the periodic contract/SLA/XLA consultation and the service consultation.

5.3 BIMC AND CUSTOMERS

Regardless of the sector, branch, government or non-government, if you offer services or a product then it is essential that you know and understand your customers. The relationship with the customer is an essential part of the demand-side of BIMC[22]. BIMC's right to exist is partly determined by an understanding of this relationship and how the customer perceives the experience of using services or products. This means both maintaining relationships within the environment and possessing an ability to expertly translate the customer's need into a product and/or service to be purchased or built. These are the tasks of customer management and policy, innovation and advice management within BIMC. From the practitioner perspective, these are the most important.

5.3.1 Insight into the needs, behavior and motivation of the user

Motivation is the capability in people that drives them to take action. This capability comes from a tension that arises as a result of unmet needs. People consciously and unconsciously strive to continuously reduce this tension by selecting objectives and by displaying behavior that is aimed at achieving these objectives. The objectives that people want to achieve depend on:

22 In the case of BIMC it concerns internal customers or users, depending what they are called within your enterprise.

- Their personality;
- Expectations and perceptions;
- Previous experiences;
- Attitude.

Needs and objectives depend on each other. The one does not exist without the other. Needs and objectives change and grow depending on the physical condition, environment, interaction with others and experiences. As customers achieve their goals, they develop new needs. If they do not achieve their goals, they will continue to strive to achieve the old goals or they will replace these goals with other goals.

Goals are at the basis of people's motivation. Especially Ronaldo's. A goal is often subjective: it defines what an acceptable level of performance is for an individual. A goal is simply defined as what an individual wants to consciously pursue. People want to achieve objectives instead of maintaining a 'status quo'. Motivation of people is made plausible by the 'goal setting' theory of Locke and Latham (2013)[23]. This theory emphasizes the positive relationship between goal setting and performance. Their research shows that there is a linear relationship between the degree of difficulty of the goal and the performance. Naturally, a goal and the achievement to be achieved (and therefore the motivation) is influenced by many factors. Think of the knowledge, skills and personality, feedback on performance, involvement in the goals, task complexity, available resources and limitations imposed by the environment. Insight into the goals of customers and the possibility of achieving them gives the management office an understanding of the nature of support required.

5.3.2 Creating insight into the products and services package

To create optimal insight into the products and services package that BIMC may seek, at least three criteria are important.

1. Classification of data products and services (to the extent that they are centrally funded).
2. Classification of data products and services (according to the extent to which they are used throughout the enterprise or are department-specific).
3. Classification of data products and services according to the extent to which the associated operational costs can be standardized.

There is, of course, a connection between these criteria, as is apparent from their description.

23 Locke, E.A., Lathan, G.P. (Editors), (2013), *New Developments in goal setting and task performance*, Routledge.

Criterion 1: Financed centrally
With the first criterion, a classification of products and services is made according to the extent to which they are financed centrally and are therefore actually purchased centrally for all employees in the enterprise. One of the members of the Board often owns the operational management portfolio. *De facto,* this Board member is the client for BIMC of the data products and services that fall under the generic basic package. This also means that these so-called basic products and services cannot be influenced by the employees in the enterprise in terms of nature, volume and price.

Criterion 2: Global, regional and local
Over time, enterprises have been confronted with a plethora of data solutions that are difficult to control and/or coordinate. The costs are correspondingly high. Cost is the reason why action is taken and an attempt is made to create broad basic data management applications and services that are suitable for everyone within the enterprise. This has led to a general subdivision of the products and services packages between global (available for everyone), regional (available for a select group) and local (available for one department or person). How is data classified in your enterprise?

Criterion 3: Degree of standardization
The third criterion relates to the degree of standardization. The management office strives to standardize as many of the supplied products and services as possible. This naturally has major advantages, not only in terms of costs but also in terms of the time that the management office has to spend on user questions, provided that the products/services are of sufficient quality. BIMC distinguishes between standard customer requests and questions, and non-standard user questions. The idea behind standard user requests is that they can be made without intervention from BIMC. This will be possible because BIMC will make prior agreements with business/LoB and suppliers.

5.3.3 Segmenting and filling in the environment

Why should you have to segment the products and services differently after they have already been classified according to the three criteria described above? Depending on the purpose, a segmentation principle is chosen. From the supply-side, the previous segmentation along the line of financing and standardization helps to realize cost benefits and to create simplicity in the total service portfolio. From the demand perspective, it helps to look more closely at the nature and character of the customers. BIMC cannot, of course, talk to anyone and retrieve information from everyone. Consequently, BIMC would do well to divide its stakeholders into different groups so that it can optimally respond to the diversity in the enterprise.

From the perspective of BIMC, segmentation can be undertaken into different groups based on user characteristics. In the first instance, BIMC segments according to the four previously recognized main groups: business/LoB management, executive management, users and suppliers. A further subdivision can then be made within each of these main groups (business or user profiles). This subdivision depends on the specific enterprise. For example, in a hospital, specialists will be seen as a separate group, whilst in an international enterprise this might be the expats or the foreign offices. Priorities might be assigned based on (capability) position and status. The line between formal agreements (blueprint) and informal reality (red print) is thin but exists, and BIMC is wise not only to be aware of this but to act accordingly.

Innovation and renewal can also be a good reason to create space and not to opt for an all too dogmatic approach. Innovation and renewal tend to manifest themselves in places unexpectedly. This also leads to a shift in the classification of 'global, regional and local' in the long term. Space for new initiatives leads to a signal effect and can result in innovations being picked up quickly and spread more widely throughout the enterprise. In this way local developments can lead to global services.

Case study: It's better to have and don't need than need and don't have
Don Covay (look on YouTube) sang this after reading DID. Well, technically that is a lie, but it is at least an attention-grabbing start. This case study concerns knowing and understanding what you need rather than simply wanting something because it is fashionable or shiny and new or you can get a nice badge. The Stones also read DID and wrote *You can't always get what you want, but if you try sometimes, you get what you need. . .* possibly.

Failings in defining need
OK they didn't but, a large government department was in the process of contracting for a modern technology platform as part of a major business transformation. The platform was intended to open up new opportunities to manage data and improve flexibility when adding new or improved applications/functionalities such as business analytics and data information messaging. The new solution would be totally different from the legacy situation. Key to acceptance was that a platform would be implemented, instead of different, loosely coupled independent information systems that would drive a totally new approach in business working processes.

It soon became clear (in the pre-contracting period) that lack of experience in defining project acceptance criteria and a practical acceptance process for IT-driven business information services was going to be a problem.

This was primarily caused by business leaders not having sufficient insight into what they really needed; they were focusing primarily on what they believed they wanted based largely on the functionality they already had. As a consequence, the contract was not well-defined. And even worse, users had little idea of what they would be receiving in terms of services, changes to processes or training plans. During the course of the project it had also become clear that the supplier did not have enough knowledge of the core business of the department, while users did not really understand how the new platform needed to be configured.

The consequences

Failing to properly define acceptance criteria was bad enough; failing to understand what was really needed made matters worse, including:

- ✔ Not enough involvement of key users and local BIMC;
- ✔ Users feeling not part of the change;
- ✔ No understanding of what information would be needed as inputs or what information would be delivered;
- ✔ Poor communication between LoB management and the teams responsible for renewal/future of the services;
- ✔ Not enough communication with users;
- ✔ No change management program within the LoB;
- ✔ Insufficient control defined in the acceptance and 'go/no-go' criteria.

The existence of the overall program and the projects involved, and the success of the business transformation were all endangered. After thorough investigation by central BIMC, it was agreed that they needed to intervene to correct matters.

BIMC impact

The BIMC team proposed a course of action where it was necessary, first, to get everybody together on the same track, making clear what was going to be designed and delivered, what the consequences were going to be for the business and how to prepare for the new situation. Secondly, together with the IT department and the supplier, changes were made to plans in order to create a more buzzword-compliant 'agile' configuration. What 'agile' really meant was that the original design was not sufficiently flexible and needed to be changed to reflect the actual business need. These changes had consequences for contract agreements but the advantages far outweighed any extra costs.

At first the Senior Responsible Owner (SRO) was reluctant to approve the proposals as she could not see why this was necessary. In her view the contract was clear; thus, deliver what was specified in the contract. Also, there was a widespread belief that by doing this, it would reignite the discussion about why there needed to be new business information systems anyway.

In the past there was widespread resistance to proposed changes and it was feared that any discussions would result in such resistance resurfacing. Unfortunately, the uneducated proved once more that it is not possible to overestimate the innate stupidity of people when presented with simplistic solutions and only chaos can be guaranteed.

So, the steering committee, principally the senior buyer who was director of the LoB and the senior supplier (the director of the IT department) convinced the Senior Responsible Owner (SRO) that it was necessary to make changes in order to mitigate risks that the overall program would be shelved.

Central BIMC together with local BIMC, IT experts, a representative group of business management and of course potential users, along with the supplier, used an approach based on Collaborative Business Service Design (CBSD)[24] to create a plan of action where:

- ✔ Detailed Terms of Reference were documented and used to inform all stakeholders about the added-value of the new platform and to furnish explanations of the capabilities of the new platform in relation to both the 'as-is' situation and the anticipated consequences for the users;
- ✔ An explicit, outcome-focused overview, of services and subservices was provided, together with an impact assessment on the work processes;
- ✔ The scope of the project was adapted to focus on the required outcomes;
- ✔ A communication strategy and plan was circulated, focused on the common denominators which lead to an understanding between the different parties;
- ✔ Explicit demonstrations and descriptions explained the impact of the transformation and the associated training needs, and defined a change program outline for the business;
- ✔ The acceptance process was fully defined, including a process for short-cyclic development and configuration of functionality which would inform the acceptance criteria;
- ✔ A general agreement between management and the supplier was documented to make sure that changes in the way of working would not conflict with the contract; where problems did arise, these would immediately be identified and brought to the steering committee to validate and discuss.

The overall program and most of the project outcomes were able to be salvaged and, ultimately, it was possible to implement the new solution, although time and budget estimates were exceeded, in some cases significantly. After a full post-mortem of what went wrong, central BIMC handed over operational control to local BIMC to monitor and manage.

24 Johnson, B. and L.P. de Rouw, *Collaborative Business Design; Improving and innovating the design of IT-driven business services*, Cambridgeshire, 2017

5.4 BIMC AND ENTERPRISE POLICY AND INNOVATION

In general, users do not think in terms of concrete products and services, but in terms of needs or solutions combined with a variety of technical solutions that they know from their personal environment. This means that a match must be made with the available products and services within the enterprise. If a product or service is not offered in the current service catalogue, a solution must be sought from outside the existing range. This match is limited by the available resources and the policy principles that the enterprise uses. If the demand is new and falls outside the existing provisions (and therefore the budget), BIMC will look for solutions. This may require investment.

Making the match means that the user demand is disconnected from the actual management of the delivery process through BIMC. Decoupling customer demand and delivery process is a well-known phenomenon in logistics. Through this disconnection, BIMC takes over the issue. BIMC translates the question into the necessary activities to be performed, the associated resources (in terms of number and hours), and the required security levels: BIMC takes over the concerns of the business and user.

User management will translate questions from users in the business into activities. In this way, user management decouples business demand. At that time, substantive activities are required and the emphasis shifts to policy, innovation and advisory management. The knowledge to make the right decisions with regards to every customer demand comes from the 'policy, innovation and advice' area of focus. This focus area should, preferably, invest the activities within existing agreements. This means that BIMC must have insight into the content and added value of these activities, as well as the most important aspects that contribute to the activities being carried out correctly.

Requests that come in through user management have consequences for the content of the service. This includes requests such as *"I want a new application", "I want a new service" or "I want new functionality*". Questions that BIMC is subsequently confronted with include: how do we assess the technological impact and how do we assess the consequences for the totality of service provision? This certainly applies if several service providers are involved. What developments are there in the market and how does this question (and any suggested solution) fit in? And, importantly: will the new products or services disturb the cohesion of the enterprise data policies?

Regardless of the tasks that are performed, policy, innovation and advisory (PIA) has three functions. In the first place, there is management of the (technical)

environment that has been outsourced and that must seamlessly connect with the rest of the enterprise. Secondly, there is an advisory task, such as providing substantive information and advice to stakeholders about technical possibilities, or about policy frameworks or proposals for policy frameworks, and offering a substantive solution for customers in the existing infrastructure. Thirdly, there is the innovation function. If it appears that no solutions are possible within the existing frameworks, then consideration needs to be given as to whether it is useful or feasible to look for, and implement, new developments.

5.5 BIMC AND CONTRACT MANAGEMENT

Contract management aims to organize the supply, delivery and management of the requested generic services, for both internal and external service providers, in such a way that the objectives are met.

The interpretation of contract management is, more so than the other focus area within BIMC, a group effort in which different experts make their contribution in the different phases of the process, from the requirement statement through to contract negotiation and performance management.
That is why almost always purchasing or tendering teams are put together with specific expertise in tendering and procurement processes. Expertise that is generally required includes:

- Buyer: the buyer knows the market, prices and procedures;
- Lawyer: the lawyer knows the legal frameworks and the formal handling of contracts;
- Economist: the economist makes financial capacity analyses, conducts market surveys and/or market research, and draws up economic price models in order to be able to tender according to the applicable award criteria;
- Subject matter experts: ensure a series of SMART-formulated questions;
- Service level (and/or experience level) manager: monitors the performance of the delivery.

Added to the above is the specific expertise needed to ensure that the business needs regarding information will be met and it becomes clear that an intelligent agency should focus on all aspects of business needs in the enterprise to ensure consistency and assist with levels of digitization. These experts can be present in different positions within the enterprise, or they can be hired. Different phases are distinguished within contract management. These phases are:

- Needs assessment, supporting demand articulation;
- Requesting parties through an RFI (Request for Information), RFP (Request for Procurement), and/or market consultation;
- Award phase;

- Management of the contract;
- The further design and realization of demand;
- Putting the result into service.

Formally, contract management enters halfway through when functional demand needs to be translated into a supply-side solution, but in practice it is more sensible if contract management is involved in demand articulation from day one. Once an initial selection has been made, the negotiation process begins. The business has a different interest compared with the supplier. The business focuses on outcome and looks to solve a problem at acceptable (preferably minimal) costs with as little hassle as possible. This interest is not always compatible with the aims of the supplier. In the long term, the supplier must earn money to safeguard its own continuity.

5.6 BIMC AND MANAGEMENT CONTROL

5.6.1 Measuring is knowing

A good contract is only the beginning of the relationship with the supplier. Proper, active management of contracts (and therefore monitoring of performance) offers many opportunities for BIMC. Active management relates to three themes that we address by answering two following questions. Does what is delivered actually match the agreements made? Does the offer still match the current needs and demands of the internal enterprise? The challenges of management control within BIMC are obvious. Management takes place by comparing the delivered performance with the agreed performance. In the analysis, BIMC connects all measurement results with each other with the aim of improving the total process. Do I get what I asked for according to the agreements made and are contracts being used optimally? Where necessary, this leads to submitting an order for (additional) management to the supplier. The following activities are included within control management:

- Control and measurement: Monitoring the quality of service. This includes measuring, analyzing, evaluating and improving the results (quality, costs, satisfaction) of services and managing the service catalogue.
- Control: Monitoring and checking the efficiency and legitimacy of the services provided.
- Financial control: Monitoring the entire budget (services, purchasing, management and governance). Preparing the financial analyses and coordinating payments to the supplier with the financial administration. Promoting transparency in costs.

The conclusions of these analyses should be reflected in improvements in the contract or SLAs, thus improving the way that the specifying of requirements for specific solutions are developed, or providing suggestions for improvements to the overall process and product and services.

Not everything can ultimately be provided analytically. For example, the scope for future expectations of users requires attention. Even though the contracts concluded are legally sound and the process went perfectly, if the service is not in line with the wishes of the business, this can lead to dissatisfaction which is annoying for both the provider and BIMC. Long-term contracts must, therefore, offer sufficient room to move with the dynamics of enterprises. This will be easier for market parties than for procurement law enterprises.

Operational compliance
In order to make management control and financial control possible, the service must be operationalized at the point at which the relationship with the supplier is completed. Performance management and quality and risk management close the Deming circle and enable things to proceed to a new cycle. Management monitors whether the specifications of the needs are, and remain, measurable. Only then can you properly address whether everyone complies with the agreements that have been made or can adhere to them. Sometimes the customer asks questions that are impossible to answer. They ask for the cheapest solution, but also want top quality. The supplier needs to explain that quality has a price and when specifying a higher level of quality this should be reflected in a realistic price estimate.

It is up to the business and therefore to BIMC to be aware that, for the right considerations, specific requirements must be set for the design method and the request. The needs that are set must also be operationalized. BIMC ensures that suppliers are professional and help customers by offering high-quality solutions at acceptable costs. This is not always easy in environments where procurement rules prevail.

5.6.2 Quality and risk management

Risk management is associated with quality. It focuses primarily on unpredictable events that may result in part of an enterprise's primary process being seriously affected, which is not easy. Risk management forces the BIMC to explicitly take probability into account. A well-known example is the switch box of a telephone provider that caught fire, causing a large part of the mobile telephone traffic in a part of the country to be disrupted. At the time, insufficient action had been taken to quickly switch to an emergency facility, exposing a failure in defining business continuity management measures; chances were small but also a very low chance with ultra-high impact should have been on the radar before the disaster. In actual fact, an environmental analysis was insufficiently carried out to identify such single points of failure. A failure analysis (FMECA Failure Mode Effect & Criticality Analysis) would undoubtedly have exposed this issue. Depending on certain factors, it took from a few hours to a few days before the mobile telephone traffic became operational again.

The structured management and coordination of activities and processes, whilst also making a contribution to the supervision of the quality of the services to be delivered, is also a responsibility of performance management.

The purpose of the quality measures is to gain insight into the nature and behavior of the results of the services and to reduce the variation in them successively. The goal is, of course, to have control over the quality of the service and to have information available in order to be able to manage effectively. When these measures are properly applied, they also provide insight into the relationship between costs and quality.

The types of data that become available also help with risk management. Think about what can go wrong with the service and what events can cause what types of damage. Examples of risks are: supply risks, HR risks (mandates, knowledge), financial risks, geopolitical developments (threats, terrorists), a loss of productivity in the enterprise because employees fear the loss of their jobs, discontinuity of the (primary) process, supplier reliability, risks in the transition process, loss of knowledge.

To recognize these risks, it is wise to think about them beforehand. Incidents can be life-threatening, but it is a different matter if the supplier's services can directly lead to life-threatening situations. An example: it is not the case that software is error-free. Software errors in healthcare, for example, can have disastrous consequences if data about blood values are incorrectly linked. This requires scenarios with associated measures that help to prevent or limit damage[25].

It is wise not to choose the most obvious key performance indicators (KPIs) such as availability and response time too quickly. Think also about KPIs that are less obvious, such as the extent to which a supplier keeps quality manuals up-to-date or, for example, the periodic testing for reliability or the available security levels of data centers. Critical success factors (CSF) and performance indicators help to monitor and compare the purchasing relationship with norms and standards. These norms and standards are based on our own measurements and experiences, benchmarks and (scientific) research.

The foregoing discussions are not abstract; they are directly applicable to a BIM practitioner working strategically. A case study in Chapter 10 illustrates how much of the strategic guidance and practical tips were used to kick-start BIM in a large, data-dependent industrial enterprise. But before that, in the next chapters we will cover how to take these design issues forward in more detail by exploring some specific activities in BIMC.

25 Nancy Levenson gives an account of that in her paper discussing the infamous Therac-25 incident 30 years later (Leveson, N. G. (2017). The therac-25: 30 years later. *Computer*, 50(11), 8-11).

Key points:
BIM Coordination (BIMC) is needed to support the BIM Board/ISSC and coordinate the activities of the various Executive Committees with those of the ISSC, whilst also acting as guardian of the data elements of the IS strategy.

The core of BIMC is managing the organizational capability of the enterprise so that the correct specification for an information service can be drawn up.

BIMC maintains various relationships with the various parties (both external and internal).

It is up to BIMC to coordinate supply and demand between these, sometimes conflicting, interests in such a way that everyone is content.

The relationship with the customer or user is an essential part of the demand-side of BIMC. Regardless of the sector, branch, government or non-government: if you offer services or products, then it is essential you know and understand your customers.

6. BIM COORDINATION

6.1 ORGANIZING BIMC

As discussed in the previous chapters, there are different ways to design and position intelligent customer capabilities within BIMC and every enterprise will have its own interpretation. However, the objective and the resulting tasks are comparable for every enterprise. The approach we will describe in this chapter concerns structural insights into how to deal with customers and suppliers, how you measure performance and how you can handle such a process from a budgetary perspective. We will also cover essential operational, day-to-day processes. You must be able to:

- Make agreements with your business users;
- Translate the work into a standardized approach where practical, and negotiate with service providers;
- Always check on performance.

Further, you should be able to translate these structural solutions into standard working methods, procedures, and standard processes that are repeatable in various situations. This approach explains why we can identify components for BIMC as building blocks, or ingredients, that can be used in every situation to shape the structure (think DNA). The way in which ingredients are combined determines what the management function looks like within the enterprise.

Our starting point regarding BIM is therefore that BIMC operational management may be different for each enterprise, but that the ingredients which every enterprise can choose from are comparable. However, be aware that the set-up of BIMC depends on the strategy that the enterprise wants to follow with regard to digitization and/or the data and information needed by the enterprise and the information services provided, and to be provided.

We should state once more that there are **no new (or fancy) theories about management or coordination** in this book; the emphasis is on a practical approach that examines the various, existing best practices of the intelligent customer,

together with well-respected guidance about program and project management, infrastructure management and the coherence between these ingredients within the framework of DID.

DID focuses very much on continuous improvement. BIMC fulfils a bridging function between the demand from the enterprise and the supply from the service providers. BIMC takes over the information needs of the business/LoB and translates this into SMART[26] formulated assignments for information/data suppliers. BIM needs are translated in such a way that they fit the enterprise-wide agreements on standardization, quality and price. BIMC then monitors the level and volume of the services. In this way the function can assist the Board in the creation of policies that can provide strategic guidance; where the processes are placed in context of the DID model, BIMC provides strategic guidance with regard to digitization generally and BIM.

To clarify the tasks and logical steps within BIMC and to illustrate continuous improvement over time, we fall back on the evergreen of quality management tools, namely Deming's Plan-Do-Check-Act cycle (PDCA cycle). See Figure 6.1.

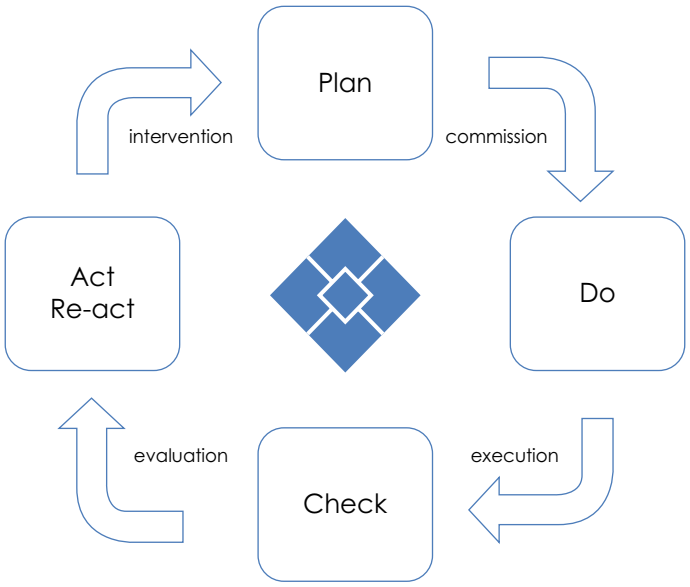


Figure 6.1 Deming cycle, the intelligent customer and DID

The necessary BIMC capabilities, extrapolated from the intelligent customer guidance, are linked to one another in a quality cycle in the form of the Plan-Do-Check-Act (PDCA) cycle. The DID domains (Governance, Strategy, Improvement and Operation) are directly related to PDCA and thus the three best practices are

26 Specific, Measurable, Acceptable (or Achievable), Result-oriented (or Relevant) and Time-bound.

linked. Using the Deming cycle, we demonstrate that the development towards a mature BIMC goes through cycles of quality improvement. BIMC focuses on results. Every time a cycle is completed, BIMC strives for an even better and more effective result. This touches on the essence of the PDCA cycle. Based on this, in Figure 6.1, we can illustrate the management activities of BIMC that are interconnected through processes. The main processes of BIMC are integrated with the entirety of the enterprise.

Each main step from the Deming cycle contains a cluster of responsibilities. These responsibilities relate to BIM responsibilities in the four DID perspectives Business, Service, Data/Information and Technology, and would be the responsibility of BIMC. The various responsibilities are the substantive tasks of BIMC and therefore the business information activities can be related to the best practice intelligent customer responsibilities. These four responsibilities are:

- Policy, innovation and advice (PIA) management (Plan, mostly Governance in the DID model);
- Contract management (Do, mostly Strategy in the DID model);
- Control management (Check, mostly Improvement in the DID model);
- User management (Act, clearly the Operational focus of the DID model).

The practitioner needs to be fully aware of operational issues. Keep in mind that **each** of the stages of PDCA will require you to think strategically, tactically and operationally because, for example, a decision regarding a legal issue leading to a change in data policy will strategically impact many information services and may alter plans to improve services. This sort of decision has tactical implications regarding, for example, the testing of new information services and unless someone is aware of the possible operational implications, users might encounter unexpected problems. Operations will inevitably be focused on and cover all triggered incidents, requests and changes. Even here there will be elements of strategy and tactics since some triggers will cause developments or improvements that will impact the overall strategy for BIM and may be a trigger for policy changes.

