

Introduction to Business Intelligence

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An Overview of Business Intelligence, Analytics, and Decision Support

The business environment (climate) is constantly changing, and it is becoming more and more **complex**. Organizations, **private** and **public**, are under pressures that force them to respond quickly to changing conditions and to be innovative in the way they operate.

Such activities require organizations to be agile and to make frequent and **quick strategic, tactical, and operational decisions**, some of which are very complex. Making such decisions may require considerable amounts of **relevant data, information, and knowledge**.

Processing these, in the framework of the needed decisions, must be done quickly, frequently in real time, and usually requires some computerized support.

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Changing Business Environments and Computerized Decision Support

We need to understand that how an organization can employ analytics to develop reports on what is happening, predict what is likely to happen, and then also make decisions to make best use of the situation at hand. These steps require an organization to collect and analyze vast stores of data. Companies are moving aggressively to computerized support of their operations. To understand why companies are embracing computerized support, including business intelligence, we developed a model called the **Business Pressures-Responses-Support Model**, which is shown in Figure 1.1 .

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