The use of the PDCA cycle is a practical way to complete the tasks of BIMC. We also observe similar management functions emerging within facility services, human resources and increasingly in other disciplines. The division into these four main groups is easily applicable to all disciplines. It is also important to determine that professional terms from a specific domain do not stand in the way of the nature of a BIMC practice, hence the choice of Deming's terminology. In other words, just make sure everyone knows what the responsibilities are that relate to the nomenclature.

In practice, any BIMC should ultimately function so well that all processes run smoothly. If you assessed all tasks in detail, you could say that each area of responsibility contributes to every process. In practice, however, it will appear that,

depending on the need, several formal or informal consultation events will be required between the employees of the individual business areas to ensure that the processes run as effectively and efficiently as possible.

Case study; Re-implementing a legacy system and 'Technology Watch'[27]

Why watch technology?
Isn't that rather like watching paint dry? Software systems are embedded in a technical environment comprising hardware, middleware and software. That environment is constantly changing. It often seems the hardware elements are replaced as fashion dictates, for instance the mainframe is replaced by a network of distributed PCs. Later the PC network is replaced by a cloud server, which in essence goes back to square one, namely a mainframe but now called an enterprise server, while the green screen terminals are replaced by much more expensive PCs with browsers.

Some software elements, e.g., the data management system, a data communication framework or a particular programming language are no longer supported. Or support from certain software providers is terminated, maybe because they terminate this line of business. Without support the user cannot go on using their products, unless others take over. On top of that, the existing technology may no longer be fashionable so that users are unable to recruit new personnel. Users are sometimes forced by industry to replace or update their products periodically. As with many other lines of business, the consumers of software are driven by the producers.

The question is often asked, '*Why should users want to renovate their old legacy environment?*' Largely, the answer is because changing the environment is not always desirable due to high risks and often high investments. It is not *just* a question of money. The existing software may contain special features which have matured over the years and no one in IT would dream of 'sunsetting' them because of the special needs of users or features that are difficult to reproduce. As liaison with the enterprise on this subject, BIMC needs to assess the impact, the risks concerning business continuity and the raising of service costs. And BIMC needs to escalate matters to the Board when disruption is a real possibility.

An example from the automotive industry
In this particular case, that of an automobile leasing system, the functionality of the legacy business is dependent on maintenance and sustainability and, of course, quality. As a nod to the future, the business architect and business

27 For more information about Re-implementation see also Sneed, H., Verhoef, C. (2019), Re-implementing a legacy system. *Journal of Systems and Software*, 155, 162-184.

information consultant, together with the technical architect and application manager were asked to come up with an acceptable solution to upgrading the technology. The system was originally implemented in the late 1970s, and regular software upgrades had allowed the software to reach a high degree of maturity, often matching modern requirements.

So: what to do? There are several ways that the IT professional can change existing software e.g. converting, re-implementing, re-developing, 'wrapping' existing software behind one or more access interfaces, or replacing it with a shiny, new existing standard system. And 99 times out of 100, maybe more, the business neither knows nor cares what 'wrapping', or re-implementing, or whatever even means. BIMC needs to both understand and care.

Any choice has advantages and disadvantages that need to be analyzed. If conversion is not feasible, wrapping is not desired, redevelopment is not affordable, and replacement is out of the question - that leaves re-implementation as a compromise solution between conversion and re-development. In fact, it becomes the solution by default since it is always possible and it can be done with a reduced effort and at low risk.

On the basis of earlier experiences and the underlying business case, the BIMC team in this case study selected re-implementation. Re-implementation meant rewriting the original code in another language and/or platform based on a re-documentation of that code. This distinguishes it from a conversion where the code is translated statement by statement to the target language. Re-implementation requires human judgement. Re-implementation can only be partially automated. Human thought is required to reconstruct the target code. Re-implementation is considered in two steps: first a model of an existing program is abstracted from the code and existing documentation. In the second step that model is implemented in the same or another language.

The result is a different solution to the same problem. In this case study other approaches had previously failed and although the re-implementation project is not finished yet, already useful results are being produced. And without BIMC to assist, the business users would have been marooned without advice from a trusted resource.

6.2 STRATEGIC AND TACTICAL TASKS WITHIN BIMC

As explained in Chapter 4 and described in the intelligent customer guidance, we can distinguish four areas of responsibilities where tasks for BIMC can be identified:

- Policy, innovation and advisory (PIA) management;
- Contract management;
- Management control;
- User management.

In the next four sub-sections the corresponding tasks and activities are explained in detail. Of course, it will depend on your enterprise which tasks and activities are most important. Keep in mind that BIMC does not always carry out **all** of the above activities and most often is responsible only for the tactical level activities. Day-to-day support is often delegated to a service desk.

6.2.1 Tasks within policy, innovation and advisory management (PIA)

The added value of BIMC is most often to be found in the substantive knowledge and expertise that it has of its own enterprise and the data needs of the enterprise, together with oversight of the professional disciplines that impact BIM for which it is responsible; these include IT, database processing, data/information security, enterprise/business architecture, the program/project portfolio and perhaps peripheral issues that might have some BIM impact such as facilities and housing services and the environment, physical security, and in-house emergency services.

This group of tasks guarantees and develops the strategic and substantive connection between environment, customer, user and supplier. BIMC advises management (policy and coordination) about this and monitors the content and implementation of projects and programs. There are, therefore, three broad task areas:

- Strategy formulation;
- Translating needs into functionality;
- Monitoring and determining the enterprise structure.

1. Strategy formulation

With strategy, we strive for the continuation of the primary business objectives. The mission and goals of the enterprise are dictated by the political developments, market, user groups, possibilities of technology, *etc.* The strategy relating to operational management support is the achievement of the mission and objectives of operational management. Working with operations will often necessitate the need for new agreements, and deviations might be required with regard to frameworks and policy.

The advisory role includes consulting with executive management about market developments. An example is the standardized design of the physical environment in such a way that the workplace fits in well with the individual wishes of the users. Advice might also be required about investment in new information systems, renovations, legacy technology, reuse and the vexed question of knowledge sharing.

2. Translate from need to functionality
To translate business demand into service provision, while also fulfilling the mission of the enterprise, the requested solutions should fit into a larger whole in which coherence is coordinated. The domain therefore provides a common language between enterprise, information and infrastructure. The requirement is determined within user management.

Effective coordination must take place with the implementing party. Desired changes that may have consequences for the implementing party will have to be coordinated at the architectural level at an early stage. Each time, a trade-off is made between flexibility and manageability by drawing up standards to achieve the desired quality at optimum cost. This ensures that future developments continue to fit within a whole (no islands of automation or knowledge). To achieve this, it is necessary that the management of the enterprise ensures that all departments work within the architecture.

3. Monitoring and determining the enterprise structure
It is necessary to ensure a consistent set of principles and models that provides coordination of the design and implementation of the processes, the enterprise structure and the provision of information. Monitoring the technical infrastructure for the customer is also a key process.
Technical services integration covers monitoring and guaranteeing the coherence of the supplier-transcending production processes and the infrastructure, including ensuring that there are good agreements regarding the functionalities of the total production chain.

Service integration (activity) integrates the different subsystems into one coherent whole, such that the different subsystems communicate smoothly and effectively with each other. From the perspective of the user and customer, the work environment functions as a whole, in look and feel, and in operation. It is important within the joint offering of services that individual components for IT services are integrated and offered as a whole within an enterprise. Services integration has two aspects:
1. Technical integration, regulated by BIMC through contributions to management policy, innovations and controls through assessing changes in business outcomes, information needs or services or innovation of services for compatibility with the portfolio.
2. The architecture/blueprint of the business operations.

In addition, there is a business, information/data, service and technical perspective of service integration. This responsibility lies largely with contract management. The actual integration will usually lie with the service provider and BIMC will ensure that the integration also takes place. The activities for policy, innovation and advisory activities of the function are summarized in Table 6.1.

Table 6 .1 Policy, innovation and advisory tasks

Strategy formation	• Strategic policy making and frameworks. • Translate business strategy. • Adaptive response to changing environment or business operations. • Outsourcing strategy. • Market exploration.
Translate from need to functionality	• Translate business demand into products and services. • Advising business operations. • Development of new products and services. • Release calendar and priorities. • Feasibility tests. • Supply technical and functional programs of requirements for purchasing and suppliers.
Monitor and determine the enterprise structure	• Determine and maintain the architecture/blueprint. • Monitor overview and coherence for all services. • Assess the impact on these services in the event of changes. • Manage and establish basic functionality. • Coherence of portfolio and architecture/blueprint with services and products suppliers (technical services integration).

6.2.2 Tasks within contract management

For completeness of understanding, we will provide further details about the responsibility of contract management; this focuses on making agreements upon the desired services with either internal or external parties, in a contract, to actively and unequivocally record, manage and monitor all term agreements, as well as to provide the agreed services. The aim is to be able to control the risks that arise because agreements are made with external parties, to monitor and optimize costs, and to ensure the services are delivered effectively and efficiently. However, the contract cannot be an end in itself, rather it is a derivative and forms the basis for the intended relationships between customer and supplier.

In general, the focus area of contract management pursues a number of things:

- For concluding contracts: translating internal needs into market supply, market exploration (identifying suitable suppliers), obtaining the most favorable agreements and reducing uncertainties about future performance.
- For the execution of contracts: providing insight into and maintaining the contracts, and ensuring that the appropriate level of performance is delivered with the right quality, at the right time and in the right place.
- For extending or terminating contracts: at a time that is most favorable to the enterprise.

Contract management therefore undertakes the following activities:

- The delivery of services and products (supply-side);
- Contract and supplier management;
- Market and client and contracting.

1. The delivery of services and products (supply-side)
Contract management offers support in determining business needs and translating them into a program of requirements. Subsequently, contract management – in collaboration with the Purchasing department, takes care of the conclusion of the contract and the contractual agreements on the performance to be delivered (specify, select and contract), as well as on any changes to the existing agreements. In addition, contract management assesses the contracts at the conclusion and periodically during the contract period.

Contract management also contributes to the drafting, evolving and evaluation of service agreements (inter-departmental SLAs, external SLAs), so that they remain seamlessly in line with the contracts concluded.

2. Contract and supplier management
Contract management information must be up-to-date and available to those involved. Contract management contributes to obtaining management information, standardizing services and standardizing the procurement process within the intelligent customer function.

Contract management covers the following issues:
- Insight into whether a (legally) valid contract is available for each supplier. For example, whether the contract has been terminated after the acquisition of a supplier or if it should be extended.
- Management possibilities for the various suppliers through, for example, periodic management reports, evaluations and benchmarks.
- Insight into the risks associated with contracts. For example, where the critical contracts/contract agreements are for daily implementation.
- Insight into quality, quantity and financial scope *per* contract, as well as per outsourced service and for each LoB. For example, for financial accountability, coordination between contracts, agreements and performance management.
- Insight into who needs to take action at what time. For example, who takes the initiative to reopen a contract, who can contact who at the supplier when something is missing in the service.

3. Market and client and contracting
Contract management maintains relationships with potential and existing suppliers. Control of total costs (TCO, short for Total Cost of Ownership), optimizing business processes, reducing risks and making optimum use of market knowledge as early as possible are the central principles.

Contract management follows developments in the range of services and products closely and uses the knowledge from the market for the timely recognition of opportunities for other and/or better services. It informs suppliers about developments

at customers and within the management enterprise. Where digitization is part of the corporate strategy, engaging with suppliers might be the only way to manage skills shortages or technical requirements.

Table 6.2 Activities of contract management

Ensure delivery of services and products (supply-side)	• Support in determining the business needs and role of IT and translating this into a program of requirements. • Participating in the entire procurement process (specify, select and contract) and co-responsibility for legal, financial, enterprise and substantive conclusion of appropriate contracts/covenants. • Reviewing contracts or agreements, periodically and during contracting period. • Contributing to the preparation and evaluation of SLAs.
Contract and supplier management	• Registration and management of contracts, contract details and agreements. • Monitoring contract agreements, promotions and planning. • Providing proactive advice on the handling of various contractual matters and the realization thereof. • Coordinating information about the contracts. Analyzing and reporting on realized versus agreed services. • Monitoring supplier performance (based on management reports), measuring results from the supplier and initiating improvement proposals.
Market and client and contracting	• Maintaining client-contractor relationships with suppliers. • Following developments at suppliers (for management/ customers). • Informing or sparring/coordinating with suppliers. • Adjusting/tweaking contracts with suppliers. • Guaranteeing service integration on the supply-side.

Service integration must also be guaranteed on the supply-side. In addition, suppliers of (groups of) products and services are designated as coordinators for the integral linking of processes or infrastructure. The other suppliers are required to coordinate their products with the designated coordinator. Table 6.2 summarizes the activities of contract management.

6.2.3 Tasks within management control

After the contracts have been concluded, BIMC naturally wants to ensure that the services provided are in accordance with agreements. This responsibility has been assigned to the control management focus area. Three task areas are distinguished:

- Service management;
- Performance management;
- Financial management.

1. Service management

The influence on the total costs is greatest in the phase where the management office initially determines the need (or when drawing up the program of requirements).

After that there are limited savings. After the contract has been concluded, influencing the costs becomes high again if changes are made to the specifications within the contract.

From this financial perspective, control management contributes to determining business needs, translating these into a program of requirements and managing the procurement process or the conclusion of contracts and changes to existing agreements. In this regard you can see how the service management and financial management areas must work together (and do not forget that the task area's might not be independently managed, they may be the task of one person).

Control management covers all activities performed by BIMC that are aimed at ensuring the requirements of the contracts are achieved and that the risks for the client remain at an acceptable level. The primary goal here is that management is efficient and effective.

Important elements of a control function are:

- The assessment of the legality and effectiveness of the products and services provided and the analysis of the (financial) risks.
- Determining costs, on the one hand, to enable BIMC to put together a realistic budget and on the other, to be able to determine market conformity. Customers (and buyers) need insight into the cost of products and services, so that they can make an assessment of whether, and if so to what extent, they want to purchase products and services.
- The analysis of whether the services provided in relation to the cost are still in line with the market. The most obvious methods are cost price analysis and benchmarking.
- The development, management and operation of a quality assurance system.
- Taking care of data management, i.e., the management and supervised updating of various data files, most often undertaken with the custodian role of DID, so that there is clarity and consistency.
- Analyzing the data and taking care of management information from these databases for the purpose of performance management.

2. *Performance management*

The quality of the service is largely influenced by the quality and reliability of the overall development. Performance management influences productivity, and assists in risk management, cost control and cost effectiveness. Performance management contributes to:

- Contract fulfillment: To demonstrate whether the delivery is what has been agreed.
- Evaluation of SLAs: To determine whether the services that have been delivered are in accordance with what has been agreed with the customers.

- Cost control: To demonstrate whether the agreed services remain within the agreed costs and whether the relationship between price and performance is still correct (test for efficiency).
- Supplier performance: To demonstrate whether the supplier has delivered the performance as agreed in the contract and, subsequently, whether the supplier can be paid[28]. Quality improvement: To gain insight into where improvements can be made in relation to the quality of service of both the intelligent customer and the services that are delivered.

3. Financial control

This includes:

- Preparing and determining the budgetary framework, budget, budget allocation and such, partly based on the agreed volume and the agreed prices.
- Taking care of financial implementation and accountability, for example with regards to intended spending or policy decisions with financial consequences.
- Invoice handling, comprising two activities: determining that the performance has been delivered (declaration of performance) and then authorizing the invoice.

6.2.4 Tasks within user management

BIMC needs to have good relationships in many areas of the enterprise. For example, the activities of user management focus on maintaining the substantive relationships with users. At the strategic and tactical level, there are four principal areas of work within user management; the first three are largely strategic, the fourth element necessitates further expansion for the practitioner, see Sub-section 6.2.5, to cover essential operational processes. The four principal elements are:

1. Ensuring the delivery of services and products (demand-side).
2. Guarding business/LoB interests.
3. Relationship management.
4. Operational management.

The fifth element is of course a movie.

1. Ensure the delivery of services and products (demand-side)

The tasks within user management aim to ensure that the needs of customers are optimally aligned with the range of services and to monitor this, together with the users, through the management of results. Needs are translated as far as possible

28 This topic is more complex than first meets the eye: when you outsource IT, for instance, often the development process becomes more formal, making it less productive, and hence you need to deal with a fair payment schedule. How to achieve that, and recognize the issues is captured in Eveleens, L., Kampstra, P., & Verhoef, C. (2015). Quantifying fair payment after outsourcing–a case study. *Journal of Software: Evolution and process*, 27(3), 147-165.

in terms of functionalities. For example, '*I want to be able to use my smartphone anywhere to process information*', instead of '*I want a smartphone type XYZ*'.

Table 6.3 summarizes these activities.

Table 6.3 Activities of management control

Management	• Assess the legality and effectiveness of the services provided and undertake an analysis of risks, including financial. • Determine cost. • Analyze the degree of market conformity, including by performing cost price analysis and benchmarking. • Develop, manage and operate a quality assurance system. • Structured management and coordination of activities and processes, and contribute to monitoring the quality of the services to be provided. • Manage and update data files and maintain the files. • Analyze and report management data.
Performance management	• Aggregate the available information (provided by the focus areas) on the financial performance, satisfaction and performance of the suppliers, analyze it in full and report on it to management. • Make improvement proposals aimed at enhancing the overall process. • Organize and monitor connections and processes between suppliers (service integration).
Financial control	• Prepare and approve the budgetary framework, develop and distribute the budget, and manage its implementation (spending, policy decisions with financial consequences). • Ensure implementation and accountability in the financial field. • Processing of invoices.

Tactically, BIMC tries to bundle needs as much as possible and to reach a common position through consultation. Specific agreements are only made in those cases where this is not possible. This creates the difference between agreements on generic services, services purchased for everyone, and specific agreements, the so-called customized agreements. In practice, there is another intermediate category that talks about common or 'plus' agreements. These agreements form a category of services that are required for parts of the enterprise but for which it is not clear who is responsible for payment.

2. *Guarding customer interests*

Consider here the role of the custodian described in DID; there is a corollary between guarding customer interests generally and the specific role of guarding the integrity of data resources. Where developments have been approved, an estimate is made of what these developments mean for the strategy and the range of information services on offer. Customers are informed about developments in the range of services and products.

3. Relationship management

BIMC uses relationships to surface specific needs (where digitization is a key driver, these may well be technical as well as data-driven, remember that BiSL describes the need to cover Business, Information, Services **and** Technology issues). Strictly speaking, relationship management can be said to include operational management (see below) though, for clarity, it is worth setting out operational tasks as a separate element.

Case study: Standard software

Introduction

In any organization there are a many different software tools. Even if BIMC is involved and takes ownership there might still be challenges. What if your supplier of a software tool includes a link to another tool from another provider. And the issue is not simply related to cloud-sharing software. People inevitably start using tools if they find them useful, but what does it mean to GDPR and what are the implications for a business? IT might not even be aware of these ghost (some businesses describe them as 'rogue') tools.

The issues

There is unlikely to be a contract with the provider of ghost tools (and what about licensing issues). What functionality do they provide? How will they handle data? Can they use data for other purposes (maybe without the knowledge of the business)? And if the business identifies a genuine need for using the ghost tools and assume that they are safe and managed, how do we make sure that different LoBs do not end up with several similar applications, used for the same functionality, that might not work together.

BIMC

This type of issue is related to the proper design of the information architecture. For instance, the city of Amsterdam inventoried their IT landscape and they estimated the number of applications between 10.000—15.000, with about 15.000 civil servants, that is an app for each one[29]. Business (and IT) use of rogue applications and tools is a major issue and should be controlled by BIM.

4. Operational management

Operational management is particularly focused on monitoring the satisfaction that customers and users experience regarding the nature, quality and extent of the information services. Operational management conducts various surveys and

29 City of Amsterdam, Realisatieplan 2010 - 2014, ICT op Open Amsterdams Peil ,available via https://fdocuments.net/document/realisatieplan-2010-2014-ict-op-open-amsterdams-peil.html?page=1 and https://www.cs.vu.nl/~x/knipselkrant/ag-111.html (In Dutch).

other techniques to establish the degree of satisfaction. Operations also uses the data that arises from handling complaints and disruptions due to production, whilst user management ensures that complaints, incidents/problems and malfunctions are handled satisfactorily. See Sub-section 6.2.5 for more information.

The user management responsibilities are summarized for you in Table 6.4.

Table 6.4 Tasks within user management

Ensuring delivery of services and products (demand-side)	• Make a contribution to determining user needs, and their translation into a program of requirements and the creation of contracts. • Record agreements in service agreements and contribute to the preparation and evaluation of SLAs. • Compile and manage the service catalogue, the service descriptions and management agreements.
Guarding customer interests	• Ensure representation of the stakeholders' interests. • Monitor customers and customer satisfaction. • Supervise the handling of complaints and malfunctions. • Initiate steering measures, changes to the services or changes in strategy or strategic planning.
Relationship management	• Maintain relationships with users/LoB management. • Follow the needs of, and developments of, the users e.g. changes in strategy or strategic planning. • Inform, consult and influence customers. • Initiate and monitor the translation of customer needs into supply services, including the control of the output. • Discuss advise and develop proposals with the users, negotiate and obtain an order from the customer to proceed with execution.
Operational management	• Monitor the satisfaction that customers and users express about the nature, quality and extent of the information services. • Manage day-to-day DID operations.

6.3 HOW TO STRUCTURE BIMC WITHIN THE ENTERPRISE

As we explained in Chapter 5, within the enterprise BIMC fulfills the role of the strategic and tactical professional representation of the business that coordinates the business information services to achieve desired business outcomes, ensures compliance with any related contracts and the control thereof, and controls costs where applicable. BIMC is positioned between the customer enterprise (business) and the supplier(s), internally and externally. It is the intermediary which, as a delegated client, ensures that the client's needs (or the needs of the business) are well served by a clear formulation of the needs and the translation thereof into purchased and delivered information services.

To operate effectively, BIMC should be aligned with the BIM operational activities.

Keep in mind that BIMC **does not carry out all of the above activities** and most often is responsible only for the tactical level, not the day-to-day activities. The tasks and responsibilities mentioned in this chapter must be properly assigned. Implementing these requires a great deal of insight, experience, expertise and competences, which are not always present. As Deming[30] notes, it is only by striving for continuous repetition and conscious improvement that high quality can be achieved.

The term BIMC is used to state what needs to be done to support management, LoB and users with BIM execution. In order to make this possible BIMC must be expert in the four areas that make up the intelligent customer capability. In many enterprises, you do not necessarily see one department where all the intelligent customer tasks are undertaken together. Sometimes the functions are spread over several departments. It is, of course, possible that little control is required and implementation will be minimal. The same is true where BIMC adopts the intelligent customer functions.

The intelligent customer functions can be instantiated in several variations. All variants are conceivable: from one person with a universal mandate to a multidisciplinary department (and everything in between). In practice we often see that two dominant criteria are used to choose an organizational model. The first criterion is about whether BIMC focuses exclusively on one or more LoBs. The second criterion concerns the mandate. Is there a direct relationship between the various focus areas, or is it a strategic network of focus areas that are functionally managed? In the last case it means that not all tasks identified are part of the functional BIMC unit but are part of organizational departments that need to cooperate.

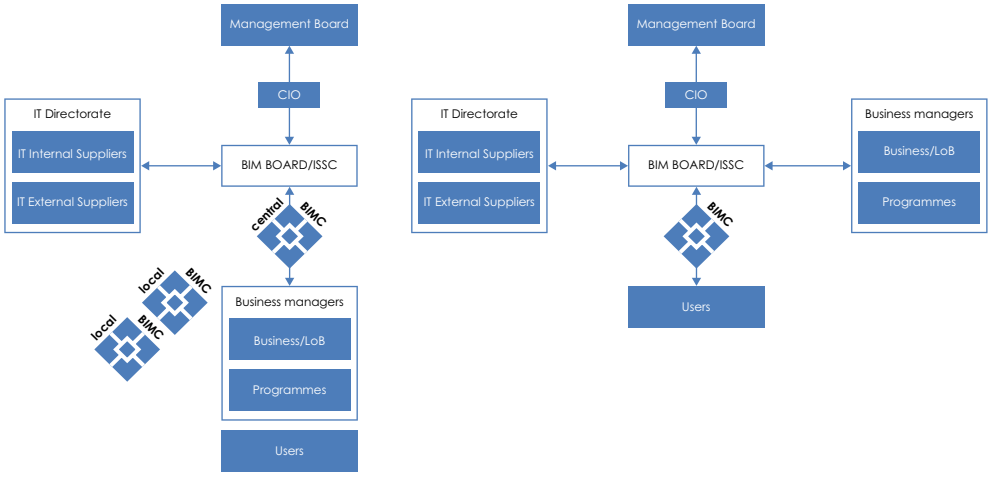


Figure 6.2 BIMC central and local organization

30 Deming, W.E., (1982, 2000), *Out of the crisis*, MIT Press; Beniger, J.R. (1986), *The control revolution, technological and economic origins of the information society*, Harvard University Press.

Although, to the best of our knowledge, no further research has been done into this, in practice we see four dominant aspects that form the basis upon which the organizational model for BIMC is decided. These are:

- The size of the enterprise. Is the enterprise of such a size where it becomes sensible to set up a single department for BIMC, or is the enterprise so gigantic that it is better to organize the areas of attention separately because of economies of scale (or other issues)?
- Complexity of the line of business or process from the primary enterprise. Are the services and information processed between one or more LoBs inter-related and sufficiently complex to warrant a coordinated approach?
- Homogeneity of the businesses. Are the LoBs comparable in terms of maturity level?
- Experience of the enterprise in the functional management of BIM. Does the enterprise have knowledge of, and experience with, functional management related to data and if so, is it effective?

For larger enterprises, a distinction is made between services that apply globally or generically to the entire enterprise and services that apply to a specific domain. In this case it is often decided to make a distinction between management at the corporate level and management at the business unit level. The principles and roles *per* focus area remain the same. However, the coherence and management of generic and specific services needs to be properly adjusted.

Again, different variants are conceivable. Figure 6.2 provides an example of a management office at a corporate and business unit level that has a clear line mandate.

Case study: Testing applications is a serious business

The issue

The external supplier responsible for the development and implementation of a replacement motor insurance information system was also contracted to provide a test strategy. BIMC discovered during the development phase that within the test strategy the requirement of the LoB regarding the participation of the user in the testing and implementation of the applications had not been specified. In addition, the supplier had not been foreseen that the complete end-to-end solution involved a functional and technical end-to-end test with specially designed data test-packs.

During the contracting phase of the project, these issues had been overlooked by the application development teams, internal infrastructure team, the senior user on the project board and even by the senior technical teams responsible for database integrity. BIMC also discovered that although the contract

specified the requirements for data delivery, the LoB had not been attentive to the functional requirements of the solution where data had to be made available to several other external parties that acted on behalf of the enterprise in reselling insurance services.

Mindful that testing was not restricted to the application software, BIMC also had to make certain that responsibility was allocated for ensuring the installed hardware and software was available. Necessary arrangements were made with infrastructure teams to ensure processing was functional and that information was processed effectively and accurately in the overall supply chain.

BIMC advice and guidance

As a consequence of the issues discovered, project management advised by BIMC instigated a number of corrective actions to improve and restructure the test process; the actions were implemented immediately to react to the issues discovered and were defined as policy for the future. These included (in this case, because the project was half complete) a revised, comprehensive test document written by the LoB in conjunction with the supplier. This created a more agile process to test requirements and service integration, defined exit criteria to make sure there was a threshold for 'go/no-go' decisions about implementation and go-live, and specified a continuous improvement strategy for the enterprise service organization that focused on the needs of the LoB.

Root cause analysis

LoB management had created their own policy of not allowing changes in the application requirements during development and or to the environment in which the new application would be implemented. They had formally issued a 'freeze' notice to the project manager. In practice, the reality is that this rarely, if ever, works, especially in a brown field environment. For then you obtain the system that you asked for but you need the system that you actually meant, which is often with different requirements, although they should of course not deviate too much[31] Also the needs of LoB will change or mutate with the market dynamics. Fortunately, BIMC identified that if the delivered application did not meet up-to-date requirements, it would have been rejected at worst, or endlessly changed during operational use.

Policy advice for the future

The purpose of requirements specification work is to avoid making mistakes and do a complete job. It is not possible to avoid all mistakes and only some

31 Kulk, G.P. & Verhoef, C. (2008). Quantifying requirements volatility effects. *Science of Computer Programming*, *72*(3), 136-175.

US presidents are omniscient. Accepting that there is a risk of being wrong is part of project planning. The essence of the matter is to make sure that your risk management is in place to manage any issues as they arise.

A 'postmortem' was instigated by BIMC and the findings reported to the Board for their consideration. It was accepted that a policy should be issued about exit criteria that defined the point where user acceptance testing would be finished, and the service was in line with what was needed based on fitness for purpose (even if not all contract requirements were fulfilled). Where contract requirements were unfulfilled, the policy was that the project team would identify such issues and the service organization would take responsibility. As an improvement issue, the service organization would be expanded for a finite time to close all open issues.

For the future, being serious about the quality of the test process would be an integral part of the project vision document and the planning process.

6.4 BIMC COMPETENCES

BIMC can manage on multiple levels of abstraction, terms and scope of service. On the one hand, BIMC advises the enterprise on new developments and helps with policy preparation. On the other hand, depending on the nature of the questions or incidents, BIMC is expected to take the measures that are necessary to guarantee uninterrupted business operations.

The role of BIMC differs fundamentally from operations that is responsible for the actual delivery of results. BIMC, on the other hand, does not interfere with operational services, but coordinates the supply and demand chain and monitors that chain.

BIMC is positioned between the four most important stakeholders. On the demand-side, BIMC has to deal with three parties: general management, customers and users. The services are purchased and compiled for users, so that they can perform their work optimally. Based on the needs of users, the BIMC office makes agreements with customers about the price that must be paid in order to provide the services. The most important customer or client is generally also on the Board or in general management, and is in charge of the portfolio for business operations.

The most important customer is also the party that pays for the generic or basic services. These needs are often laid down in service agreements or (internal) service level agreements (SLAs). BIMC assesses the needs and translates these functional requirements into a technical package of requirements that is understood by whoever will design and supply the business services. In doing so, BIMC takes

into account any requirements set by the management, such as architectural requirements, operational management principles, etc.

In addition, BIMC will advise the Board on topics such as new developments, standardization policy, policy frameworks and costs. BIMC then purchases the service from one or more suppliers. BIMC must be aware of the market, technological trends (particularly in terms of BIM, digitization and knowledge/information/data management) and developments in society and their significance that may translate into services.

To that end, it concludes contracts, covenants, or service and experience level agreements (SLAs/XLAs). The service is delivered to the enterprise (users) in accordance with a product and service catalogue and maintained, for example, through service management and a service desk. Based on measurements (audits, satisfaction surveys or panels) and performance management on the contracts, BIMC obtains a picture of the quality delivered. The results are reported back to the general board and the customers. BIMC can also take the initiative to advise users or service providers on new developments.

The consequence of this, in general terms, is that the emphasis of the required competences is on social-communicative and intellectual capabilities. This is in contrast, for example, with an enterprise that implements in-house solutions, where the emphasis is more on administrative-enterprise, emotional and task-oriented competences.

In summary, therefore, the required BIMC competences are:

- Specifically, following the demand-side of the intelligent customer guidance.
- Feeling personally responsible for the relationship with internal customers.
- Effective complaint handling.
- Ability to communicate with all management levels and departments in an enterprise.
- Think like the customer, make proposals to the customer for alternatives and a new approach to problems. Personnel should empathize with customer needs and express the wishes of the customer in their own language.
- Identify any underlying question and provide specific advice.
- Take the initiative in building a network within the enterprise based on trust and expertise, and know who are the most important/influential people.
- Possess the ability to establish relationships between developments in society, politics, governance, the professional field and the future needs of the enterprise, and advise on the trade-off between theoretical solutions and practical feasibility.
- Substantive knowledge of subjects, or the ability to identify subject matter expertise.

- Knowledge of, and experience with, project management, being skilled in managing multidisciplinary teams in projects (mostly technical, logistical, legal and financial-economic disciplines) and having the ability to disseminate new ideas and concepts in such teams.

6.5 HOW MANY PEOPLE ARE NEEDED IN BIMC?

When looking at the competences of a BIMC, the question arises of how many people need to work within BIMC? 103. No wait, that's not very agile, let's have seven. Look how agile we were there, we reduced management overhead by 96 and yet have no clue how much work is actually needed, that is the beauty of being agile.

More seriously, the answer depends entirely on the size of the tasks being undertaken, as well as the size of the enterprise. BIMC should coordinate and assist with the implementation of all major programs, not only a specific BIM program, to realize the enterprise objectives regarding information/data and to monitor the results. This includes the strategic advisory role. BIMC is positioned between supply and demand. In terms of BIM, what (and who) is the need behind the demand for data and what (or who) will supply that data.

It is worthwhile thinking about sizing the function initially from a 'global' perspective and then (because this book is about BIM) specifically thinking about BIMC in your enterprise. We need to consider the size because the intelligent customer is defined independently of implementation. It may, therefore, be that large parts of the actual implementation, such as programming work or technical maintenance, are included within the enterprise, for example as a separate department. If everything is outsourced, a core staffing that is responsible for a few basic functions will suffice. Outsourcing often refers to a rule of thumb of applying 8% to 12% of the outsourced amount as structural costs for managing contracts. However, this can be considerably lower if there is main contracting. It can also be considerably higher when it comes to vital systems or safety-critical systems. We often see a ratio of 1 FTE internally to 3 FTE externally.

The maturity of the demand enterprise (business) and the maturity of the providers also influence the size. The more mature the demand enterprise and the providers' function, the smaller the management enterprise. Or vice versa: the worse they function the more coordination is needed.

One more point; quite often the need for more people is met with the response that something is 'not very agile' or that 'it needs too many people'. Well, did anyone actually quantify the work that needs to be done? If there is no need for work (or

a process) then of course anyone working on that activity is a waste of resources. However, if an activity has value, then it should be properly resourced and that value might well pertain to the ability of an enterprise to transact business based on data. In which case (depending on need), 100 people working in a pyramid management structure might well be considered 'agile'.

And you do not often hear about Google, Microsoft, Facebook, or any other data hive complaining about having too many people looking at data. If a service is free, you are the product. Or as they say in the USA 'TINSTAAFL', which is short for 'there is no such thing as a free lunch'.

Key points:
BIMC will support business managers, IS planners (governed by some form of BIM board/IS Steering Committee, the ISSC) and Program Directors in translating the policies of the Management Board (guiding principles) into purpose and direction for the managers of IT services.

BIMC fulfils a bridging function between the demand from the enterprise and the supply from the service providers.

BIMC operational management may be different for each enterprise, but that the ingredients which every enterprise can choose from are comparable.

To cover essential operational, day to day processes. BIMC must be able to: make agreements with enterprise business users, translate the work into a standardized approach where practical, negotiate with service providers, and always check on performance.

To manage these activities BIMC will have four responsibilities:
- ✔ Policy, innovation and advice (PIA) management (Plan, mostly Governance in the DID model);
- ✔ Contract management (Do, mostly Strategy in the DID model);
- ✔ Control management (Check, mostly Improvement in the DID model);
- ✔ User management (Act, clearly the Operational focus of the DID model).

BIMC must be expert in the four areas. Thus, BIMC is positioned between the four most important stakeholders. On the demand-side BIMC has to deal with three parties: general management, customers and users. On the supply-side with relevant suppliers.

In many enterprises, you do not necessarily see one department where all the intelligent customer tasks are undertaken together. Sometimes the functions are spread over several departments.

7. IMPLEMENTATION OF BIM

7.1 PRACTICING BIM

Given the ever-present nature of digital information sources and assets *where do you start?* is a very good question. The answer to the '*why*' question should be obvious, because of the sheer volume of data floating around in the electronic ether and the vast amounts of data being collected by various (and nefarious) organizations. When implementing BIM, typically the first question is: where to begin. There are two major approaches you can choose: bottom-up or top-down.

Frankly, if BIM is not already practiced in your enterprise then anywhere will do, though, in our opinion, the most substantial effects will be achieved if executive sponsorship and support is obtained. If you have a new line of business with undocumented business processes to start with, then you can use this line of business (LoB) as a pilot; if you have undocumented business processes throughout your enterprise, use that problem as an opportunity. No matter how small the project, make sure you can demonstrate benefits.

In this chapter we will focus on both approaches to kickstart. Whatever approach you choose, follow the steps below:

1. Understand the topic at hand, the position in relation to the DID drivers (i.e. where the topic impacts your business model) together with the environment of the enterprise and the position in the lifecycle.
2. Think about governance and strategy and any necessary business transformations by understanding your organizational architecture (the operating model of your enterprise) and the consequences for topics and issues to be analyzed in conjunction with other strategic themes and choices.
3. Understand the necessary capabilities and identify business mission fulfilment capabilities.
4. Present the business case for your project/plan and make sure a management decision can be taken about your proposals.

5. Implement the plans for transformation and make sure the developed solution is both permanent and robust in operation.

Each step can be placed within an overall framework that summarizes our earlier chapters (Figure 7.1). For each step, we are supplying checklists of essential questions you need to ask and the information you should gather that will help you to build a solid business case for business transformation, and/or BIM, and how to use DID effectively to assist you.

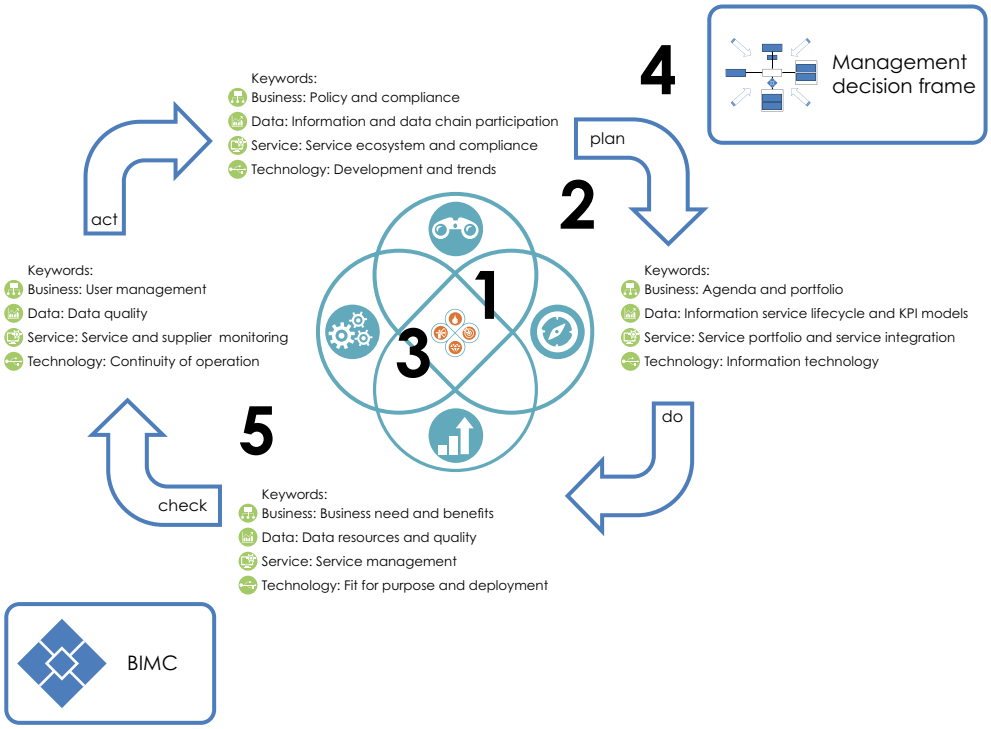


Figure 7.1 Implementing and executing BIM

7.2 STEP 1: UNDERSTAND THE BUSINESS MODEL

7.2.1 Identify your business drivers

Use **Drivers** to identify *your* business drivers and current organizational drivers. Before embarking on establishing BIM (or implementing DID), it is good practice to think about how your enterprise and its business are organized. The questions listed below will help you to develop a balanced view:

- What is the main business of the enterprise? It might be obvious to you, but are all goals and aspirations clear to everyone, including suppliers and partners?
- What are the strategy and goals for the enterprise/LoB?
- Who are the customers and stakeholders (both internal and external)?

- Where are the internal customer and supplier boundaries?
- What about external customer, partner and supplier boundaries?
- What about information chain partnerships?
- How, why and when does the business interrelate with other LoBs in the enterprise or other enterprises?
- What are the digital assets?
- How well does the enterprise meet its current objectives?
- Can information integrity be relied upon?
- Is BIM a recognized discipline within the enterprise and, if so, how is it functionally organized?
- What is the enterprise trying to do better, cheaper or differently, and what are the factors that constrain this?
- What are the relationships with other enterprises, including competitors?
- What information services are provided and for whom?
- What information services are procured and from whom?
- Who else should be consulted?
- What characterizes the culture of the enterprise?
- How are responsibilities organized?
- What are the command structures and reporting chains?
- What styles of management are in use?
- Who has authority and to what degree?
- What freedoms, constraints or political imperatives are there?

A balanced view is no guarantee for a balanced enterprise. In IT-intensive organizations, we see some styles of IT-governance that could hinder rather than help. For instance, `operational excellence', that is, managing on time can be really dangerous in case time is not really of the essence. If you cram too much IT-work in too short a timeframe, we speak of time compression[32] and this phenomenon can surge IT-costs to a level where a good IT-investment can turn sour and become lossy, due to the sheer extra costs. Also managing on cost can be detrimental and the same hold for consistently managing on quality. A balanced view thus also requires balanced governance with flexible/agile governance and the style of leadership that fits the business endeavor[33].

7.2.2 Analyzing underlying topics and issues

From a BIM perspective the practitioner should be thinking about the impact of (digital) services, ensuring the focus is on the business processes. Transforming the business begins with the business model and articulation of the desired enterprise

32 Verhoef, C. (2007). Quantifying the effects of IT-governance rules. *Science of Computer Programming*, 67(2-3), 247-277.
33 Verhoef, C. (2005). Quantifying the value of IT-investments. *Science of Computer Programming*, 56(3), 315-342.

services. The elaboration should always begin with thinking about the business model, the enterprise architecture(s), the services and then the operating model.

You can analyze the issue at hand using the DID model. Refer to Figure 7.2, where the 'anchors' have been placed, to give you an idea of the types of key topics in each domain and use the **Perspectives** to gain insight. Keep in mind, as we mentioned earlier, that you need to distinguish between green and brown field situations or (more likely) hybrid situations and consider how your plans correspond to the **Drivers**.

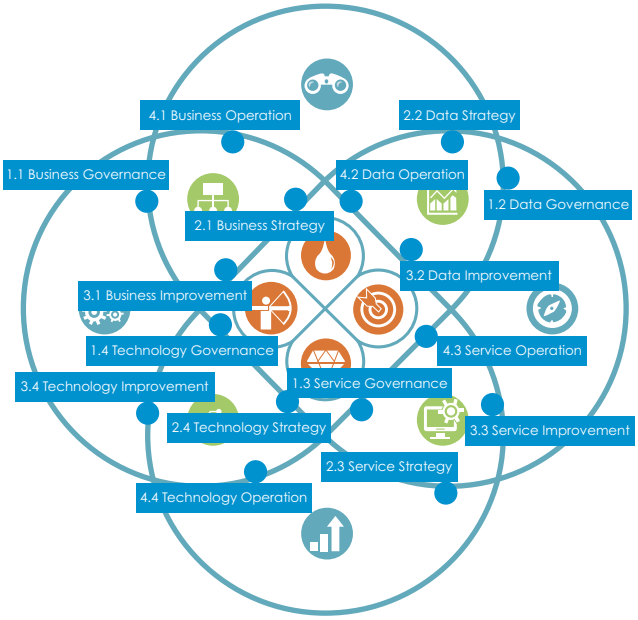


Figure 7.2 Anchors

7.3 STEP 2: GOVERNANCE, STRATEGY AND BUSINESS TRANSFORMATION

The most effective introduction of BIM requires the business case to focus on the scale of the current and future digital environment, and how good governance and effective strategy will assist with being clear about the need and value of new or improved digital business services.

7.3.1 Essential questions for your strategy

It is suggested that when addressing the business model, you should initially focus on the following questions:

- How does the enterprise currently determine whether technology support and delivery capabilities accurately match requirements with regards to managing data and information services?

- What challenges does the enterprise face in achieving strategy and goals?
- What are the internal delivery capabilities (processes, competences) required to fully support the enterprise strategic objectives?
- What is the experience you expect users to have when using digital information services and will these match expectations?
- What are the delivery capabilities that are currently provided by suppliers and do they work with both internal and external suppliers?
- Does the enterprise have a plan that accurately describes how your business will function in the near future? In six months? In twelve months? In eighteen months?

Remind yourself that there is not one, single, absolute way to success, use what suits you and your audience. Once you have answers to the questions posed above, or have gained an understanding of the current state of play in your enterprise, you will be in a position to identify the supporting information needed for a solid business case.

7.3.2 Gather essential supporting information

You can expand your thinking by acquiring information about how success should be measured. Some of the questions you will find are repeated. Look for evidence, not just 'box ticking'; a quality policy will usually require documented evidence, but sadly this is not current practice in all situations.

Consider the following points when gathering supporting information:

- How do you arrive at the measurement of business need and value with business information services and information technology solutions in terms that are both quantifiable and meaningful to your executive management? And are they meaningful to users? And partners or suppliers?
- Describe the process and technology used by the IT units to manage the assignment and configuration of information and data assets for specific information services. Is it effective?
- Describe the processes and technologies used to monitor and manage essential commitments made by IT and measure user satisfaction. Are they effective? Are they focused on information services and not on technology?
- How does the enterprise evaluate the successes and failures of BIM/IT initiatives? What are the key issues?
- Have you documented an enterprise data architecture for your enterprise? Where is the data about the architecture recorded and how is it made available as appropriate?
- Based on the execution and impact of ongoing projects, how are enterprise data risks identified, classified, recorded, analyzed, documented, managed and communicated?
- What financial approaches are used to fund and track both initial and ongoing investments in information/data programs and projects? Are they effective?

7.3.3 IT planning

In the digital age, information is intrinsically and irrevocably linked to IT; clearly then, you must now take a close look at IT within your enterprise and ask some searching questions. Consider the issue of structured and unstructured data; in many enterprises unstructured data is the major issue and in all there is evidence that more unstructured data exists than useful structured data. Think also of the 'digital savvy' employees who have created (for whatever reason) their own personal database(s). Not just that but also their own personal downloaded apps that sit on the corporate network (rogue apps).

If parts of the enterprise have pockets or islands of information that are organized or used in some specific fashion in order to meet business needs, then it should be corporate and it is a failure of BIM to have no knowledge of the need and the data. Conversely it is also a failure of BIM to recognize the danger inherent in allowing these islands of data to exist if they are not necessary. Did a policy exist regarding keeping data in private repositories? If not, why not? And if it did exist, how was compliance enforced, what went wrong?

Some key issues in relation to IT planning are:

- Describe how the enterprise tries to overcome resistance to change and to meet any urgent need for the planning and execution of business opportunities. Does the enterprise examine risky opportunities and take chances in order to profit?
- Describe the strategies, processes and technologies used by the enterprise to identify improvements and to initiate, assess, approve, assign, deliver and support changes to the user environment. Is change management an enabler of change or a bottleneck?
- Describe the way in which the enterprise initiates, assesses, approves, assigns responsibilities, strategizes and delivers beneficial results from IT-driven and data-driven projects to the users.
- How effective is IT in these areas?

7.3.4 Architectural issues

It may not be all about IT, though as we have continuously emphasized, IT is both a driver of innovation and a legacy that you must deal with because information is delivered electronically. Particular attention should be paid to information service architectural issues. Some of the following points will amplify your thinking about the LoB in the context of IT. And remember, BIM primarily focuses on the data architecture – but a service architecture, and a technical architecture will also exist and so will a business architecture; as BIMC you will need to be aware of all of these. Not only the (hopefully) documented architectures (blueprint) but also the as-implemented ones (red print). They can be (vastly) different.

A few typical 'IT' issues are:

- In considering a merger with another enterprise, is it possible to get scale advantages from combining two central IT departments? This is far more than a technology decision.
- At which level of the enterprise should the IT strategy be formulated? What about the data strategy?
- Should the enterprise's information strategy and transformation evolve 'bottom-up', or 'top-down'? Why is one of these approaches considered preferable to another?
- Should the enterprise's information strategy be dictated by the available technology?
- Is your enterprise state-of-the-art or 'state-of-the-ark' (but proven) technology?
- Should you always commit to a supplier that proposes a particular technical solution?
- How do you determine the degree of IT support the enterprise needs to function effectively?
- Do you know how much knowledge of your processes, products, services and customers resides in unstructured and inaccessible files? Can old database files in depreciated formats, or worse microfiche, records, paper records, CDs, video tapes or eight track cassettes be found, let alone accessed for content?
- If a new way of working requires support from a new or improved information service or system, can you be sure of obtaining one that works? What will you do if it doesn't work?
- How many frameworks and standards are there, and who knows what they are and how they fit together?

As an illustration that choosing a system after a merger is more than a technical question: Deutsche Bank wanted to become an important player in the investment field and a merger was the way to go. Of course, the question arose which global trading and settlement system would be chosen and why. In the end the system that Deutsche had migrated to a so-called federated-architecture (where business impact was aligned with technical impact) won the battle over function richness at some points as this migrated system was better fit for global-yet-controlled growth[34].

34 Faust, D., & Verhoef, C. (2003). Software product line migration and deployment. *Software: Practice and Experience*, 33(10), 933-955.

7.4 STEP 3: IDENTIFY CAPABILITIES NEEDED

The capabilities discussed in Chapter 3 provide you with the important information you need to think about in terms of how the enterprise mission can be addressed. To help you focus on some key features, think about answers to the following questions.

- What major enterprise and departmental polices guide your technology choices? How is Bring Your Own Device or Choose Your Own Device (BYOD or CYOD) implemented and, more importantly, controlled?
- How are new digital information system technologies introduced into the enterprise? How is their impact assessed and managed in the data center and in the field?
- Have you identified a catalogue of standard information/data services? Or a blueprint of how the standard technologies interact with each other and support the digital environment?
- Are you dependent on any one particular partner or supplier for the whole, or any part, of the information services of your enterprise? What about IT infrastructure?
- Have you clearly identified possible transition strategies?
- Have you made sure that everyone understands there is a difference between a capability and a capabil-**IT**?

7.5 STEP 4: PRESENT THE BUSINESS CASE

Does the enterprise have a process in place to continually examine and determine how to bridge the gap between the anticipated future requirements for information and data, and existing resource capabilities? Can you interpret your business model in a way that focuses on strategy and not only what is operational?
Questions to be asked include:

- Do you have an information management decision framework in place?
- Is there a controlled process to present initiatives and make decisions?
- Is there a mandate for change?
- Are the appropriate stakeholders present in the steering board for BIM?
- Do we understand existing resource capabilities?
- Do we understand how customers perceive the service, is it needed and valued? Is the experience of using the service good, bad or merely adequate?
- Do we understand how to explicitly describe future capabilities needed and is it explained in the business case how they relate to the proposal?
- Is it understood how the requirements impact operations?
- How does the business case explain the strategic added value in relation to the four drivers: capability, mission, value and need?
- Does the business case explain the strategic need and also whether proposals are realistic and how actions can be executed?

7.6 STEP 5: SECURE THE TRANSFORMATION

If operational management of BIM is already in place, at this point BIMC switches from a supporting role to an executive role. Activities should be focused on translating the solution into improvement and operations. A key question to answer is: Who owns the transformation program? And who owns the BIMC unit?

7.6.1 Delegating responsibilities for functional management

Who will be responsible for the following activities?

- Orchestrating the pace and timing of digital transformation and the use of DID.
- Communicating a consistent view of the transformative changes you wish to make; are you focusing on documenting and automating business processes, or on finding an opportunity to introduce BIM or simply using the DID good practices?
- Creating a central point for information exchange.
- Using sensible, non-generic KPIs to monitor progress.
- Making sure that executive action focuses on the links between strategy, tactics and operations.
- Providing regular updates for middle managers, using handouts to ensure further dissemination.
- Appointing someone to stay close to the program manager or leading teams, to stay on top of issues and to ensure that no mixed messages are communicated. This could be your services design coordinator role if you have one, or of course the SRO.
- Understanding that there is a difference between communicating what is to happen and expecting it to happen.
- Making sure the overall vision is simple and inspiring, but not constricting.
- Considering which specific groups of employees will be implementing improvements or changes and will therefore be expected to understand the change.
- Identifying what new skills will be needed.

Case study: Data and information strategy in government

Background

A government traffic management agency formulated a data and information vision and strategy. They concluded that their directorates and suppliers already held a lot of data, but the way it was managed and contained in different systems failed to make providing that information as timely or as useful as it could be. Naturally such conclusions required months of work by expensive consultants, interviewing rafts of people who already knew what the problem was, but required consultants to say the same things or they would be ignored by their directors.

Many decisions required information from multiple places. It was critical to have a business information model which offered a single view of the types of data

that existed and a logical information model which described how these various types of data related. The consequence of the failings were: additional cost, re-work to applications development and delays that crept into almost every part of their business. Levels of frustration resulting from poor data and incompatible systems were high, which impacted their people, their engagement and well-being. Levels of frustration that a bunch of strangers were paid small fortunes to tell them what they already knew.

Innovation
Traffic management technology changes very quickly (no, that is not a joke). Which sadist invented the speed camera? Also, the external environment changes at pace, though years of road works is how we know that judging speed as well as time is relative. Digital development and technology advances mean that data is everywhere, and customers can consume information about their traffic management network. The executive board decided that their reputation and the reputation of the department and even their right to exist depended on their ability to provide trusted information and services to the public, by protecting and treating traffic and traffic-related data and information rapidly and ethically every day.

The information vision and strategy created by the department reflected this ambition and captured their excitement about a connected future (they are civil servants, they take excitement where they can get it), enabled by information – that benefits employees, customers, stakeholders, society and the economy.

Vision statement
"Our vision is to realize the full value of information by empowering our people, connecting ourselves and building trust with our suppliers, stakeholders and customers. By providing information that can be trusted and valued by all, we can fulfil our purpose of connecting the country through better journeys. The future belongs to the connected. What connects our environment is us. What connects us is the power of information."
It reads just likes it came out of Dilbert's random mission statement generator.

We can agree this vision is not very brief, then again there is a lot of traffic in the world, so a long statement does impart a certain gravitas. In four primary objectives they describe what they hope to achieve:

- ✔ Harness the passion of their people to innovate and realize value from information.
- ✔ Treat information as an asset, and a means of achieving their strategic objectives.
- ✔ Build advocacy with their suppliers, stakeholders and customers by sharing trusted information.
- ✔ Use information to shape their future role as a great enterprise.

The Board wanted to have the opportunity to become a data-driven enterprise with the capability to unlock the value of their information assets and enable strategic imperatives. To highlight the size of this opportunity, they looked at how effective information management could support them, their customers and the environment. Based on their vision the Board formulated ten principles describing why they believed information was critical to success and to guide all their information management activities:

- ✔ We will use information as best we can, even if it's not perfect.
- ✔ We will increase the trust people have in our information by assuring its fitness for purpose.
- ✔ Information can affect people's lives and we will use it transparently and ethically.
- ✔ We need to understand how the information we collect is used by others to make sure it is good enough for everyone.
- ✔ We must continually earn the right to look after our customers' data.
- ✔ Information is a valuable resource that will be kept safe and secure from accidents and attacks.
- ✔ Looking after information has a cost we should understand and account for.
- ✔ We all have a responsibility to look after our information so that it is fit for purpose.
- ✔ Decisions made with information create better outcomes for our customers, stakeholders and ourselves.
- ✔ The value of information is only realized when it's used to help make decisions.

BIMC and the information strategy

From their vision the Board formulated an information strategy that sets out a roadmap and framework of being data-driven and how they want to achieve their vision. It describes how their information vision will be achieved to deliver value and realize the best possible return on investment. It also explicitly describes the need for BIM in the work of the enterprise if the intended future state is to become a reality.

As stated in their strategic documents, being data-driven will enable them, their customers and suppliers to make decisions underpinned by a trusted source of truth. Through developing their information management system and investing in data-to-intelligence capabilities, they will enable the strategic outcomes for their enterprise. This change will be delivered through three activities:

- ✔ Inspiring a data-driven culture;
- ✔ Providing data-to-intelligence services;
- ✔ Investing in data-driven capabilities.

Each of these activities will be a BIM (BIMC) responsibility.

7.6.2 Performance

The front line may not be the executive focus, though it is very important that you gather information about how the information services are performing so that you can provide any evidence about the need for BIM. In doing so, consider the following points:

- Does the IT supplier or unit have the infrastructure and performance instruments in place to accurately determine how the enterprise is currently functioning with regards to digital information service use, quality and need for improvement?
- What methods are practiced by the information service developers to ensure that the processes of design and delivery are continually improved? Is Agile implemented as a buzzword or truly a way of acting and thinking? Are communications effective?
- Describe the means used by management of the enterprise to discuss and develop objectives, provide required resources and organize work.
- Describe the enterprise process of dealing with user incidents, requests and problems in terms of the initial identification of issues, escalations, assignments, scheduling, time tracking, entitlements, ongoing information and knowledge collation, and resolution. Is the process 'ITIL-like' or 'ITIL-compliant'? The former generally implies a thoughtful approach, the latter a reliance on an expensive consultant model that may or may not add value and which is likely to focus on infrastructure issues.

The key to formulating strategy is not having a model of procedures, it is being aware that the combined brain power of a group of individuals needs to be focused on sensible, measurable goals and benefits that improve the business. The approach shown is valid for any strategic brainstorm. After all, is BIM so special that it should have a unique strategic thought process? Think before acting and eliminate risk where possible before spending money; mistakes are often more expensive to correct as time passes.

7.6.3 Compliance with policy, strategy and performance

- Can you identify the parts of the enterprise data architecture that are critical to your information services? Do you know which parts of the architecture represent risks (potential bottlenecks, capacity chokepoints, single points of failure, etc.) to the efficient operation of your information services?
- What communications and formal agreements are put in place to set the coordination for technology infrastructure and project architecture programs? Are the agreements contractual or legally binding? If so, how have they been working?
- Do the sourcing and procurement organizations in your enterprise get involved with making technology choices? How do they help?

- Is any group responsible for enforcement of the (various) architectures? Communicating the architectures? Guiding other groups in understanding and using the architectures?
- How do you manage technology decision-making?
- How do you determine the priority and impact of IT-driven project requests? Do you operate a planning unit, program or project office? How effective are they?
- What cost components are important to you in defining the value of your significant information services and your supporting technology infrastructure?

Case study: Article 17 GDPR 'The right to erasure (to be forgotten)'[35] user request

Introduction
A university receives a request from a former student based on Article 17 of GDPR: Right to erasure). Since this particular university was born out of several other universities, the amalgamated body has not designed processes to fulfil such requests and as the data protection officer is in charge of all GDPR-related requests, as is common, they will ask IT to remove the related data.

The issues
The first question is: Where is all the information about this student that needs to be removed and the second is, how do we identify the information that should not be removed? And if you think you have an answer, consider the local use by the student of Excel sheets, marketing applications using their own data and so on. What information did this student interact with, where is/was it stored, is it archived, who else was the student in contact with? And to what extent are you responsible for each and every occurrence of personal data somewhere in your IT-landscape?

BIM
The main concern relates to who REALLY knows what to do. This is why BIM should be in charge. DID has specific references to ensuring that BIM understands the holistic use of data across the entire IT infrastructure as well as in the business. Key to that understanding is being involved in all stages of the design of application services and use of applications.

7.6.4 Quality and efficiency

A quality management system (QMS) dictates that documentary evidence is available and that such evidence (data if you like) can be audited. Whatever the answers you may have unearthed in gathering evidence, this now needs to be documented to cement a quality-driven approach:

35 https://gdpr.eu/right-to-be-forgotten/

- Have you documented the enterprise data architecture? Does it correctly (and succinctly) describe the information services, systems, data, and applications aspects of your information services?
- How is the information services data architecture implemented in your enterprise? Is the architecture dictated by legacy services? Are there guidelines and procedures that guide the implementation?
- Are your data designers and architects sufficiently experienced and trained?
- Who has ownership of the current data architecture management process and who is responsible for implementing the architecture?
- What do you do to ensure that technology choices are consistent?
- Does every IT unit in the enterprise follow the standards and guidelines of the enterprise data architecture?
- How is information regarding problems and/or work requests analyzed and fed back to improve the technology or applications infrastructure?

7.7 DON'T GIVE UP

These words were sung by Peter Gabriel and Kate Bush, but there again they had loads of money and could afford to sing in clichés. That said, it is in fact true that persistence is needed to ensure a rigorous approach to BIM. Of course, the lists of questions cannot be definitive, though armed with these as a guide and amplified with the answers to many of the other questions we have identified throughout this book (and the DID Foundation book), you will be in good shape to prepare a business case that provides evidence of the need for BIM in your enterprise.

But what happens if you cannot engage executive interest? Firstly, you should identify an information service that is valuable, needed but unfit for purpose and dissect the service components. Then think about the information service in terms of the four domains, identifying how good Governance should be applied or better Strategic design, or perhaps simply Improvement. Identify the key (and expensive) Operation issues. Be flexible in your thinking.

Consider the service from all stakeholder perspectives to assess where improvements will be justified, cost effective and demonstrable. Then consider the drivers we have identified and sketch out how you can use these drivers to identify KPIs and CSFs for an improved service.

Calculate the costs of having to maintain the inadequate service and the impact of the service on the business. Then calculate the costs of improvement, and the money that will be saved through having a service that is not causing problems.

Remember that maintenance costs over the life of an information service far outstrip the cost of development[36].

You can demonstrate the improvement value for one business information service in this way; extrapolating these results into the likely outcomes of improving other information services should be an effective way to gain interest!

Setting up and operating BIM governance and BIMC is a change process that has far-reaching consequences for the employees. In order to improve the chances of successful implementation at an early stage, it is necessary to include them in the thinking and development process for the design (and functioning) of a BIM function that fits in with that of the enterprise. This can also mean that a different 'language' is created that fits better with one's own culture and discipline.

The road to fully realized BIM is characterized by behavior rooted in experience where it develops from reactive, through active, to proactive mode. But this development process is not linear. It is the route from 'good' to 'better' that makes the added value of BIM visible, it is not a targeted pursuit of a final phase in the development.

John Kay (who knew Steppenwolf lyrics would cover such arcane management theories. . .) describes this as 'obliquity'[37]; it (in this case 'it' is BIM. . .) is not the goal but the route to it that matters. And in general, this route is not a straight line. This is why we also state that, apart from the trajectory that it is developing, BIMC must strive to move from reactive, through active, to proactive behavior. This can only be reached if BIMC staff have sufficient time to gain experience.

Risks will manifest themselves differently in each enterprise, however all risks must be mitigated in a timely fashion. Various risks have been identified in the previous chapters. We list a few of the more important risks below:

- Too much focus on delivery and demand bundling and too little on users, customer satisfaction and governance.
- Too little capacity for planning and/or competence within BIMC.
- Too little sponsorship from higher management.
- Not taking the time to grow and gain experience.
- Forgetting to look back. Are the assumptions we made with regards to design and development still legitimate?
- Not enough visibility of the added value of BIMC.
- Failing to recognize when 'good is good enough'; knowledge of the market means insight into the range and suitability for one's own objectives and needs.
- Insufficient insight into the project portfolio and costs.

36 Verhoef, C. (2002). Quantitative IT portfolio management. *Science of Computer Programming*, 45(1), 1-96.

37 Kay, J. (2011), *Obliquity, why our goals are best achieved indirectly*, Profile Books.

- Too little interest in opportunities for cost savings, innovation and improvement.
- The lack of adequate risk management.

Often BIM is seen as being 'Something done by IT' (a capabil-**IT**) rather than being a management function that the enterprise depends upon to ensure the integrity of the information used to transact business effectively and appropriately. And business transformation often focuses on the operating model and not on the enterprise architecture, meaning that there is a gap between business and IT understanding. DID will help you to focus on innovation for the business by structuring the process of thinking about new services and will assist you in maintaining the integrity of the business data/information perspective.

This concludes Part 1 of this book. If you have been sufficiently inspired by now, read on. If not, have a drink and try again. In Part 2 we show several examples of how introduce BIM or to improve BIM using DID guidance. So, have a drink anyway.

Key points:

When implementing BIM, typically the first question is where to begin. There are two sensible approaches you can choose: bottom-up or top-down.
Basically, you cover five steps:

1. Step 1. Understand the business model: Understand the topic at hand, the position in relation to the DID drivers (i.e. where the topic impacts your business model) together with the environment of the enterprise and the position in the lifecycle.
2. Step 2. Governance, strategy and business transformation: Think about governance and strategy and any necessary business transformation by understanding your organizational architecture (the operating model of your enterprise) and the consequences for topics and issues to be analyzed in conjunction with other strategic themes and choices.
3. Step 3. Identify capabilities needed: Understand the necessary capabilities and identify business mission fulfilment capabilities.
4. Step 4. Present the business case: Present the business case for your project/ plan and make sure a management decision can be taken about your proposals.
5. Step 5. Secure the transformation: Implement the plans for transformation and make sure the developed solution is both permanent and robust in operation.

PART 2: IMPLEMENTING BUSINESS INFORMATION MANAGEMENT USING DID

8. CREATING THE INFORMATION SYSTEM STRATEGY

8.1 INFORMATION SYSTEM STRATEGY

If it is not clear by now, let's make things crystalline; BIMC (that's you, the practitioner) will need to be closely involved with the creation of the Information System strategy (IS strategy). When the BIM Board/ISSC (IS Steering Committee) mandates an Information System strategy it should be obvious that the enterprise will need BIM good practices, and therefore DID, or something similar to draw up the strategy. It is highly likely that you, the BIMC, will be required to support the BIM Board/ISSC, coordinate the creation of the strategy and, most likely, do most of its actual execution, so better then also engage in the actual writing.

The Information System strategy covers ALL aspects of IT, not just the technology. An IS strategic planning exercise typically comprises five phases, all of which to a greater or lesser extent require BIM input depending on the data strategy, digital transformation, or just getting information properly managed. They are:

1. Scoping study;
2. Strategy study;
3. Strategy definition;
4. Implementation planning;
5. Monitoring, tuning and review.

We use the DID guidance to create the Information System strategy.

8.2 SCOPING AND STUDYING STRATEGY

The study defines the breadth of the strategic planning exercise and identifies any issues which must be addressed before the strategy study can start. The study identifies how many strategies the organization needs; yes, there may be more than one needed. A business transformation, a data, a knowledge, an IT or even a relocation strategy.

The strategy study takes account of existing business reports, existing strategies, policies and business plans. From these, the planning team derives a series of business objectives and priorities. Current business operations are usually modelled in some detail, including details of the data/information requirements. This activity should involve the IT Services Departments and provides insight into how IT can be best utilized. A detailed appraisal of current application services and costs is also included.

From this analysis, a series of options or scenarios are identified. These are then evaluated in terms of the potential costs and benefits. Business objectives and business priorities documents are produced during this phase. These documents are of particular importance for subsequent planning and management purposes. The documents detail what the goals are and provide a weighted priority for each objective.

We will now explain the five steps for applying the DID model in the strategy study:
Step 1: Understand the issue at hand: you can use Table 8.1 to give you an idea of the types of key topics in each domain, with the perspectives helping to gain insight. Keep in mind what we mentioned earlier, namely that you need to distinguish between green field and brown field or (more likely) hybrid situations and consider how your thoughts correspond to the drivers.

Step 2: Ensure a comprehensive understanding of the business drivers in relation to the business information/data drivers. Take a look at Figure 8.1 to gain an idea of where the actions lie in the context of the DID model. Let's assume that you are unfortunate and your enterprise simply wants to transform every manual process that has existed since 1776 and build a digital world. That is your Mission; and now you must identify every possible capability that you will need in order to fulfil that Mission. Hopefully 'burning witches' is no longer a service that comes under **'Need'**, or at least if it does, no one other than the odd misogynist (unless you were in Iceland where male witches not were) or evangelical actually attributes **'Value'**.

Every service that is Needed and Valued needs to be documented in detail: data sources, how the data is processed, what the outcomes of the processing are, who does the processing, the storage, legal and security issues (now you should consider governance and policy as well), and you need to know what has to be done to identify new services, replace existing services or simply improve services that can continue to exist in their present form.

Table 8.1 Topics within the DID framework[38]

Plan	Do	Check	Act
1.1 Business Governance	2.1 Business Strategy	3.1 Business Improvement	4.1 Business Operation
• Responsibilities and policy making • Business change governance and P3O • Standardization policies • Knowledge management	• Enterprise vision for BIM • Business architecture • Agenda of strategic themes • Portfolio of improvements	• Business requirements • Description of information service offerings • Testing • Training and documentation	• User support • Service desk • Communication and training • Authorization
1.2 Data Governance	2.2 Data Strategy	3.2 Data Improvement	4.2 Data Operation
• Data exchange policies and contracts • Data governance committee • Master data management policies • Identity and access policies	• Information/data architecture • Information service lifecycle • Key performance indicator (KPI) models • Master data management (MDM) and models	• Data requirements • Enterprise data environment • The cost of information quality • Automated and non-automated information	• Master data management • Implementation quality plans • Data quality • Operating the data environment
1.3 Service Governance	2.3 Service Strategy	3.3 Service Improvement	4.3 Service Operation
• External executive relationships • Sourcing policy • Service portfolio policies • Service Integration	• Service portfolio management • Sourcing strategy • Service architecture • Service integration	• Build a service organization • Service requirements • Assembly • Service validation	• Service support procedures • Service measurement • Service monitoring • Operational supplier management
1.4 Technology Governance	2.4 Technology Strategy	3.4 Technology Improvement	4.4 Technology Operation
• Technology policies • Guidance on technology-related topics • Shared technology • Technology driving change	• Importance of the technology strategy • Technology integration • Information technology infrastructure • Joint procurement	• Deployment • Non-functional requirements • Testing • Technology watch	• Availability • Partner and supply chain liaison • Suppliers • Incident management

38 Remember the summary on the DID guidance at the beginning of the book. Within the DID model you can find the PDCA cycle on different levels. Mini PDCA cycles exist everywhere. On a different level, processes in each domain also should be continuously improved using the same approach.

Step 3: Understand the perspectives from which you should approach the issues. Again, refer to Table 8.1. and look at Figure 8.1, using the DID model.

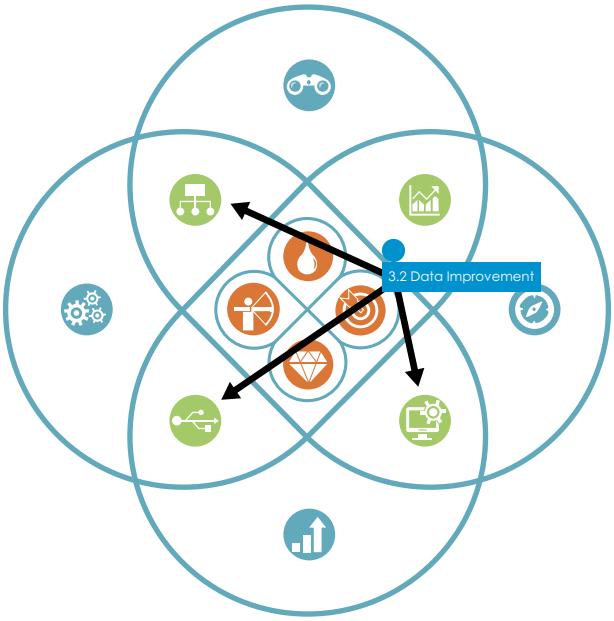


Figure 8.1 Using the DID model

Using Table 8.1, an issue belonging to **'3.2, Data Improvement'** will principally be examined from an information/data perspective; but make sure you consider business (need and value), service (new, replaced, 'as-is' or improved) and technology (do we need new/other technology?).

The more observant among readers will have noticed that we follow the PDCA cycle; this is not accidental. Placing guidance in the widely accepted Deming cycle for continuous improvement makes more sense than attempting to create some fatuous and useless model for improvement that improves precisely nothing that is already in existence.

Step 4: Find your issue on the model—ideally one that does actually impact your enterprise, and start following counterclockwise (or, depending on the vagaries of your enterprise and where you were, by necessity, compelled to begin your assessment, following clockwise) to Plan-Do-Check-Act the several strands in order to analyze the issues and understand the changes that need to be made. See Table 8.2.

Table 8.2 Using the DID model, starting with Step 3.2 Data Improvement

Plan	Do	Check	Act
1.1 Business Governance	2.1 Business Strategy	3.1 Business Improvement	4.1 Business Operation
1.2 Data Governance	2.2 Data Strategy	3.2 Data Improvement	4.2 Data Operation
1.3 Service Governance	2.3 Service Strategy	3.3 Service Improvement	4.3 Service Operation
1.4 Technology governance	2.4 Technology Strategy	3.4 Technology Improvement	1.4 Technolgy Operation

Figure 8.2 Analyze the Strategy domain

Step 5: Following the analysis, examine how the drivers are impacted (Figure 8.2) and identify where additional capabilities or investments are necessary.

To a large extent, this follows the steps taken by well-educated business/systems analysts, i.e., those that look at data and information; our book just aids in making you one too! The emphasis for BIMC is on the data and how it is needed and used; sadly, that emphasis has been overlooked for many years.

Case study: BIMC and IT network infrastructure

Introduction

IT enables enterprises to globalize their operations and achieve domestic and foreign revenues and profits through the coordination of similar value chain activities (such as procurement or production in LoB) across different geographic locations. These activities impact the management of business information to make decisions related to the activities and the management of knowledge and resources necessary to perform the activities. Overall, they effect the utilization of capabilities across the enterprise and will influence the framing of Board decisions about information and data.

Information management decisions at Board level can have consequences for IT deep in their operation. And *vice versa*, choices made at the basic level of IT operations can limit or strengthen strategic decisions made at Board level.

An effective network infrastructure enables enterprises to utilize global and local systems to communicate knowledge through different levels of the enterprise and provides an infrastructure through which to share, distribute and absorb knowledge across geographic and functional boundaries, to coordinate activities and develop strategic opportunities.

The issues

A multi-national enterprise with several subsidiaries, maintained connectivity through a single network provider. Since they operated in many countries, these subsidiaries had to reconcile different services from different service providers. To facilitate reconciliation, the multi-national had outsourced the entire global WAN to a single large carrier, that was then required to patch together the most cost-effective offerings from regional providers. Cost savings and a belief that information security would be improved were basic governance principles that brought the enterprise to their choice to outsource.

Contract renewal

Imminent expiry of existing contracts caused the Purchasing department and IT contract management to decide that because of technology changes and price decreases in the market, it was necessary and worthwhile to initiate a new tender. IT network infrastructure being incredibly sexy and entertaining,

meant that no one in the business areas had any interest in looking at the tender specifications; IT and Purchasing therefore took charge of the tender process and engaged architects from different subsidiaries to assist with contacting the market and requesting expressions of interest and preparation of information that would form the ITT (Invitation to Tender). Over coffee with one of the involved architects an information manager from centralized BIMC became aware of the activities, while discussing an unrelated subject.

BIMC

At the same as the ITT, BIMC (central and local) were working together with the different LoBs (and of course the IT department) to formulate a new data strategy for the next five years, involving the use of new technology platforms together with business analytics and artificial intelligence. These innovations were not an issue and were not considered a risk to the enterprise business model. BIMC teams were also aware of another development within the enterprise which was intended to lead to new business opportunities and would significantly influence the enterprise business model.

BIMC took responsibility for central oversight of the new technology platform, the data strategy, new business development and coordination of the networks refresh, and created a program plan that treated each of the projects both individually and collectively to ensure coherence.

This decision was taken because the Internet is an untrusted means for WAN transport, consequently using it as part of a corporate backbone requires significant planning to secure dynamic connectivity. In many cases, retail and financial institutions have deployed separate networks with local Internet exits to offload certain traffic, such as guest Wi-Fi. This is done to preserve bandwidth for the corporate branch and also to segment guest traffic for security and compliance reasons. Pending legal decisions and recent experiences with data leaks that had drawn attention to privacy and cybersecurity at Board level would, without BIMC attention, have threatened the focus on improvement and innovation.

Improvement

Tendering for significant technology upgrades without knowledge of new business developments could hurt the enterprise in both the short and long term. Hence, it became essential for BIMC to make sure that the data vision and strategy was in place before the tender process started. BIMC escalated the results of their investigations and the CIO intervened, paused the tender and agreed the program plan. Priority was set to make sure the data vision and strategy was formulated. The strategy would frame the structuring and choices

made by IT about the network infrastructure allowing contract management and the Purchasing department to progress their work. And of course, governance was improved by the Board becoming aware of the issues and making sure policy existed to cover future technology planning.

8.3 STRATEGY DEFINITION

During the strategy definition phase, the options chosen are developed into an outline portfolio of work. Estimates are made of the resources required and the business benefits that will result. This includes an evaluation of how the existing infrastructure will migrate to meet the new requirements.

Management and technical policies are formalized and documented at this time. However, additional work may subsequently be required before policies are finalized.

8.3.1 Using the capabilities

A practitioner will use DID to execute and govern the planning and development of strategic information services and data needs, strategize portfolio needs and plans, decide on the development and programming methods and prevent a framework Armageddon (see Figure 3.2).
To achieve this, you must analyze your current environment, use the drivers to identify what you need to transform and adopt strategic processes to provide context for business service design based on data needs.

The IS strategy plan should provide clear direction on the services that IT will supply to meet the needs of the business for the foreseeable future. The plan considers the business conditions and IS conditions, and how these will shape the business demands for information systems.

Current and future business conditions are considered in terms of how they may affect the business requirements for IS. This means quantifying the likelihood of changes in the business priorities and methods of working in the enterprise. Similarly, financial and other resource constraints must be defined. Much of this information is available from the business strategy plans. However, the implications for IS need careful evaluation.

Current IS conditions, including existing plans, require careful consideration. An understanding of the current position provides valuable information on the constraints placed on existing and future strategies.

The planning process produces options for future IS strategies. These options must be examined to identify the business and IS implications of each scenario considered. From these analyses, organizations can reach decisions as to what is expected from the IT Directorate during the planned period. With final management agreement, the planning team can convert the decisions into an outline plan for progressing any agreed strategies.

Many important decisions are made as a result of the IS strategy study. It is important to document the basis for these decisions and to make this information available to managers and planners who are responsible for subsequently implementing the plan. The role of tactical planning is to determine how the IT Directorate will supply the systems and services to meet the business demands identified by the strategy study.

As we mentioned, enterprise capabilities differ from sector to sector and must be identified in plans and documented. Supporting generic information/data capabilities can then be placed in context. You must now be very specific about the requirements of your enterprise. The enterprise strategy must be consulted and strategic issues identified.

8.4 IMPLEMENTATION PLANNING AND MONITORING

The decisions and supporting documentation from strategic planning are passed through to the tactical planning teams who are responsible for developing programs into detailed implementation project proposals.

A plan must be drawn up for the required work program. This plan must take into account the lead times for procurement, resource limitations and any inter-dependencies. Individual project profiles will take account of resources, funding and benefits. In the DID framework you will roll forward again, going from the Strategy domain to the Improvement domain and into the Operations domain as shown in Figure 8.3.

A proposed program of work must be produced, based on a realistic assessment of what is possible given the current priorities and constraints. Where conflicts arise between business priorities and the program order, the reasons for these must be highlighted to senior management. Where possible, these should be accompanied by ideas for overcoming such problems and their impact on the budget and timescales.

Figure 8.3 Implementation planning and monitoring

8.4.1 Monitoring, tuning and reviewing

This is a continuing activity whose objectives are to ensure that the strategy delivers the expected business benefits.

This can be considered as both an Improvement activity (in the sense that where data needs are not being met, you can initiate activities to fix the problem before it impacts business) and an Operation activity because problems might not be spotted until services are being used in anger.

8.4.2 IT infrastructure planning

Business and technology are in a constant state of change. The rate of technological advancement in the computer and telecommunications industries is ridiculous for hardware. However, for software this is not the case, in fact the better the hardware the better bad software still runs on it. And for managing software it's even worse: we keep on making the same mistakes. This rapidly changes the investment options available and poses difficulties for the IS strategy planner. By choosing inappropriate technologies for hardware, software and network services, and inappropriate management of these endeavors, in the long term the IT services planner could significantly constrain the enterprise growth, and technologies may be difficult to change. The choices materially influence how we use data; the practitioner needs to be aware of technology, developments and potential for use. Think about AI for example; the potential for loss is as large as the potential for gain. You can and should influence selections, though you are not responsible for procurement.

IS strategy planning must address the IT needs of the organization for the strategic planning period. This is an important consideration for the business. The ideal situation is where the application systems and supporting data can be supported on a wide range of technology without significant change or dependence on specific systems.

Infrastructure planning transforms the program, or programs, that emerge from the strategic planning exercise, to add new or enhance existing IT services in support of changing business needs into a set of projects. The process makes a more detailed assessment of the actual resources available and current constraints and risks. The emphasis is on what will be delivered and the infrastructure changes that are necessary to support these deliverables.

The limitations on resources must be resolved during tactical planning. These limitations may be due to current commitments, such as maintaining existing services and existing development projects, or financial constraints. Final arbitration of what is to be achieved will be decided by the business priorities and data needs established during strategic planning.

8.5 WHAT WE DO IN THE SHADOWS

Not just a great movie, but a good description for BIMC. At every stage in the strategy formulation, if you are not involved in ensuring that the right information is being made available at the right time so that your enterprise will prosper or your government department will properly serve the citizen, then who is?

If you know the answer and responsibilities are defined, documented and clear, then everything will be wonderful. Though let's be realistic, much of the detailed nuances and improvements do exist in the shadows where most people have either forgotten to pay attention or simply assumed someone else (anyone else) is responsible.

Having covered the issues of good foundations, execution and the myriad capabilities you would hope to find in the enterprise, we can now consider how BIMC should work. If you think that having wall-to-wall planning bodies and resources devoted to implementing back-breaking processes is what is needed, think again. Many activities will, in the modern world, be managed through intranets and the Internet and it is likely that many roles and responsibilities for capabilities will be vested in only a select few. That creates two problems; you are going to be busy and you will need to convince the wider world that they require BIM.

9. IMPLEMENTING BIMC

9.1 A ROADMAP FOR BIMC

The intelligent customer guidance suggests the following as a roadmap for '*how to get started*'. To a large extent, any roadmap depends on knowing the state of play in your enterprise and, with regards to BIM, whether or not BIM activities actually exist. With that in mind, you should think about the state-of-play of BIM right now and whether or not you need to do some 'marketing'.

Remember the Introduction? BIM is the ability of the enterprise to set up an expert interface between all business information activities and the users and suppliers of that information; ensuring a strategic design and execution for the governance and management of the BIM organization. By now you know why the enterprise needs a BIM coordinator (or a team, depending on the size of the organization). BIMC will support business managers, IS planners (governed by some form of BIM Board/IS Steering Committee, the ISSC) and program directors in translating the policies of the Management Board (the guiding principles) into purpose and direction for the managers of IT services.

The generic features of the best practice of 'the intelligent customer capabilities' are used when designing the BIMC organizational structure.

We can distinguish four areas of responsibility within the value chain of the generic BIMC. These four are illustrated in Figure 9.1.

The focus areas of customer management and policy, innovation and advice (PIA) form the demand management side of the intelligent customer. This is about matching supply and demand. Demand management deals with topics such as: researching, identifying, combining, rationalizing, standardizing, modulating and prioritizing demand. Only enterprises such as Google and Facebook can truly claim to have performed these activities religiously, which is what you should be aware of when using Facebook, since in practice it is using your data as a profit generator.

The areas of focus for contract management are supply management together with topics such as market conformity and market standards, relationships with suppliers, contracts, legal aspects, performance agreements and control.

Supply and demand management are inextricably linked and highly dependent upon each other.

9.2 OPENING UP BIMC: FOUR RESPONSIBILITIES

Policy, innovation and advisory (PIA) management requires that needs are translated into products or services that must fit within standards and agreements as applied by the enterprise. Clearly this is a planning task and is therefore strategic, dealing with the necessary policy. This responsibility fits within the Business perspective. **Contract management** (the 'Do' element of the Deming cycle) will be needed to drive the purchase of required products or services and the DID perspectives of Information and Services will be influential in determining the design of the necessary services. Contract management is a responsibility that BIMC undertakes to make agreements with the market (with some activities also relevant to the design and build of services by internal departments). These agreements must be managed.

Management control is the 'Check' element of the Deming cycle, ensuring that any contracts (or agreements) made are met and the finances are guaranteed. This responsibility should be undertaken within the DID Service perspective. All policy directives and strategic principles and designs should be thoroughly audited.

User management (the 'Act' part) is responsible for all internal needs or questions that must be articulated and addressed. This responsibility fits within the Services and Technology perspectives. Where BIM and DID are concerned, the need is to ensure that services process the required information as they should, that data is both accurate and properly managed, and that the needs of business have been fulfilled. Feedback about, for example, the design of the applications or the limitations of current technology will help the Board to provide for continuous improvement by influencing new or adjusted policies and, therefore, new or improved services.

The four responsibilities are linked to one another through information processes/services. In the main process – ensuring the delivery of the information services (delivery process) – two streams are recognized: standard user needs or standard user services, and specific user needs or user services.

Examples of standard services are requesting a new password, the request for a new workplace or for data (reports) to be circulated. Examples of specific needs are the application for a license for a non-standard software package (for example

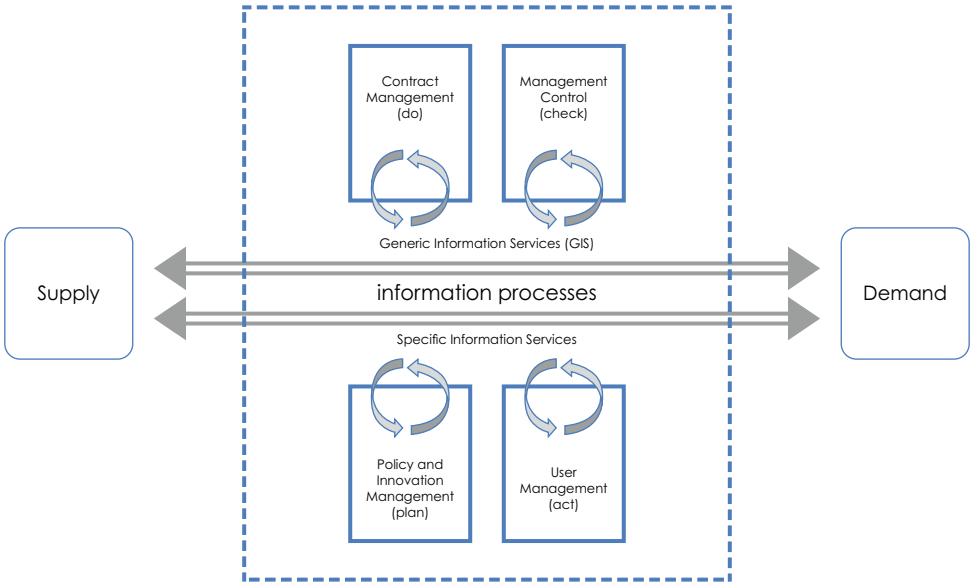


Figure 9.1 Opening up BIMC: four responsibilities

a word processor specifically incorporating mathematical symbols), demand for new information services based on new policies, the application for a new software package or implementation, or the conduct of a tender. For the moment we will use these two types of information processes to explain the functioning of BIMC. With regards to BIM, it is clear that accuracy of data is a key component in the ability of any BIMC to be able to guarantee quality of services.

BIMC will need to address standard and non-standard information sources, information requests, processing, storage, archiving and sharing issues.

Non-standard needs are, surprise, surprise, not known in advance and answers cannot be planned. PIA management will have to examine the best solution as and when such questions arise. In cooperation with contract management, we can look at which solution is the most suitable (and thinking as one of the capabilities of the intelligent customer), can be supplied by the market. Performance management is also a process within control management.

In general, we see these four responsibilities reflected in all enterprise forms of BIMC. However, it will differ for each enterprise in terms of whether responsibilities are carried out locally, by third parties or by other enterprise units where different departments have to work together. In terms of BIM, employing the DID domains and perspectives as lenses through which to apply intelligent customer thinking will radically improve the ability of the enterprise to design and build robust applications that process data effectively.

9.3 BUILDING BIMC USING DID GUIDANCE

Now use the DID model to understand and organize the activities within BIMC.

The necessary BIMC capabilities, extrapolated from the intelligent customer guidance, are linked to one another in a quality cycle in the form of the Plan-Do-Check-Act (PDCA) cycle. The DID domains (Governance, Strategy, Improvement and Operation) are directly related to PDCA. Each main step from the Deming circle contains a cluster of responsibilities. These responsibilities relate to BIM responsibilities in the four DID domain (Governance, Strategy, Improvement and Operation) and its perspectives (Business, Service, Data/Information and Technology), and would be the responsibility of BIMC. The various responsibilities are the substantive tasks of BIMC and therefore the business information activities can be related to the best practice intelligent customer responsibilities. These four responsibilities are:

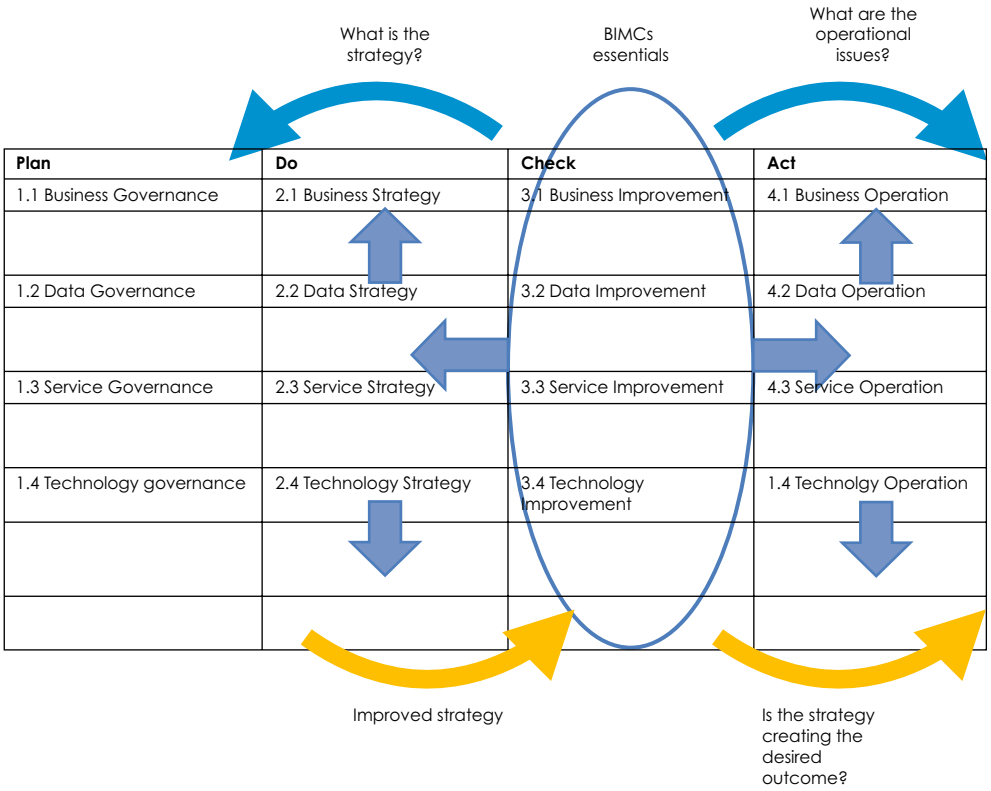


Figure 9.2 Building BIMC: Analysis of outcomes

- Policy, innovation and advice (PIA) management (Plan, mostly Governance in the DID model);
- Contract management (Do, mostly Strategy in the DID model);
- Control management (Check, mostly Improvement in the DID model);
- User management (Act, clearly the Operational focus of the DID model).

Step 1: Understand the issue at hand; you can use Table 9.2 to give you an idea of the types of key topics in each domain, using the perspectives to gain insight. Keep in mind what we mentioned earlier, namely that you need to distinguish between green fields and brown fields, or hybrid situations and consider how your thoughts correspond to the drivers. In Chapter 6 we presented a straightforward approach to BIM; now we go forward with a more complex but more effective approach using BIMC. In this case, the essence of BIMC can be found in the Improvement domain. Basically, all topics in this domain must be covered to support operational and strategic information management.
Step 2: Again, we follow the PDCA cycle; this is not accidental. Placing guidance in the widely accepted Deming cycle for continuous improvement makes sense. Thus, we need to look back to discover if strategic issues were covered, and forward to see whether all necessary issues in the operational perspective are taken care of.
Step 3: Start with an issue in the Improvement domain. We have selected *3.1 Business Improvement* in the model—it is not important **where** you start but following the flow that we describe will make it easier to draw the DID model and cover the issues that arise.

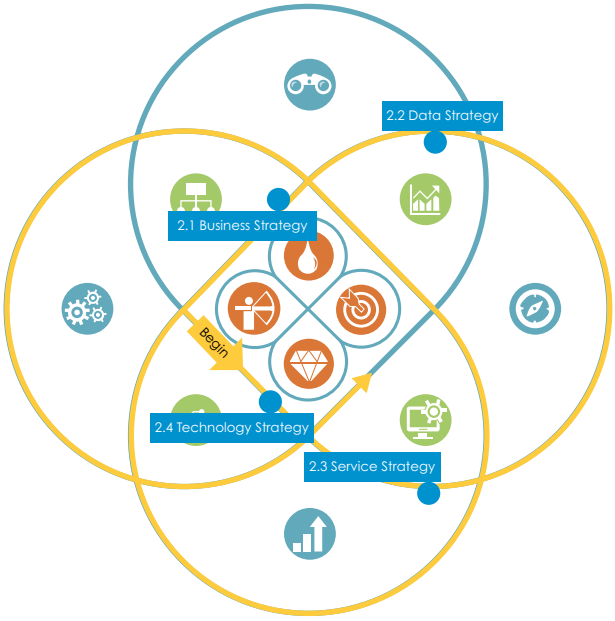


Figure 9.3 Implement and improve BIMC

Next, follow with the Strategy domain, and decide on the changed strategy that translates into improvement actions. In the model you will navigate back from the Strategy domain into the Improvement domain where the strategic actions are translated into implementation plans and activities and are implemented within the Operation domain.
The process then indicates several strands that you should amplify to analyze the issues and understand the issues to be covered. See Figure 9.3.

9.4 RESULTS OF ANALYSIS IN THE DIFFERENT DID DOMAINS

9.4.1 User management

The first step is to make the connection with the business and users. What is the need? Why is this need there? Does this need occur in more places within the enterprise? In practice, you never have to start from scratch. Consider the well-researched use of IT in the enterprise; evidence suggests that technology is rarely implemented in a 'green field' situation; even where this is a policy statement, most often projects fail because of an inability to recognize that implementation must be based on existing technology. There is always a legacy issue with IT. This is the case for any BIM project; unless you work for a start-up that erupted from a brainstorm in the local pub, most data sources and processes will already exist, albeit if most are chaotic and were constructed without a strategic overview.

In the case of BIM, consider the Need and Value drivers in the DID model and, of course, BIMC must also assess the viability by examining the tension between the Mission of the enterprise and its current Capability.

While working, a network of relationships within the enterprise will be built. It can and should not end there. This relationship structure should be based on the principles of the intelligent customer capabilities. For example, the following capabilities have been identified within the focus area of customer management, though obviously they do not apply solely to the generic intelligent customer:

- Relationship management (internally focused). The goals are maintaining professional relationships with business and stakeholders with the following objectives in mind: recognizing user needs and developments, receiving requests for new or adapted services, identifying suppliers, recording agreements with customers, steering the results and complaint handling.
- Advising/information management. Translating business demand or policy demand into services and possible solutions, taking into account the dependencies between business processes and information systems, as well as providing insight into the (financial and other) consequences of the proposed solutions.

Case study: Setting up a Business Change Advisory Board

BIMC and assessment of change

Consider an enterprise that has four LoBs; each has a 'local' BIMC implemented to keep watch over the data needs of the day-to-day management of BIM. One of the LoBs is commissioner for a multi-million business application renewal project. After two years it becomes apparent that changes in the specifications are required as a result of new business developments. Originally it was decided by the Board that a 'freeze' should be in place, that is, no changes would be allowed to impact the specification. A specific governance rule was that any changes that had consequences in time and money were not allowed unless mandated by the steering committee. However, this rule was not implemented.

It soon became clear to project teams that specifications were either incorrect or had not been thought through and that it would be sensible to disregard the freeze to make the new IT fit for use. Primarily, the changes seemed to have only technical consequences, but the local BIMC discovered that the so-called technical changes would have major business processing consequences. BIMC also discovered that management had become aware about changes too late in the process. By then, changes were already agreed on and budget had been allocated to project teams, and in some cases already spent.

Establishing control

Only after project control was properly executed was it found that budget overrun was inevitable because of changes that had been accepted without official executive mandate. Project management therefore requested a change procedure for the business *before* technical impact analysis and proposals were issued to avoid any discussions on business needs and the financial consequences being undertaken by those without the necessary business experience (in other words, IT). The change procedure was set up according to the following agreement.

Local BIMC was charged with the creation of a Change Advisory Board (CAB) within each LoB to make sure that any changes, either technical or relating to business processes or functions, would first be presented and analyzed against business use, the consequences for project lead time, risks and possible budget implications.

The CAB process was set up largely along the lines discussed in the ITIL framework, adapted for the specific needs of business and information, and chaired by BIMC. In particular:

- ✔ When potential improvements/changes are identified by the supplier or the business, the change subject should firstly be discussed in the CAB. Only after discussion and agreement by the business will further impact analysis be mandated. After any further impact analysis, the changes would need to be presented again to the CAB.
- ✔ A description (using a standard format) needed to be created presenting the impact of the possible improvement/change. Before the final decision could be taken, four steps were foreseen: initial presentation, impact analysis, advice by the CAB, decision by the directors. If the change was likely to be larger than a specific amount (in this case 70k euros) the formal steering committee would be convened to make the decision.
- ✔ All changes, including those not accepted, were to be registered in a BIMC CAB register.
- ✔ The Change Advisory Board (CAB) now meets every four weeks, where all changes are discussed and any decisions are taken. The contract manager is responsible for communication liaison with the supplier. BIMC is the liaison to executive management from the LoB. In case of urgent requests, the CAB can be convened earlier.
- ✔ Only directors can schedule a discussion of urgent requests.

BIMC took control over the entire business change/improvement process because of business ignorance of IT and IT ignorance of business. Neither business nor IT were to blame for their lack of knowledge because both disciplines are so radically different. However, where improvement is key (as described in the DID model), then simply hoping a change will do the trick really does not work and it becomes clear that expertise is needed to make sure everyone is content with new services.

Of course, by setting a governance rule of, let's say, 70k Euro, you need to know you run the risk of missing many artificially small changes that stay under your radar, but in concert lead to a significant change with serious and unintended impact. Another risk is that some changes that in fact need more budget will be structurally underfunded. You need to keep a sharp eye on potentially related changes and their associated impact and no doubt unexpected cost.[39]

9.4.2 Policy, innovation and advice

If BIMC has made contact with the customer (the customer may have also taken the initiative) and has identified a need, BIMC must translate this need into a solution (which might also be: Computer says 'no'). In order to be able to do this, BIMC must have insight into the matter, the issues, the technology, the concrete solutions

39 Verhoef, C. (2007). Quantifying the effects of IT-governance rules. *Science of Computer Programming*, 67(2-3), 247-277.

that are available internally or in the market and the solutions that may already be available elsewhere in the enterprise. Based on this responsibility, the following capabilities within the focus area of policy, innovation and advice are needed:

- Policy and strategy formation and preparation of strategic plans.
- Developing and maintaining the business strategy: the vision, spearheads, priorities and multi-year planning for the services of the enterprise in order to help realize the business strategy.

This means clearly defining the strategy and translating it into the services that the intelligent customer provides in such a way that the synergy with, and the development of, the enterprise is optimally based on internal and external developments. The chosen strategy is then blueprinted in strategic plans:

- Manage architecture/blueprint of business operations. The goal is monitoring and controlling the architecture/blueprint of business operations, i.e. the consistent set of principles and models that coordinates the design and realization of processes, enterprise structure and information provision, including monitoring the optimal use of services.
- Portfolio management. Determining and monitoring the technical and logical coherence between the systems. The correct timing of new investments is important for the growth of the business. This does not necessarily relate just to investments in new systems but can also mean that investments are made in existing systems. In both cases it is important to prevent legacy problems (such as those with technology) and to alleviate problems that have already arisen in outdated services.
- Program management. Managing projects/programs that are executed by the project managers or suppliers on behalf of the customer enterprise. Coordinating the mutual coherence of those projects and making optimum use of the opportunities for synergy.

9.4.3 Contract management

After determining which solutions are suitable for improvement proposals, contract management comes into the picture. Contract management researches the market for suitable service providers and takes care, often in conjunction with Purchasing and Finance, for contracting including underlying service level agreements. Where services (or application development) are outsourced it may be necessary to examine possible service integration with the service provider to ensure coherence in the information and/or partner supply chain. Capability within contract management involves:

- Contract management, managing contracts at the strategic and tactical level. Negotiating contracts, adjusting contracts when changing circumstances require, monitoring the intended goal(s) (from best buy to partnership).

- Supplier management, managing supplier relationships. This means having knowledge of the market and developments therein, understanding the supplier position and the range of services.
- Services integration, managing the information and supply chain. The monitoring and safeguarding of the coherence of the supplier-transcending production processes and the infrastructure, including ensuring proper agreements with regards to the functionalities of the total (production) chain.

9.4.4 Management control

After the agreements have been put in place, the service can be delivered. Performance management actively monitors whether the service agreements made are in accordance with contracts. Activities within performance management are:

- Control and measure. This involves monitoring the quality of service. It includes measuring, analyzing, evaluating and improving the results (quality, costs, satisfaction) of services and managing the service catalogue.
- Quality management includes monitoring and checking the efficiency and legitimacy of the services provided.
- Financial control and analysis, which includes monitoring the entire budget. The intelligent customer will be responsible for preparing financial analyses and coordinating any payments to the supplier with the financial administration. BIMC is unlikely to embrace total responsibility for this monitoring, (unless no one else is responsible), though it is recommended that they take full control of the process regarding the development of information-intensive application development.

These elements are generic intelligent customer capabilities. By this we mean that these elements are needed in every BIMC. They form the foundations upon which a BIMC within the BIM Governance framework can, in principle, be designed.

However, it is the variation in size, scope, content and complexity of the BIM needs of the enterprise that makes every BIMC different.

9.5 QUANTIFYING THE ADDED VALUE OF BIMC

Can we quantify the added value of BIMC? On the cost side this should be doable. The costs mainly comprise personnel costs and because expertise is important, these costs are relatively high. Quantifying the benefits is more difficult unless the process of benefits management (discussed in the DID Foundation publication) is in place.

Without BIMC, the supplier has free rein, customers can ask for whatever they want and if that demand is insufficiently managed, this can lead to substantial additional cost overruns when designing and building business applications.

Moreover, in an IT-outsourcing context, demand management is paramount to achieving success.[40] Added *value* arises from more effective use of resources, preventing excessive costs and combating hidden costs. The cost-of-service development should be transparent to all parties and the customer should know and understand what they are paying for, what this entails and how their expectations will be met. Otherwise, you can expect the customer experience to be poor and the usual backlash to occur about failing to meet expectations.

Looking at potential benefit in this way, where customer satisfaction is 'built in', makes the use of BIMC become a clear and obvious necessity.

More effective use of resources and control of costs
BIMC can earn money for the enterprise. On the one hand by preventing extra expenses or costs (cost avoidance) and on the other hand through the effective use of demand and supply bundling (economies of scale or smarter, enterprise-wide portfolio management). The latter assumes that BIMC has a good understanding of the products and services that are being delivered and the underlying architecture (generic or not) or structure of the enterprise.

For example, a supplier can sell licenses multiple times to different users. With BIMC in between, the chance of this happening is much smaller because there is a portfolio-wide overview. A study of portfolio management within the business world shows that just having a good overview of the total portfolio can save enormous amounts of money.

With a perspective on enterprise digitization and the data issues that pertain, it does not take much imagination to identify the cost savings that could be made by avoiding duplication of databases and inconsistency of data. Think of the value of the data to the social media companies and search engines.

Make hidden costs visible
When everything is in-house, there is little pressure for the need of documenting hours or charging (internally) costs for all activities. External suppliers generally think differently about this. The result is that these invisible activities suddenly become visible. A rough estimate is that these costs are at least 5%. With regards to BIM, hidden costs are most likely in the duplication of data and in data accuracy (which in most enterprises would better be described as inaccuracy).

40 See G.P.A.J. Delen, R.J. Peters, C. Verhoef, S.F.M. van Vlijmen, Lessons from Dutch IT-outsourcing success and failure. *Science of Computer Programming*, 130 (2016): 37-68. And G.P.A.J. Delen, R.J. Peters, C. Verhoef, S.F.M. van Vlijmen, Foundations for measuring IT-outsourcing success and failure. *Journal of Systems and Software* 156 (2019): 113-125.

For BIMC to have the right to exist, it must at least be able to provide evidence of how the function recoups its costs. This can be achieved through the documentation of cost reduction, demonstration of effective use of resources through, for example, smart demand bundling and portfolio management, prevention of failure, and the prevention of additional costs by continually assessing whether the requested service is justified or necessary.

10. CREATING A BIM STRATEGY

10.1 FOCUS ON OUTCOME

Creating a BIM strategy means clarifying, creating and refining the strategic vision, strategic issues, strategic themes and the candidate programs and/or projects that will commence after approval. The strategic vision expresses the projected future for the enterprise, its desired position in relation to its partners and supply chain ecosystem, and the outcomes it wishes to bring about, both within the enterprise and in its dealings with customers and information chain partners.

10.1.1 Creating a strategic BIM vision

The strategic vision can be seen as a blueprint for change. It might well focus on a number of related (and sometimes unrelated) changes that are managed in the Improvement domain and should be fundamentally focused on outcomes, which are set in policies defined in Governance. Outcomes are the changes the enterprise or LoB aims to make in order to improve the benefits for the good of the enterprise and/or its customers or partners. Government examples might include a healthier population, or improved access to education, perhaps a reduction in crime or in the reduction in cost of public administration. Information services will be essential for each of these themes, for instance the collection and distribution of healthcare information (which will be subject to privacy regulations), the creation of accessible websites and distribution of information, and the collection of financial data for action.

BIM is important to ensure that strategic themes are enacted as expected. Consider also interface changes, focusing on how the enterprise positions itself in relation to its business environment, both internally and with partners, in terms of how it will do business or how its business needs will be achieved (perhaps through new ways of working with suppliers and/or customers).

Although BIM is not directly concerned with internal changes that focus on how the enterprise wishes to be constituted, such as any internal restructuring, infrastructure

renewal or even a change of culture, it must be influential in ensuring that such changes reflect the need to manage information with integrity and in line with BIM governance.

Results that are strategic but represent only a stage along the path to achieving more significant outcomes are known as intermediate outcomes. In your enterprise, a program directing the work of an employee training scheme might increase the number of employees trained to certain levels, or in certain disciplines (one of which might be sales). For this scheme, an intermediate outcome might be a raised level of sales expertise in the workforce, and a final or policy outcome could be the beneficial effect on market share.

10.1.2 Strategic issues

An issue is a challenge facing the enterprise that requires action. It may be regarded as a problem or an opportunity. Issues that are critical to the enterprise's high-level plans for realizing transformation outcomes, or that could jeopardize its business, are referred to as strategic issues.

All enterprises will differ in terms of the issues to which they must respond, there is no 'one size fits all'. The range of relevant issues will depend on individual circumstances, although many enterprises will identify common elements. Generally speaking, we can identify four categories:

- Business: how the enterprise interacts with its customers, information chain partners and its suppliers, how it provides its services and improves efficiency or revenue by meeting rising customer/citizen expectations or through the need to streamline supply chains.
- Political: decision-making, hierarchies, policy issues, e.g., the need to address public perceptions of a policy, for example one relating to a sensitive issue such as crime or health, or where successful delivery requires collaboration and commitment from enterprises or organizational units within the enterprise that report to different management boards.
- Cultural: values, attitudes, competences and relationships, such as the need to change the existing behavior of staff and customers in order to work in new ways.
- Technical: IT, business information management and communication concerns, e.g., requirements for robust security on information provided and shared electronically, digital delivery, cloud native, the capacity of technical resources needed to deliver high levels of service performance and common standards for information exchange and interoperation.

A critical success factor for a strategy is being able to demonstrate that a key issue has been addressed in a way that is clear and enables outcomes/benefits to be measured.

BIM therefore must be addressed strategically with specific measurable goals based around themes for improvement.

10.1.3 Strategic themes

Strategic themes are the areas of business activity in which the enterprise needs to engage to meet the challenges posed by strategic issues. BIM should be aware of, and monitor, strategic themes and issues to gauge the influence of them on information services and to identify any necessary improvements to information services.

The strategic vision describes the desired future, in broad terms, which will be the intended outcome of the changes undertaken by the enterprise. Strategic themes are the specific areas that must be addressed along the way. A road map to the desired future of BIM in the enterprise is mapped to strategic themes.

To illustrate the relationship between strategic issues, strategic themes and candidates for action, an example for an enterprise providing online services to its customers might be:

- Strategic issue – the pressure to improve quality of service in online transactions because of poor customer experience;
- Strategic theme – improvements in information provided to frontline staff, requiring better linkage between front and back office.

Candidates for action might include enterprise-wide electronic document/records management, Internet access, and a program of staff training; each of these being wholly dependent on effective BIM.

Some possible strategic themes for each of the four types of strategic issues (business, political, cultural and technical) above could be:

1. Themes relating to business issues:
   - Responding to customer information needs;
   - Dealing with competition;
   - New requirements for products and information services;
   - Requirements for partnering and other new external relationships;
   - New ways of doing business, brought about by new technologies, social media or automation of existing manual processes;
   - Reorganization to improve efficiency;
   - Regulatory changes.
2. Themes relating to technical issues:
   - Using innovative IT to improve support for the business;
   - Using IT to transform the business (for example, through e-business, or apps);
   - Improved management and processing of information;
   - Restructure of tasks and processes;

- Facilities for communication, within and beyond enterprise boundaries;
- New systems for management, monitoring and regulation.

3. Themes relating to political issues:
   - Decision processes;
   - Sources of power and influence in the enterprise;
   - Definition of policy;
   - Relationships with the external environment;
   - National and international regulatory issues.
4. Themes relating to cultural issues:
   - Enterprise values;
   - Communications in the enterprise;
   - Stakeholder perspectives;
   - Skills of staff and new skills becoming necessary;
   - Internal and external structures and relationships.

There are some obvious critical tests of success for this strategy. Services must be:

- Joined up around customer needs, offering them valuable information services;
- Accessible, secure and reliable;
- Delivered and supported electronically, seamlessly and jointly by enterprises and departments that should be part of an information chain;
- Open and accountable;
- Able to be used by everyone entitled to do so, as mentioned above; not everyone can afford a smartphone, not everyone has access to the Internet, and not everyone wants to communicate via these means, e.g., when this also implies risks (for instance banks changed the conditions on Internet services such that the client is, in principle, responsible in the case of Internet fraud). Business information must, therefore, be available to everyone, leading to a conclusion that paper will still be needed somewhere.

10.1.4 Creating and managing the strategy

Managing business, IS and IT strategies is about creating, harmonizing, implementing and monitoring strategies for the business and the information services and information technology that support it. In other words, it is about managing strategically so that the enterprise business is supported, enabled or transformed in the most effective way possible by its information services and its information technology.

Creating and managing strategies follows three stages of planning, followed by the ongoing process of strategic management – implementing the programs that have been decided upon, and reviewing and updating the strategy. This is the sequence of activities that must be undertaken regarding the components of strategic management, cascading from strategic issues through major themes to individual programs and projects of change. The three stages of strategy development are:

- Business analysis (looking in detail at the issues facing the enterprise, how things are currently done);
- Deciding the future state that the enterprise should move towards and identifying strategic themes;
- Strategic planning, translating strategic themes into candidates for action, prioritizing these and assisting executive management in deciding how to proceed.

The main characteristic of strategy formulation in the early stages of any strategy study is synthesis: identifying patterns and creating candidates for improvement from a wide spectrum of inputs. BIM should be focused on improving the way information is made available and information services are being used. The quality of service design, leading to the integrity of the application processing of the data and appropriate security/confidentiality are as important as the availability of information services. The third stage of strategy development involves shifting the emphasis from strategy formulation to high-level planning, which is the necessary basis for detailed planning and implementation. Detailed planning will generate detailed breakdowns of activities and resources required, which is discussed in Section 4.4.

The strategy for the enterprise, be it the enterprise as a whole, an individual LoB, or its information services, should include as part of its overall mission, a strategic 'vision' that promotes BIM. The vision is a long-term view of how the enterprise wishes to position itself in relation to its business environment, for example, its role and functions, the products or services it will deliver, its relationship with customers or competitors. BIM should not be 'just another trend'; it should have an agenda for improvement.

10.2 AGENDA OF STRATEGIC THEMES: ANALYSIS AND DECISIONS

BIMC should focus upon the significant areas of improvement the enterprise needs to address in order to respond to the risks and opportunities it faces. These themes will form the focus of interest for the Strategy domain. The enterprise might need to change in terms of organizational units, and in turn business functions and activities, product and service delivery, management and staffing issues, technology or external relationships will all alter and have an impact on business information.

The policies which guide the decision-making processes, and provide a framework for management decisions, will influence the patterns of behavior which drive the enterprise towards the desired future; governance policies will be key to changing behavior. The policies can be regarded as the 'strategy success factors' – those

which the enterprise must focus upon if it is to move in the direction of the desired future and if BIM is not one of those success factors then it will inevitably fail to become established.

10.2.1 Analysis using DID model

Again, the analysis follows the same approach as we have seen earlier. However, in this case, we stay within the Strategy domain although we should reflect all topics in relation to Governance to see whether they are still valid. Begin at *2.1 Business Strategy* (see Figure 10.1 and also Table 2.1 (for reference)) and follow the topics coming from the four perspectives on the Strategy domain.

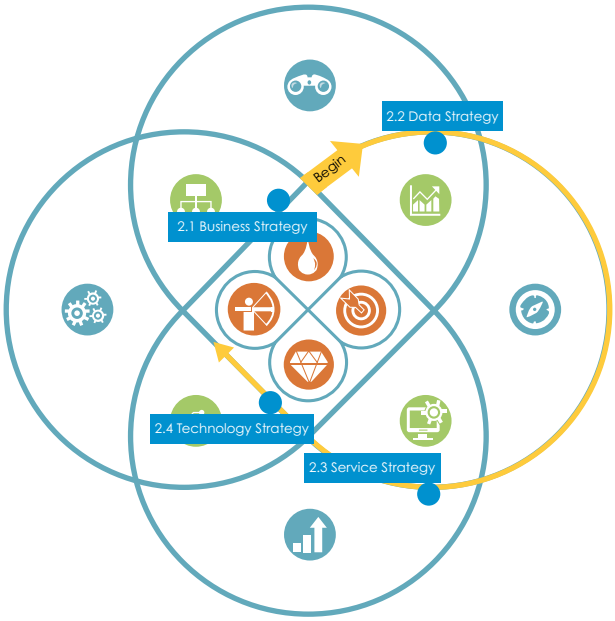


Figure 10.1 Analysis using DID guidance

10.2.2 Business strategy

You should have reached a view on whether your current business information services, the IT infrastructure or data structures are a part of your business problem, or are largely irrelevant to it. And keep in mind that improvement will depend on careful planning of any required changes.

As an outcome of your deliberations, you should be aware that some of your IT applications will become redundant because they either do not support current or future demands for BIM, or they are a cause of poor-quality information being used. You may need new or substantially modified applications. You may need new network and computer capacity. You may need your infrastructure to have greater flexibility.

So, before using your understanding of your current IT to improve it, you first of all need to assess its continuing relevance to the new business environment. In any respect, the changes to the business portfolio and its impact on information services, whether carefully planned or disrupted by events will require you to understand portfolio, program and project planning.

10.2.3 Data strategy

The strategic focus will most likely (or it should) consider how all LoBs can be better served by creating useful common modules of information and data that are used by many LoBs (for example the name and address of a customer might be shared across many enterprises in the information chain).[41] At the LoB level, strategy is an amplification of perspectives of the enterprise strategy. The focus is on the interpretation of enterprise policies and their enactment to ensure the right information is being captured, processed and used, and to establish that appropriate outcomes are being met.

The information policies and principles set out in the Governance domain will impact data architecture, modelling, data portraits, database design, and data administration and data stewardship. Data portraits of customers will be subject to privacy policy and external regulation, though some enterprises will see the opportunity to mine data and prefer to take risks.

Business areas should be represented in the committee where policy is adopted, and they should be free to be able to negotiate flexibility or with degrees of compliance. Where a LoB negotiates exemption, it is not enough to simply say "*OK, we are now free to implement Apple computers instead of Microsoft Windows because we prefer to develop our ideas on a Mac*"; a proper exemption should be documented and recorded, after all we are promoting proper records management in BIM! One good reason could be that a department is in need of UNIX machines to construct and run AI-algorithms, and then a MacBook may be a reasonable idea; but cloud access to such facilities in an already existing cloud-service contract may be a more astute policy to follow up on. BIM is the linking pin into working out the best option for both the user and the enterprise.

The agreed standardization policies and data architecture should be pursued by making strategy responsible for the instantiation of projects that meet the specifications set out. As can be seen above, clearly wanting to use a Mac is not just a technology issue; the why is crucial into supporting the expressed need.

41 For multinational enterprises local regulations sometimes demand that customer data cannot leave the country, causing you to rethink IT infrastructure: for such countries separate data centers are mandatory and thus you cannot always just share customer data worldwide. So by explicitly working on strategy you will also bump into these issues so as to make no large mistakes while implementing it.

10.2.4 Service strategy and service integration

Service strategy

The services perspective requires stakeholders to analyze both business information service needs and value, and the issue of sourcing, e.g., build or buy? All services that are built in support of information services will be part of an IT service portfolio, and the dependencies between the IT service portfolio and the information services portfolio must be unequivocal.

A service supplier is expected to have the correct mix of services that enables business objectives to be met consistently and effectively. The service portfolio is the internal view of that mix of services, whereas a service catalogue is the external view, since the catalogue is open to view.

A primary consideration is the impact of improvements to enterprise business information services on customers, partners and suppliers. BIM should focus on projects that will lead to visible and demonstrable improvements in the way that business is transacted, and these projects will be candidates for development from the portfolio.

The suppliers of the information services may be internal, external or a combination of the two. Whatever the structure, the relationship must be carefully managed. Information services consumed operationally will, of course, mean that day-to-day management activities will take place but that will not be the case at the strategic level.

When it comes to sourcing at the strategic services level, contracts and agreements and detailed discussion will be mostly a Procurement undertaking. BIM must ensure that the strategy will meet business information needs. That is a question that cannot be answered generically, though BIM will need to establish both a value for money (VFM) case for existing services and often, VFM criteria for introducing new information services or changing existing services. As mentioned, BIM should be visible in such discussions because Procurement, irrespective of their experience and expertise, will not be looking at issues regarding information services supply or indeed at detailed issues regarding software quality.

Service integration

Service integration is the set of principles and practices which facilitates the collaborative working required to maximize the benefit of delivering services using multiple service suppliers. Service integration links services, the technology of which they are comprised, and the delivery organizations and processes used to operate them, into a single ecosystem which is capable of meeting the needs of the business it supports. A good practice (e.g. Service Integration and Management, SIAM)

exists to cover the technical side of integration but BIM must take responsibility for addressing integration issues regarding information and data sources and use.

As indicated in Chapter 4 of this book, the scope of the information management organization will vary between enterprises. As a minimum, it will usually include management of the origination or acquisition of data, whether it originates in digital or other form, storage, processing to create more valuable data and reports *via* applications, and the transmission of the data or resulting reports.

Failure to enforce a holistic approach to managing information services and sources of the data will almost always lead to a fragmented set of information services and data stores (often known as islands of automation), which may be incompatible, contain duplicate or inconsistent information, and omit critical components of information.

The mess is compounded when information partners or supply chain partners are excluded from the picture of the ecosystem to be managed.

10.2.5 Technology strategy

The portfolio of the agenda of the BIMC will guide the Technology strategy.

The appropriate Portfolio, Programme and Project Offices model (Portfolio management good practice; P3O), will allow the enterprise to define a balanced portfolio of improvements (changes) and will ensure a consistent delivery process. Larger enterprises will have a sophisticated, tangible office and team, smaller ones perhaps a virtual team. The creation of the portfolio is governed by the executive decision-making as described in the Governance domain.

A portfolio is defined as 'The totality of an enterprise's investment (or segment thereof) in the changes required to achieve its strategic objectives'. Portfolio management is a coordinated collection of strategic processes and decisions that together enable the most effective balance of organizational (enterprise) change and business as usual. Be aware that a service portfolio is a subsidiary of the overall enterprise portfolio.

10.3 TO CONCLUDE

As we postulated earlier, perhaps the most important contribution of DID is to ensure that from the start of a program to transform the business, or to improve BIM (using DID), an efficient connection exists between the various business information management activities, meaning that good governance is mandatory. The day-to-day operation of the framework should be delegated by BIMC as we proposed in

this book. BIMC can be a person or a department, but it can also be the whole of responsibilities delegated to different cooperating key persons, making BIMC work. Coordinating BIM requires specific skills and knowledge.

11. PROVIDING STRATEGIC GUIDANCE: A CASE STUDY FROM INDUSTRY

11.1 STRATEGIC INVESTMENT IN IT

A major multi-national enterprise with operations headquartered in Europe requested all of its subsidiaries to begin a strategic investment in IT to 'future proof' business operations and to embrace an IT-driven approach to business services design. IT had been largely ignored in terms of investment for many years and was not a trusted resource.

The enterprise subsidiaries focused on the manufacturing and sales of rubber-based products (for example products such as industrial strength conveyor belts for mining and metal pipe manufacturing, fabrication of rubber cements and glues, the importing and assembling of components for tire repair kits - which even in 2023 is a multi-billion dollar market - and re-selling of multiple imported related products), and the provision of bespoke services to the mining industry.

This case study relates to the North American subsidiary HQ office, where the organization is brigaded under five Vice Presidents: Purchasing and Supply, Industrial, Corrosion Protection, Automotive and Engineering Belting. The President of the subsidiary made it clear from the start that IT use was inadequate and not remotely in line with modern business.

The existing IT support was focused on incident management of operational activities and provision of the IT environment, desktops and laptops; mobile phones were distributed and managed in a different area. All Sales and much of the Purchasing and Manufacturing information was intended to be part of a Microsoft Navision suite first installed in 2002/3.

As with many organizations that operate in a complex purchasing/manufacturing/distribution/sales environment, the business information needs were inter-connected, nuanced and engendered many dependencies, requiring detailed analysis before any decisions could be made regarding the information needs of the enterprise. As

a result, the Navision product was tailored making it also difficult to migrate to newer versions with richer possibilities.

Initial consultations revealed virtually no evidence of a consistent approach to gathering, storing, securing and exchanging data. Reliance on IT was increasing though the business was surprisingly analog in its approach; expensive manufacturing designs were (literally and figuratively) made on scraps of paper and stored in filing cabinets. Items imported to warehouse facilities were placed in storage without any IT support such as bar coding and almost all warehouse activities were manual, duplicated and reliant on people. Purchasing and manufacturing processes were duplicated in the Warehouse and in HQ via networked printers reliant on inadequate IT hardware and networking equipment, and all activities relating to the processing were manual—no automation of any scale was present.

However, the operations were **very** profitable, and because of this an *'If it ain't broke don't fix it'* attitude prevailed at the top of the office and the scale of change believed to be needed to move to an IT-driven business was feared and considered to be perhaps rather risky and expensive.

Furthermore, the local IT department did not use any of the best/good practices that exist and was almost entirely reactive. Any strategic proposals regarding improvement and investment were largely put on the backburner.

Clearly saying *'You need DID'* was likely to lead to general hilarity and almost universal head-scratching since no business or IT framework had ever been promoted either from the European HQ or from within local IT. It was decided that the approach to information management was to be focused on trying to improve the efficiency of the enterprise by identifying current and future information needs, identifying how IT should be used, and identifying costs and benefits of investing in training people in new technologies and its use.

The focus of this case study is how DID was used in the background of investigations to create a data warehousing approach for the business focused on their use (or lack of use) of the Microsoft Navision software and the creation of the guiding coalition at executive level to drive improvements.

11.2 GOVERNANCE, STRATEGY, IMPROVEMENT AND OPERATION

After initial investigations had unearthed (no pun intended), to the surprise of no one, an almost entirely absent approach to any form of information management and sharing, and a universal failure to properly maintain the Navision data, it was agreed

that pilot projects would be needed to demonstrate benefits and to engender support. One such project was the creation and launch of a business-to-business website for existing customer businesses and another was the upgrading of Navision; the current Navision version was not only contractually 'out of maintenance' with Microsoft but the enterprise had been informed that it was so out-of-date that Microsoft would not provide any form of support. Thus, any maintenance was carried out by a third-party consultancy (that for many years had advised the enterprise of the need to upgrade). Note that Navision does not support version management, and thus any changes to the sources (that you obtain with a license) need to be recognizable by way of the developers making that explicit. This is generally not always the case, and hence the more changes to the original source, the more complicated upgrading to new versions of Navision (or Microsoft Dynamics as it is currently called) it becomes. Sometimes such migration projects can take years to complete and consume significant resources.

The President of the enterprise made it clear that the business of the enterprise would be difficult to sustain given the advances in technology that were being exploited by rival enterprises; though not supported by the executive in general, the President proposed that the enterprise should embrace automation and, where possible, exploit the potential of IT and in particular the potential of data warehousing using the much under-utilized Microsoft products.

Navision and its subsequent release as Dynamics, is state-of-the-art inventory management software (see Figure 11.1) where the population of information is the only limitation to its use as enterprise-wide data warehousing covering everything from HR to warehouse receiving and shipping.

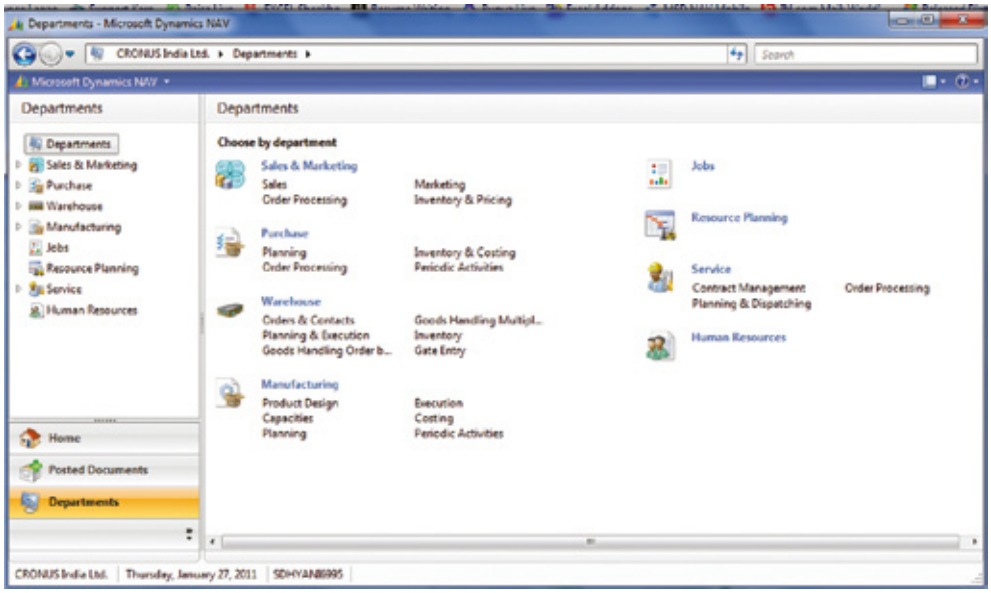


Figure 11.1 Example of scope of Navision software

The enterprise COO was very supportive of any activity to increase the collection and use of data in the Navision environment but very skeptical of both the will and the ability of the enterprise personnel to see improvements through. The COO was also very supportive of beginning with good *governance*; very few policies (other than HR) had been published and as far as IT was concerned, none even existed.

It was decided that an initial key IT-driven improvement, focused on B2B (business-to-business) customers, would be a website where (initially) long-standing customers could order products. The website would initially focus on automotive products (because of pressure from the VP of Sales in Automotive, who was a proponent of greater investment in, and use of, IT).

The DID model was introduced in high-level discussions, including the third party consultancy that had advised the enterprise about using Navision back in 2001/2; the model was introduced as providing guidelines not dogma, and to focus on 'big picture' issues such as the future state of enterprise data and the building blocks (for example the B2B website) that would need to be constructed in line with the overall mission of the President to make more (sensible) use of IT. It was soon clear that the website development would have repercussions across all the lines of business and an approach was agreed to define *governance* and *strategy* and from there to examine the *improvement* that would be possible as a result of the well-defined developments required.

Inventory would need to be updated in 'real time' from warehouse stock figures for the B2B portal to work successfully, whilst the current installation of Navision inventory software was entirely reliant on people updating information manually (unsurprisingly stock taking was a significant event requiring many people and taking up to three months to complete). At this point the business leaders realized the scale of improvement needed would lead to many technological changes and indeed to the need to instill (or acquire) new skills in people. Use of bar coding had been an agenda item for many years without any progress in assessing the true need and value let alone the impact on people. HR was immediately called into all meetings.

11.3 UPGRADING TECHNOLOGY IN LINE WITH BUSINESS INFORMATION NEEDS

It was identified that good *governance* required the creation of *strategic* direction/development in accordance with policy. The COO of the enterprise directed that best practice principles should apply to all policy making regarding the website and the services to be built and deployed, and that customer-centric policies regarding information management must be created by the business and supported by,

inter alia, IT. Using the DID guidance regarding *Need* and *Value*, and *Mission* and *Capability* it was quickly apparent that the overall mission was neither properly qualified nor understood in the enterprise; further discussions identified that the capabilities of the business organization to use the software (which was key for many processes including annual financial reporting) was sorely lacking and that no senior executives had invested any training time in learning the capabilities of the software.

It was clearly identified that an upgrade to Navision was urgently needed and would have significant value; the upgrade was a CSF (critical success factor) for the mission put forward by the President and COO, but the Capabilities, both human and technical, were almost entirely absent.

The decision was made at this point to develop a program of changes to major components of Navision prior to any upgrading of the technology, and to examine the Business, Information/Data, Service and Technology perspectives recommended in the DID guidance at every planning stage of the multiple projects identified. Strong support for upgrading came from the Automotive VP who was convinced that business would benefit from the ability to identify trends using the dashboard capabilities of the software (Figure 11.2).

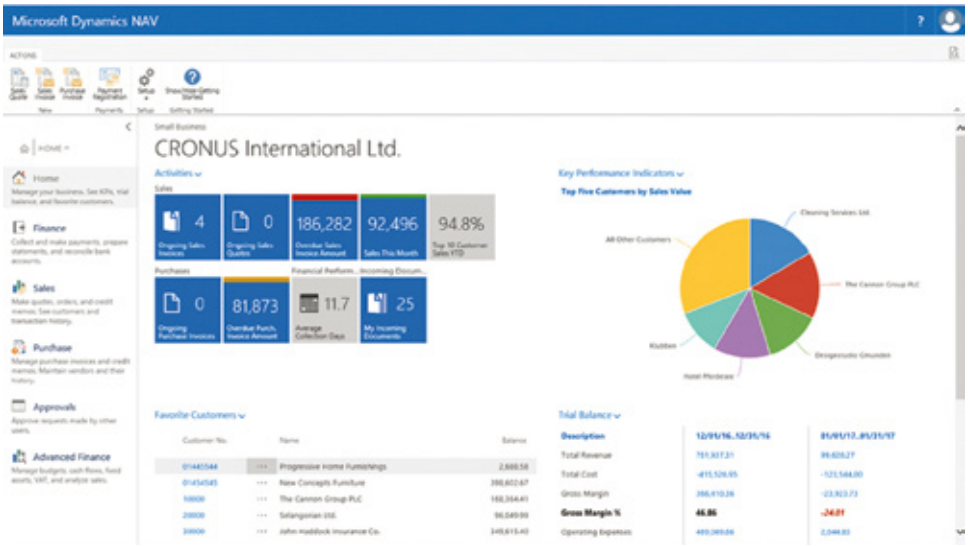


Figure 11.2 Example of business dashboard

At this stage of program planning, investigation of the data and information needs of the enterprise it became clear that business VPs routinely contacted the CFO for financial information and sales reports that were available in the current version of Navision, but they had no idea how to access the reports (an example is shown in Figure 11.3); it soon became clear, that month after month IT raised the same incident

reports and supplied the same resolutions to almost every business unit regarding their inability to access reports. An immediate improvement was to streamline the operational processes to handle these incidents as known errors and to train people to be able to use the software.

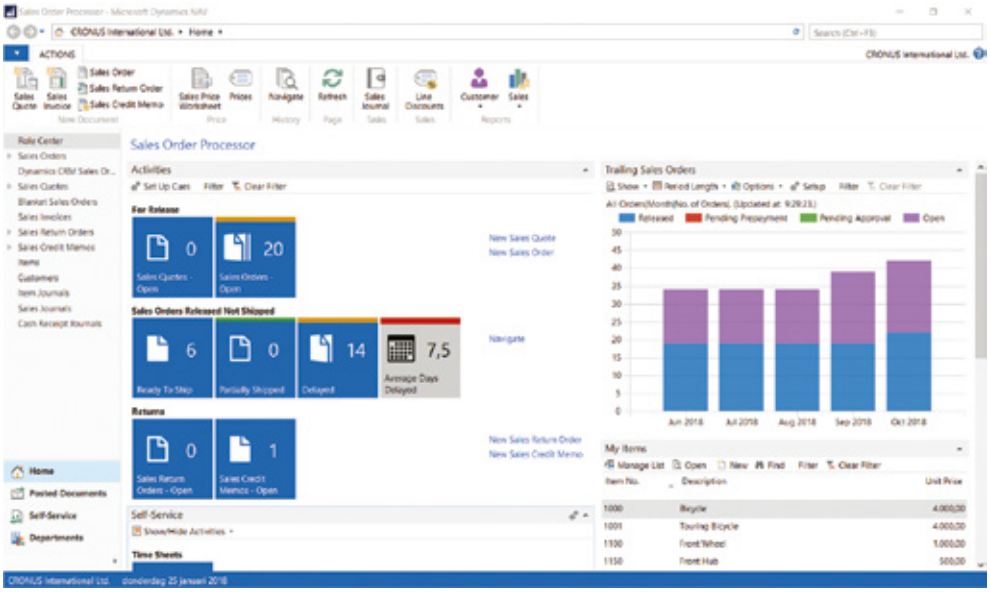


Figure 11.3 Example of sales report

11.4 IMPLEMENTATION ISSUES

The scale of information gathering was daunting for the business leaders and IT was already under-resourced and unable to assist. It was agreed, therefore, to use third party consultants to gather the information necessary to create information schemas for each 'menu' item shown earlier in Figure 11.1, and to identify dependencies; individual LoB leaders would have overall responsibility for finalizing their own data schema and for ensuring all dependencies were identified.

Each VP was also tasked with identifying the types and contents of reports they needed; every VP had a different requirement and none had ever committed those requirements in a specification.
Third party consultants would create an overall business information schema and be responsible for all coding and report creation; the sheer scale of the exercise indicated high risk and detailed program/project management. Agile is not a method to reduce risk and therefore Agile methods were rejected by the COO. A PRINCE2-driven project was initiated.

Business sales website

The support given by the VP of Automotive for the technology upgrade led to their nomination as Senior Responsible Owner (SRO) for the B2B website project, and in tandem with the Director of Marketing, being made responsible for content. The design of the website was entirely from the perspective of Business in the first stages. The DID guidance was used to design the interview techniques that would be used for both the information/data design and the functionality of the website. The success of analyzing the business drivers, (*Need, Value, Mission and Capability*) and adopting the four perspectives (*Business, Information/Data, Service and Technology*) when planning the technology upgrade, meant that the approach had proven to be of benefit.

As with all business service designs, initiation should begin with analysis of *Need* (for the services) and *Value* (actual and perceived) in the context of the business demand from customers; if a service had no value, it was unlikely to be needed - and *vice versa*. The COO in particular demanded evidence from the Automotive LoB that customers were putting pressure on Sales staff to have access to a web portal where they could purchase their goods and that customers would value the service. Need for a website within the enterprise was also carefully considered along with value to the enterprise because no business case had been prepared that illustrated cost vs benefit. If customers did not use the portal, or had no way of knowing the portal existed, then the investment would be wasted.

Although it would have been desirable to construct a web portal within the Microsoft Dynamics) suite, an early decision to build the portal as a standalone project was taken because firstly, the web portal was considered a priority and secondly, because it would be a solution that allowed important decisions to be made and tested that would impact the software upgrade.

Operation needs were recognized early in the lifecycle of development and definition of Key Performance Indicators and Critical Success Factors (KPI and CSF), would drive the outcomes required. A key outcome was increasing Sales; measuring the contribution of the web portal was however a challenge.

IT, though a key stakeholder, would only be responsible for operational activities once the website was launched (and for integration with the upgraded technology); IT was not considered to be able to define the business requirements. For one thing, it became obvious that abrogating the design of business information services while reducing the workload of the business VPs was a retrograde step; only business managers knew the business information needs and neither they nor the IT department was sufficiently competent to create a full specification for the business services, only the indicated functionality. For that reason, DID expertise was instead employed to ensure that the data design for the web portal would be carried

forward to the future information design of the software. As inventory needed to be updated in real-time, a temporary solution utilizing technology to access current Navision data files would be used (sufficient to ensure that orders could be fulfilled) but the future of the portal was predicated on full integration with Dynamics.

After consultation with business stakeholders, policies were agreed and communicated, and a *strategy* based on strategic business service design undertaken; the project was led by a DID practitioner with direct access to the SRO and impacted business managers.

Throughout design it became clear that significant investment in new skills (or new personnel) would be a necessity. Examples of specific deficiencies in skills were the creation of taxonomies of information, data design, the ability to elaborate business requirements and the skills to create information/data dependencies that would provide the degree of accurate and appropriate data to the service desk and thus to customers. Warehouse personnel were identified as being significantly lacking in even very basic IT skills, with many executives being vocal about their concerns that even bar coding would be beyond the current skill set.

The issues of *improvement and operation* were discussed in detail and KPI/CSF identified for the business, information/data, service and technology problems. ITIL processes were identified as suitable for managing requests, incidents, problems and so on, which was in line with DID recommendations regarding using well-researched best practices; as mentioned earlier, local IT did not make use of any best practices.

11.5 PRACTICAL IMPLEMENTATION

From inception of the website portal project to final user acceptance testing took four months including interviewing of potential suppliers of the portal technology. This was considered a major success given that most projects in the enterprise that involved business leaders and IT either failed, were mothballed or were simply left to wither away and hope that no one would notice.
An initial approach to use Agile methods to accelerate requirement specification was a complete failure because of the inability of both business leaders and IT to adequately specify requirements. Requirements from the business were either unclear or insufficiently detailed and design prototype after prototype was thrown out because functionality was lacking (sometimes because it was not considered necessary until the design was 'tested' and sometimes because the requirements were simply misunderstood by the programmers as they were insufficiently informed).

A project plan was drawn up, key roles identified and DID practitioners took control of the design exercise which led to acceptance within a week, and all information being made available within a month.

The enterprise has now successfully implemented the up-to-date suite of Microsoft products and is enjoying the huge benefits of optimized use of this very sophisticated software.

A useful point to note is that Supplier management became part of the program as it became clear that inventory would be impacted by the technologies used by the many different suppliers of goods (many of which were imported from the European HQ, though many more arrived from China, Chile, Canada and other countries). In each case the information and data were analyzed to ensure completeness and identification of dependencies.

12. A DID BOOT CAMP

12.1 A DID BOOT CAMP SESSION IN FOUR PHASES

Gathering the necessary people and collaborating together to improve business information management in your enterprise is a great way to work. The DID framework is a good model to use in a boot camp. So, how can you ensure 'the best' DID boot camp session and organize it into various phases? It depends on you and your environment. Issues like the time available, complexity of the services, experience, culture of the enterprise, practitioners involved, and more are all important considerations.

Here we provide some thoughts on whether you should apply the framework yourself or use a DID practitioner, and offer you some experiences that we have gained in organizing and working through boot camps that were similar to DID sessions. And most importantly, the great thing is that after reading this, you can throw it out of the window and decide to do it your own way. DID is a tool and a communications medium; it is not the 'Ten Commandments for BIM'.

In general, a DID boot camp approach dictates that you go through three phases. The phases comprise:

1. Preparation – choosing and understanding the goals, outputs and outcomes.
2. Undertaking analysis and producing results.
3. Reporting results and the aftermath.

In going through the three phases, you can use whatever poster or paper material you like to gather all the information you need to analyze specific issues and themes. We recommend that you use the DID canvas, utilizing it as a series of templates to paste your text or pictures on.

We have drawn a simple canvas to support the collective analysis. The idea is that everybody can put 'notes' on it, write on it and draw on it. The canvas is shown in Figure 12.3. The DID canvas is also presented in Appendix B. You can download the DID canvas at the DID community site (www.didfoundation.com/) or at the authors' site (www.fmresource.nl).

12.2 PREPARATION (STEP 1)

Using the DID model requires people to ask the right questions, formulate sensible ideas, promote and challenge pre-existing (often false) concepts and often, to knock together the collective heads of people so that a fully converging and coherent model is available to all who are involved in building out the detail of a design; this ensures that all the actors and stakeholders can fully understand their roles. DID is a means to make sure that discussions end and directions can be chosen without the paralysis that arises through lack of knowledge. This approach is not a framework where we elaborate (and provide) often useless and top-heavy 'process models' for people incapable of drawing up a set of instructions or a simple service level agreement. An architecture requires thought and consideration, and if you have people who simply wish to copy another person's process, or work instructions, or model, well, you probably need to hire more creative people.

Before you start the discussion, you should at least prepare for three issues (see Figure 12.1). Firstly, you have to make sure who will own (or have a responsibility for) the issue at hand (whom we will call the Senior Responsible Owner, SRO) and the output of the discussions and analysis in relation to the desired business outcome. Identify the key issues and problems in your organization that you wish to address and mark them on the canvas in the particular domain, perspective or driver that you feel is the correct one and identify the appropriate people who should attend.

Depending on the size and type of the enterprise, who (manager or team) or what (department or several organizational units), the responsibility will be defined differently. The SRO should have a position at the appropriate management level and must have responsibility for the commissioning of a UK government Gateway Review of a major project, a survey or a feasibility study, or a complete LoB. Secondly, you have to translate the BIM generic subjects that we use in the DID framework so that they are relevant to your own enterprise. And finally, you should be aware that the numbers on the DID framework are references to the DID generic themes from the table (which also is presented at the beginning of this book (Table 2.2).

Focus is important. Although we think the DID canvas is a great help, using it will not assist you in answering important questions about the meaning of life or why coffee

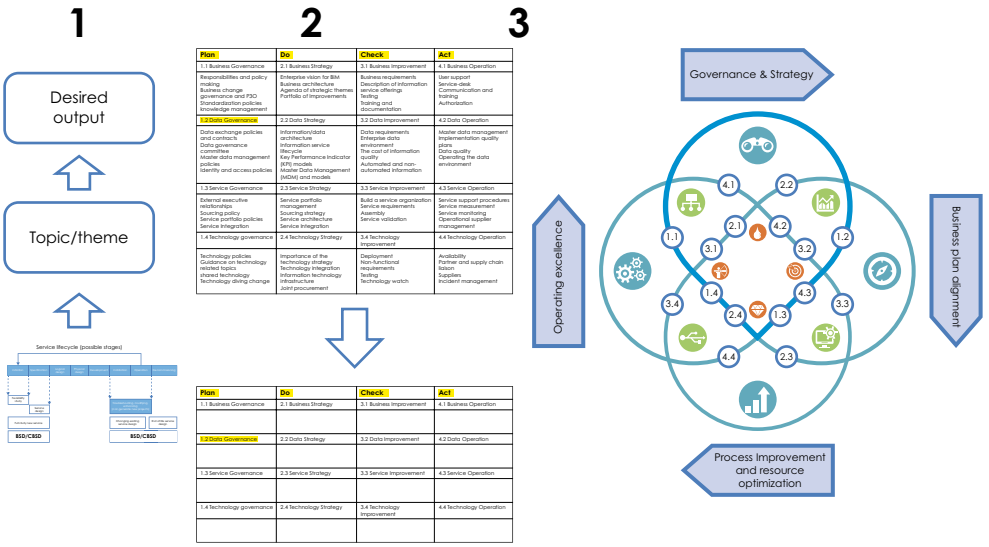


Figure 12.1 Prepare the canvas

at the office is so bad (although sourcing `creature comfort' and using KPIs that users must actually like the coffee would help, and is in the scope of DID).

The first task is to define the focus of your DID canvas. It depends whether you focus on a digital transformation of the enterprise or you prefer to look specifically at business information management problems in a LoB or business unit, or even smaller, partially at a process for example within the Sales department. If you look at services, be sure you understand where in the lifecycle you are! Then you can better understand what information you are looking for. In Figure 12.2 you will find an abstract schematic of the lifecycle of a generic service.

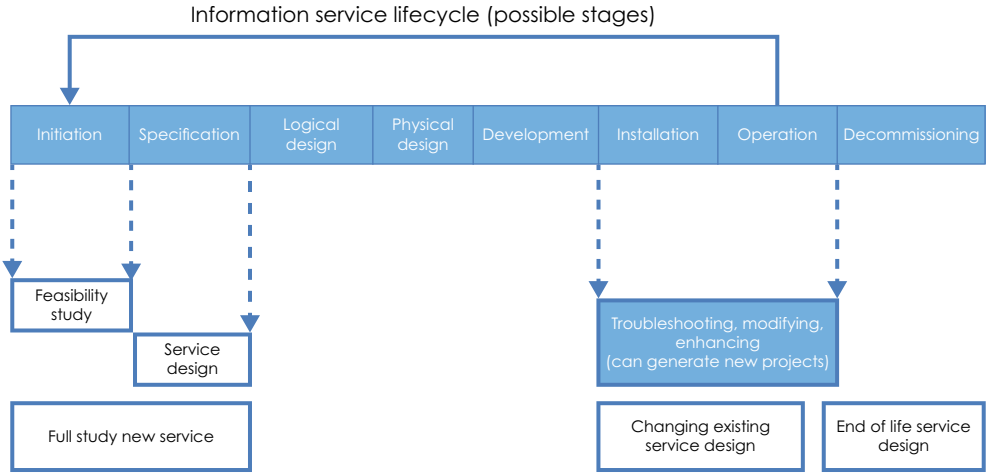


Figure 12.2 Information lifecycle

In your preparation of defining the issues/problems that may be suitable for analysis, think first of the business information services in your organization. To make sure all the aspects are part of our analysis it helps us to think about information within a work system. This was a term coined by Steven Alter[42] to define a natural unit of analysis for considering information systems in enterprises. In organizational settings, work is the application of human, informational, physical, and other resources to produce products/services. A work system is a system in which human participants and/or machines perform work (processes and activities) using information, technology, and other resources to produce specific products/services for specific internal and/or external customers. Information systems, are work systems whose processes and activities are totally devoted to processing information through activities that include capturing, transmitting, storing, retrieving, deleting, manipulating, and displaying information. The unit of analysis then contains the different aspects like:

- Processes and activities.
- Participants: These are people who perform work within the work system, including both users and non-users.
- Information: All information (automated and non-automated) that is created, used, captured, transmitted, necessary etc. in the context of the work system analysis. Typical informational entities include orders, invoices, warranties, schedules, income statements, reservations, medical histories, resumes, job descriptions, and job offers.
- Technology: Technologies include tools that are used by both work system participants and automated agents (that is, hardware/software configurations that perform totally automated activities). This distinction is crucial as work systems are decomposed into successively smaller subsystems, some of which are totally automated.
- Products and/ or services: The information systems should support and be used to deliver products/services for users or customers.

We have mentioned numerous examples in this book both in the running text and some in textboxes:

- Identifying requirements;
- Creating a digital strategy;
- Renewing legacy IT within the information systems;
- Understanding business information management coordination, and the role of the central office;
- Performing social security processes;
- Article 17 GDPR 'Right to erasure (to be forgotten)' User request;
- Securing the information chain partnership;
- Using standard software;

42 Alter, S., (2013), Work System Theory: overview of core concepts, extensions and challenges for the future, Business Analytics and Information Systems, Paper 35., *Journal of the Association for Information Systems*, online: http://repository.usfca.edu/at/35.

- Re-implementation of a strategic application to support lease-processing;
- Operating user support and knowledge management;
- Understanding the service development lifecycle.

Understanding the topic and the logic of the topic in context will help you to formulate the delivery process. And the delivery process can be mapped and analyzed using the DID canvas.

The principles with which BIM within the enterprise must comply, i.e. governance, must be considered. Within these principles, strategies are drawn up that are translated into the appropriate actions. These actions are in line with what needs to be requested or improved, with optimal use of resources, and then implemented so that possible new or adapted working methods can be used in the operational environment based on adapted information needs. It must be regularly demonstrated whether the information is adequate and remains current.

Remember the difference between output and outcome. The result (output) of your analysis should help to improve the needs of users in a way that fulfils customer outcomes and therefore enterprise outcomes. Outcome is key to guiding (not gilding!) decisions on investment and transformations. So, remember that the focus of the DID boot camp output should add value to business outcome.

You can define the focus of you boot camp on the canvas (Figure 12.3).

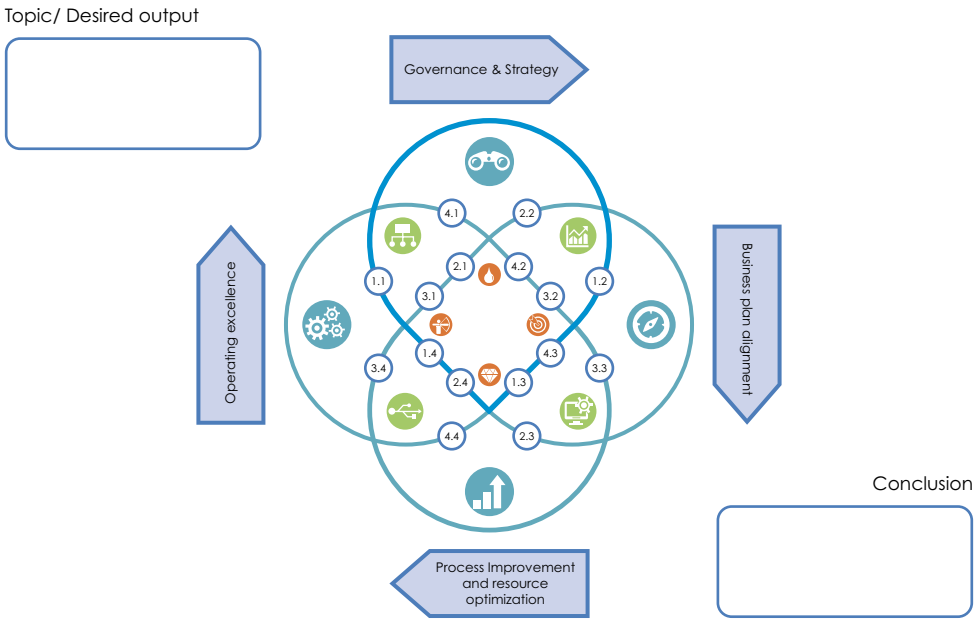


Figure 12.3 The DID canvas

DID helps to interpret, categorize, demonstrate coherence in context, show the needs and involvement of stakeholders, and ask the right questions in relation to the way the enterprise is structured. Thus, we take the topic and ask ourselves in which management domain it can be found (Governance, Strategy, Improvement or Operation). Then we need to understand in what value chain the topic or theme is an issue. Or perhaps it is the value chain itself. This becomes the focus of our DID analysis and synthesis.

12.3 ANALYSIS AND RESULTS (STEP 2)

To use DID effectively, numerous roles come into play. Where the SRO has not got the free time to focus on the program, the responsibility must be allocated to a person with the time, the availability and the power to act on their behalf. Here are our ten commandments that should help you to make the best out of it (actually there are 11, but we think ten sounds better and has a biblical weight).

1. What do you want to achieve using DID?
2. Get the right stakeholders (or their representatives) involved.
3. 'Do it yourself' or use DID practitioners?
4. Make sure your own people are participants.
5. Use tools to explore information and possibilities.
6. Be sure everyone involved understands outputs and outcomes.
7. Use some format for meetings/techniques.
8. Remember the special role of BIMC.
9. Be sure to write everything down!
10. Getaway days/off-site meetings or virtual?
11. Who is in charge (or who leads the boot camp)?

1. What do you want to achieve using DID?

First you have to think about what you want to achieve using the DID. Maybe there is some specific issue that needs to be explored, such as an application that seems to be processing data incorrectly on a regular basis, and reassess and establish the business requirements and roadmap. Or maybe you should plan a feasibility study that helps those responsible to grasp the concepts of BIM or digital transformation first and the possible beneficial outcomes (or consequences) before they mandate a more structural exploration. Or you go nuclear: setting up a digital data strategy is your ultimate goal and you use the DID canvas to explore topics and themes. This also means you need an idea of how much money and time you need to reach your goal. Maybe it is just not feasible to start out with an organization-wide BIM program? Reread Chapter 11 of the DID Foundation book that explores a 'Kick off' when no BIM infrastructure is in place. It is sometimes wise to time-box the total exploration in different phases so you can assess each component and get the right support and mandate.

2. Get the right stakeholders (or their representatives) involved
Everybody wants to be part of a boot camp, exploring and discussing topics that make the new world. But you have a job to do. Discussions are good but they need to lead to practical results, at least in most organizations. First, decide who to invite and make sure everyone who has a stake is at the table. Secondly, be sure that all information is on the table. Thirdly, be sure that there are people available who have BIM and DID experience. Make sure representation from both demand- and supply-sides is at the table.

3. 'Do it yourself' or use practitioners?
Many roads lead to Rome. The way you are going to organize the exploratory phase depends on the organization, the sort of questions you need to answer, the number of stakeholders involved and the strategy you should adopt to develop and deploy a new service, setting up the right requirements, and understanding the logical dependencies in your organization (remember, everybody wants better services supported by new improved and innovate IT solutions). But somebody must pay for it and there has to be a need. The DID model will help you and the guidance will provide indications about asking the right questions.

There are two types of people when it comes to using frameworks: those that need to understand the technology of the framework and those who are only interested in the result of applying the framework. Many people are not really interested in the instrument but just want the result. Compare it to the cabinetmaker who knows all about using the right tools and has a wide knowledge of joinery and materials. All you want to do is buy the table. In the end, customers and users alike (especially managers) like to sit at the table (the one you just bought) and prefer to tell the world what they think is important.

The actual BIM practices should be undertaken by specialists. Do not bother your stakeholders with the DID manual: involve two or three BIM and DID practitioners, depending on the complexity of your program and the number of people you need to involve in the design process.
The DID and BIM practitioners will lead the participants through the different cycles; some competences we believe to be essential, such as '*walking on water*' and '*turning water into wine*', have been omitted from the list though we are sure that these two would also be very useful.

4. Make sure your own people are participants
You might think that we are making a joke. But we are not. Often, we find that business owners send external consultants to these meetings. Often because they are not thinking about the impact of failing to take part. The business stakeholder is always busy, perhaps they have hired the consultant to do a specific job and a cursory knowledge of both architectural service design and the usual sketchy

idea of what the consultant is *actually* doing, means that the business owner feels entirely justified in sending them in their stead.

Oh dear. That never works out well, as Captain Kirk always discovers when the first crew members teleported to the planet are vaporised by aliens (by now you would think the first crew members picked would have learned to bribe Scotty to send them to a different planet).

5. Tools to explore information and possibilities

In each cycle in the DID boot camp, a lot of information about stakeholders, use, transactions, resources, etc. is requested. This information is not always available on a silver platter. Sometimes specific research must be conducted. A 'smart' DID boot camp program will take this into account, depending of course on what part of the lifecycle you are in, or what goal the DID canvas exercise needs to fulfil (feasibility study or full study). There are many different tools that can help you to explore the necessary information and evaluate the different possibilities. In Table 12.1 there are some tools that can help you. More information can be found in the references, or on the Internet.

In the textbox below a few suggestions.

Table 12.1 Tools to research and explore

Stakeholder maps
A Service Safari
Shadowing
Customer journey maps
Contextual interviews
The five whys
Cultural probes
Mobile ethnography
A day in the life
Expectation maps
Personas
Idea generation
What if, scenarios
Collaborative Business Service Design
Storyboards
Desktop walkthrough
Service prototypes
Service staging
Agile development
Co-creation
Storytelling
Customer lifecycle maps
Service role play
Business model canvas

6. Be sure everyone involved understands outputs and outcomes

Be clear about need and responsibility. Even experts can be distracted; we sometimes were at sea during the process of exploring the DID canvas (too many cycles made us think we were already at the end of the day enjoying the final discussion in the pub) because we lost track of the required outcome. We have witnessed lots of discussions about functional requirements or design methods that had nothing to do with required output. So, every design session must allot enough time to make all the participants understand (perhaps even be brainwashed) about the output and outcome!

7. Format of meetings/techniques

There are different techniques that you can apply within a DID program to elicit the right information needed. Again, depending on the situation (knowledge of people involved, culture, typical issues of the required design, preferred style, etc.) you can choose between many methods, mind mapping, storytelling, drawings, data flow diagrams, beating with large sticks and so on. There are many techniques available, and some may be more useful at different stages or in different cycles.

8. Remember the special role of BIMC

As discussed previously about the different stakeholders, most participants have a good idea where they belong in the scheme of things. But BIMC needs to play an important role and avoid it becoming an orphan. As we mentioned in Chapter 5 within the enterprise, the BIMC (business information management coordination) fulfils the role of the strategic and tactical professional representation of the business that coordinates the business information services to achieve desired business outcomes, compliance with any related contracts and the control thereof, and controls costs where applicable. You are lucky if there is a business relationship management function, project manager, or a participant from the project office who happily jumps at the opportunity. But oftentimes this is not as easy as you would hope for. In which case, dedicate some participants specifically for this most important part. If you find nobody to volunteer, then make sure DID practitioners take this part. Somebody needs to be the information owner!

9. Be sure to write everything down!

Agile development does not mean that requirements are not documented, despite numerous people having perpetrated this myth; and this approach explicitly supports being Agile (it is almost a method for acrobats), though it also recognizes traditional methods and supports what has come to be known as waterfall development (always spoken of in pejorative terms these days because it is 'not Agile', when, despite the claims, every step in the despised 'waterfall' is still carried out though most likely with more frequent iterations, as in DSDM). This seems a *sine qua non*, and it would seem unnecessary to mention it. But you would be surprised. The Agile community discovered that a long time ago. Hence, they created DSDM

Agile Project Framework to complement other Agile approaches to ensure a project approach that is both defined and will add value[43].

Dynamic Systems Development Method (DSDM)[44]
The DSDM philosophy is "that any project must be aligned to clearly defined strategic goals and focus upon early delivery of real benefits to the business." DSDM advocates that projects should do just 'enough design up-front' in order to understand and clarify the structure of the overall solution and to create an agile plan for delivery of the project. This puts in place the foundations for successful development and delivery. The Foundation phase of a DSDM project is very different to the Analysis and Design steps in a traditional 'waterfall' approach. In a DSDM project, analysis and design activity covers the full breadth of the project but deliberately avoids going into detail. Substituting traditional 'big design up-front' with DSDM's 'enough design up-front' promotes agility in developing the required solution whilst avoiding the risk of 'no design up-front'.

10. Getaway days/off-site meetings
Remember last time when you executed a program in a meeting room within the organization? You suddenly found that some of the participants were missing. They had an opportunity 'to walk away for a few minutes', had an important meeting with a colleague, needed some particular work done, were asked some questions that they needed to answer immediately, and generally considered themselves to be indispensable from operational work. We would advise you to plan to get away to a different location, depending on the program. Our experience is that with larger programs you can differentiate between the different components: sometimes in-house, sometimes off-site, depending on whom you need, how important these people (think they) are and sadly, budget.

Some minor details about off-site working that are worth thinking about: make it *relatively* easy to get to the location. Make sure sleeping facilities are convenient (this means good but not necessarily expensive). You want to make staying away more attractive than travelling back home, not too easy but easy enough if there is a genuine need.

And yes, as we finish this book we celebrate the end of the Covid 19 pandemic, that kept us busy, too.[45] And the world has been turned around as we (and others) found that video conference tools are a superb addition to our toolset.

43 https://www.agilebusiness.org/
44 https://cdn.ymaws.com/www.agilebusiness.org/resource/resmgr/documents/whitepaper/the_dsdm_agile_project_frame.pdf/
45 www.cs.vu.nl/~x/corona.html

11.Who is in charge (or who leads the boot camp)?
Then the eleventh commandment. Identify a process supervisor, workshop leader, facilitator – choose your favourite term! We consider the IT needs of the enterprise in two different (though related) scenarios; IT is required to act as an innovator of radical change, IT needs to change radically because it is inadequate. In the case of the former, it is more likely that business information managers (if they exist in the enterprise) or application developers will lead design, as they assess the information needs of the enterprise; in the latter case, it is more likely that infrastructure management will be the driver.

12.4 REPORTING AND AFTERMATH (STEP 3)

It ain't over till the fat lady sings. Perhaps preparation was brilliant, there was a wonderful and energizing gathering, but you will only be remembered for what you presented. Although SROs are probably interested in what you did with DID, they mostly are interested in results. So, it's important that you are able to present the results and potential benefits in a manner that is appropriate to your own organization. Look back at the preparation where you chose and defined the initial goals and then summarize the essential conclusions from your analysis, including CSFs and KPIs. Make sure you are able to explain the potential benefits to the senior responsible owners, those who need the results.

Make sure that presenting the report will be followed-up, depending on the original request or needs. A boot camp is often a preliminary step in a decision process that marks a new phase in the lifecycle, a call for action or further discussion.

Example: Finding common ground to define a common language
In a private software company, we will call it 'Midworks' that mainly works with government, municipalities and financial institutions, management was asked to investigate whether the Digital Information Design (DID) framework was applicable in order to establish whether a common language for the development of IT-driven business information services within Midworks business and technical groups was viable. Midworks leaders had identified that the Business and Sales domains in the enterprise often struggled to understand developers and *vice versa*. DID was used to structure interviews relating, in particular, to Governance, Strategy, Improvement and Operation because Midworks development and design portfolio was already 'needs and value based'. Resulting from the interviews and document research, it was be concluded that Midworks did not always have clear, documented, organization-wide policies in many components of the management domains and, that (where a policy did exist), compliance was not monitored or enforced.

The most commonly raised point was that Midworks was managed in organizational silos. In some instances, there seemed to be acceptance that poor communication was expected, and it was considered impractical (or too difficult) to integrate activities in a manner that facilitated better understanding. In general, all interviewees agreed that many issues regarding development would be improved by enterprise-wide creation and understanding of a sensible, usable glossary of common business and IT definitions that would be universally endorsed and applied.

As an example of what was discovered, something that (on the surface) appeared widely understood namely *the business issue of having a budget for project development*, was either wholly misunderstood, ignored or defined in an entirely different way across each technical team from project management, to architect, to application development to infrastructure management.

At a technical level, despite governance and policy apparently being in place, three 'ITIL incident management databases' existed on three different software tool platforms, none of which communicated with one another - made more of an issue by the DevOps team having their own, ring-fenced incident management software!

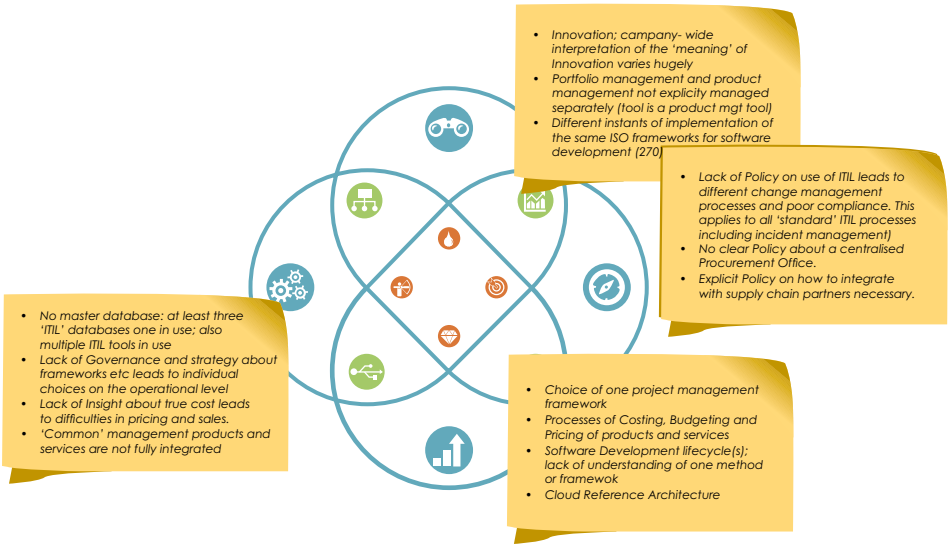


Figure 12.4 Example of developing a canvas

The interviews also revealed a substantial amount of information about a significant number of issues and problems that, although related to the need for a common language, could not be solved with by solution alone. A common language would be especially useful for multi-disciplinary teams to use when addressing such issues, though the root cause was most often to be found in

long established ways of working and a lack of clarity at the enterprise-level regarding policies and expectations.

The issues raised can be broadly categorized as either capable of being solved by using DID as a template to formulate a common language for technical teams involved in development of IT-driven business applications or, using DID to assist management – to identify and manage topics that require strategic action.

12.5 CONCLUSION

We can summarize the three phases of a DID boot camp in Table 12.2.

Table 12.2 Summarizing the three steps of a DID bootcamp

Phases in the program	Step 1 Preparation	Step 2 Analysis and results	Step 3 Reporting and aftermath
Objective	Intake. Determining whether DID can assist initial meetings. Logistics. Communication.	Using DID and the DID canvas to identify the BIM issues and its related topics within the organization.	Accept or amend report and obtain clearance for next step.
Activities	Setting outcome. Intake and request. Selecting and inviting stakeholders. Budget planning, Understanding the topic and the delivery process or value chain. Timetable. Programme. Location. Budget available.	Insight into output and outcome in relation to business strategy. Insight into BIM topics and issues. Insight into requirements. Insight into roadmap. Insight into risks and compliancy.	Make sure it can be reported. Making the delivery. Evaluation. Lessons to be learned.
Action SRO	Explaining required outcome in relation to business strategy. Agreeing on budget for bootcamp. Bringing all stakeholders together.	Being available for additional information or communication. New relevant information.	Acceptance and sign-off.

We hope that we were able to engage you in a modern way of thinking about business information management using the DID framework as a guidance. We are very interested in your own experiences and examples. If you have some time please leave us a note at the community site (www.didfoundation.com/) or at the authors' site (www.fmresource.nl).

Appendix A: TERMS AND DEFINITIONS

TERM	DEFINITION
Application	The automated part of an information system consisting of application software, application-related data, the storage structures (physical and otherwise) in which this data is embedded, and the relevant documentation.
Application development	The initial development of applications until operation and transfer of responsibility to application management.
Application management	The domain responsible for all of the tasks and activities that are aimed at managing, supporting, maintaining and renewing existing applications and related data structures. Note: Application management includes all of the tasks, responsibilities and activities that serve to bring applications into a state where they meet the requirements and needs of their owners throughout the entire lifecycle of the business processes that are supported by the applications.
Business (Perspective)	The perspective focused on the business processes and the lines of business within an enterprise.
Business activity	An action taken within an enterprise and related to achieving its goals.
Business function	An organizational subdivision of work performed by (part of) an enterprise, such as marketing, sales, operations, support, financial management and HR management.
Business information	All information used within an enterprise to achieve its business goals. Business information can be used internally, be shared with other enterprises, or be provided to customers and other stakeholders.
Business information management	The management domain responsible for all of the tasks and activities that are aimed at governing, defining, improving and supporting the use of information services needed for running the business and achieving the enterprise goals

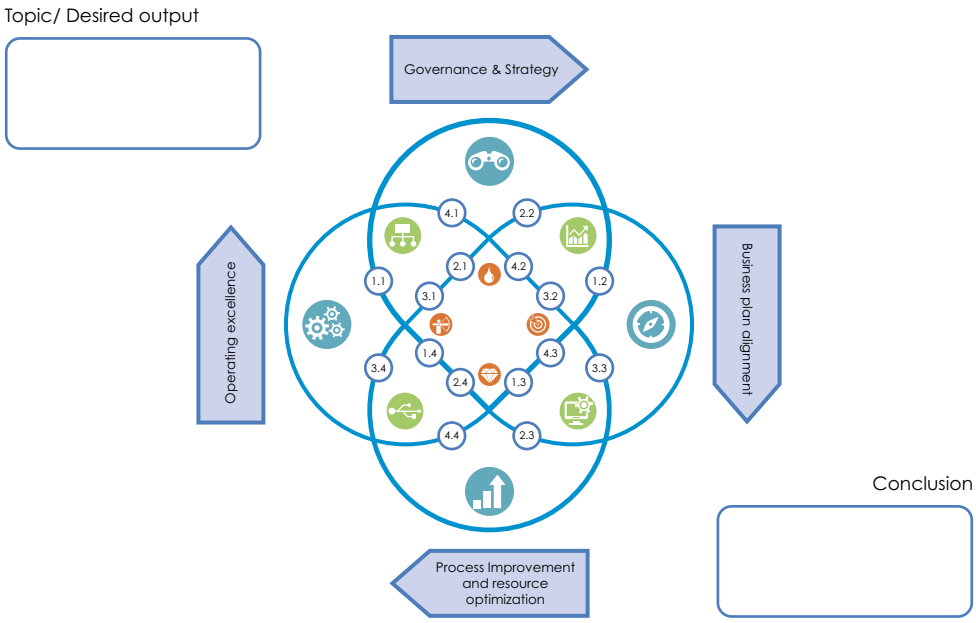
TERM	DEFINITION
Business information management coordination (BIMC)	BIMC is positioned between the customer enterprise and the supplier(s), internal and external. It is the intermediary who, as a delegated client, ensures that the client's needs (or the needs of the business) are well served by clear formulation of the needs and the translation thereof into purchased and delivered information services. The core function of BIMC is being the intelligent customer capability of the enterprise so that the correct specification for a business information service can be drawn up. Sometimes the combined activities of BIMC are known as 'functional management' as opposed to 'technical management'. BIMC might be one person or a team; it is the role that takes all responsibility for business information in the enterprise and where BIM and intelligent customer expertise is to be found.
Business information service	A service providing the business with the necessary information for delivering business services.
Business organization	The non-IT part of an enterprise.
Business process	A cluster of business activities.
Business service	A service provided by the enterprise to its customers and other stakeholders, which comprises one or more products and/or services.
Capability (Driver)	The organizational ability to perform business activities. Note: Capabilities require investment of time and effort to develop, unlike resources which can be easily acquired. Resources are the means that may be necessary to supply the capability.
Chain partner	An external party or organization with which the business organization cooperates in a chain, in which information exchange takes place. Only other user organizations in this chain are considered as chain partners.
Customer	A party that purchases a commodity or service (from the enterprise).
Data	A set of values of qualitative or quantitative variables. Note: in this book it is often used as an overall term for 'data & information' (so all of the data, including data with meaning and purpose, usually called 'information').
Data (Perspective)	The perspective focused on the data and information necessary for running the business and attaining the enterprise goals.
Data carrier	A medium on which data is recorded.
Data management	The development and execution of architectures, policies, practices and procedures that properly manage the full data lifecycle needs of an enterprise.
Data, information, knowledge and wisdom	A 'pyramid' that defines data, information, knowledge and wisdom, and their relationships.
Database	An organized collection of data on a digital data carrier.
Database management	The set of database-related activities within application management and IT infrastructure management.

TERM	DEFINITION
DID model components	The twelve components that, in combination with each other, describe the structure of DID.
Domains	Areas of activities.
Drivers	The factors that exert significant influence on business information management. These are related to all of the activity domains. The drivers comprise two sets of two linked components that complement one another and are also in tension: Need and Value, and Mission and Capability.
Enterprise	An organizational entity involved in the provision of products (goods and services) to consumers. An enterprise can be a private or public organization, profit or non-profit.
Enterprise ecosystem	The organizational environment in which an enterprise operates, comprising customers and other stakeholders.
Governance (Domain)	The organizational capacity exercised by the Board, executive management and IT management to control the formulation, implementation and management of information services. Formal management oversight of how the enterprise is managed in terms of hierarchies, authority, roles and responsibilities.
Improvement (Domain)	Analysis, specification, realization, testing and deployment of new and/or changed business information services.
Information	Data with meaning and purpose.
Information chain	The flow of information between the business (user) organization and its chain partners in the supply chain.
Information management	Management of the information services comprising functionality, data and technology.
Information service	A service providing any party with the necessary information for its activities. Information services comprise three components: functionality, data and technology.
Information system (IS)	The people, procedures, data, data carriers, software and hardware that produce information to accomplish goals of (part of) an organization. Note 1: An information system may be automated or non-automated, or a combination of both. Note 2: An information system often supports one business process or a part of it.
Information system components	The 'stack' of non-organizational parts that comprise an (automated) information system.
IT function	The part of an enterprise that is concerned with providing IT services to a business organization. The IT function can be an organizational unit that is separate from the business organization, and/or can be an integral part of the business organization.
IT infrastructure	All of the hardware, software, networks, facilities etc. that are required to develop, test, deliver, monitor, control or support applications and IT services. The term includes all of the information technology but not the associated people, processes and documentation.

TERM	DEFINITION
IT infrastructure management	The domain responsible for all of the tasks and activities aimed at managing, maintaining and renewing the IT infrastructure of the information system, including the operation of the information system. Note 1: IT infrastructure management includes all of the tasks, responsibilities and activities that aim for a correct technical operation of the information system, consisting of hardware, (system) software and data sets. Note 2: The IT infrastructure management organization is responsible for running the application software in the production environment.
IT management	Specific areas of consideration that are important within the overall area of the management of information systems. Three IT management domains are distinguished within the overall management of information systems: • IT infrastructure management • Application management • Business information management. Strictly speaking, unlike the other two domains, business information management is not a domain that provides IT services. Business information management acts as the customer for the IT providers of application management and IT infrastructure management.
IT service	A service provided by an (internal or external) IT service provider. IT services comprise both core services that provide customers with access to information systems and supporting services such as a service desk and database management.
Knowledge	Information connected in relationships.
Master data management	The set of processes, governance, policies, standards and tools that consistently define and manage the critical data of an organization to provide a single point of reference. The data that is mastered may include: • Reference data – the business objects for transactions, and the dimensions for analysis • Analytical data – supports decision-making. Master data (as opposed to 'data') represents the business objects which are agreed on and shared across the enterprise. It can cover relatively static reference data, transactional, unstructured, analytical, hierarchical and metadata. Master data management is part of data management.
Mission (Driver)	A statement of the enterprise's (digital) identity and purpose, and a picture of the objectives and overall goals, from which KPIs and CSFs can be inferred.
Need (Driver)	The resources needed by the business to fulfil its mission. In the context of business information management, the needs for business information services.
Operation (Domain)	Support for those using information services when carrying out their activities within the business processes, for the operational management of the information services supplier, and for providing and monitoring the operational services.
Perspectives	Important aspects that are considered during Governance, Strategy, Improvement and Operation.

TERM	DEFINITION
Products and services	Products and services exist on a continuum, in which a 100% pure product is material, as opposed to a 100% pure service that is immaterial. An enterprise usually provides a combination of services and products. 'Service' is also often used to designate a combination of products and services.
Project Support Office (PSO)	A PSO is a temporary or permanent organizational unit that provides a portfolio of services to support project teams that are responsible for a defined group of projects. Depending on your favorite framework or practice you may call it something different.
Service	A means of delivering value to customers by facilitating the outcomes that they want to achieve. A service comprises an (1) offer from one party to another, between whom a (2) relationship exists; an (3) engagement between both parties, (4) interaction (or service act) between parties and results in (5) output and (6) outcome for both parties. When 'service' is used to designate a combination of products and services, service is defined as anything that can be offered and provided to a market that might satisfy a want or need.
Service (Perspective)	The perspective that is focused on the services required to acquire the necessary information for running the business and reaching the enterprise goals.
Service design	The activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between the service provider and its customers.
Stakeholder	A party that significantly affects, or is significantly affected by, an enterprise.
Strategy (Domain)	Definition of the information strategy, and coordination of business information services.
Supplier	One that provides goods or services (to the enterprise).
Supply chain	A system of organizations, people, activities, information, and resources involved in moving a product or service from supplier to customer.
Technology (Perspective)	The perspective that is focused on the technology needed to acquire the necessary information for running the business and achieving the enterprise goals.
User	A person who uses an information service.
Value (Driver)	The benefits that the business derives from the business information services.
Wisdom	Integrated knowledge – information made super-useful.

Appendix B: THE DID CANVAS



About the authors

Brian Johnson has 12 official titles within the IT Infrastructure Library (ITIL) and in total has contributed to more than 30 books. He is the author of books on good practices in business and IT and also half a dozen books about worst practices. Brian has had many different positions and roles in his career, including England Soccer International, Formula One racing driver, mountaineer, astronaut, accomplished liar, vice president, lead architect, coordinator and consultant. One of his current roles is lead architect for DID for the ASL BiSL Foundation.

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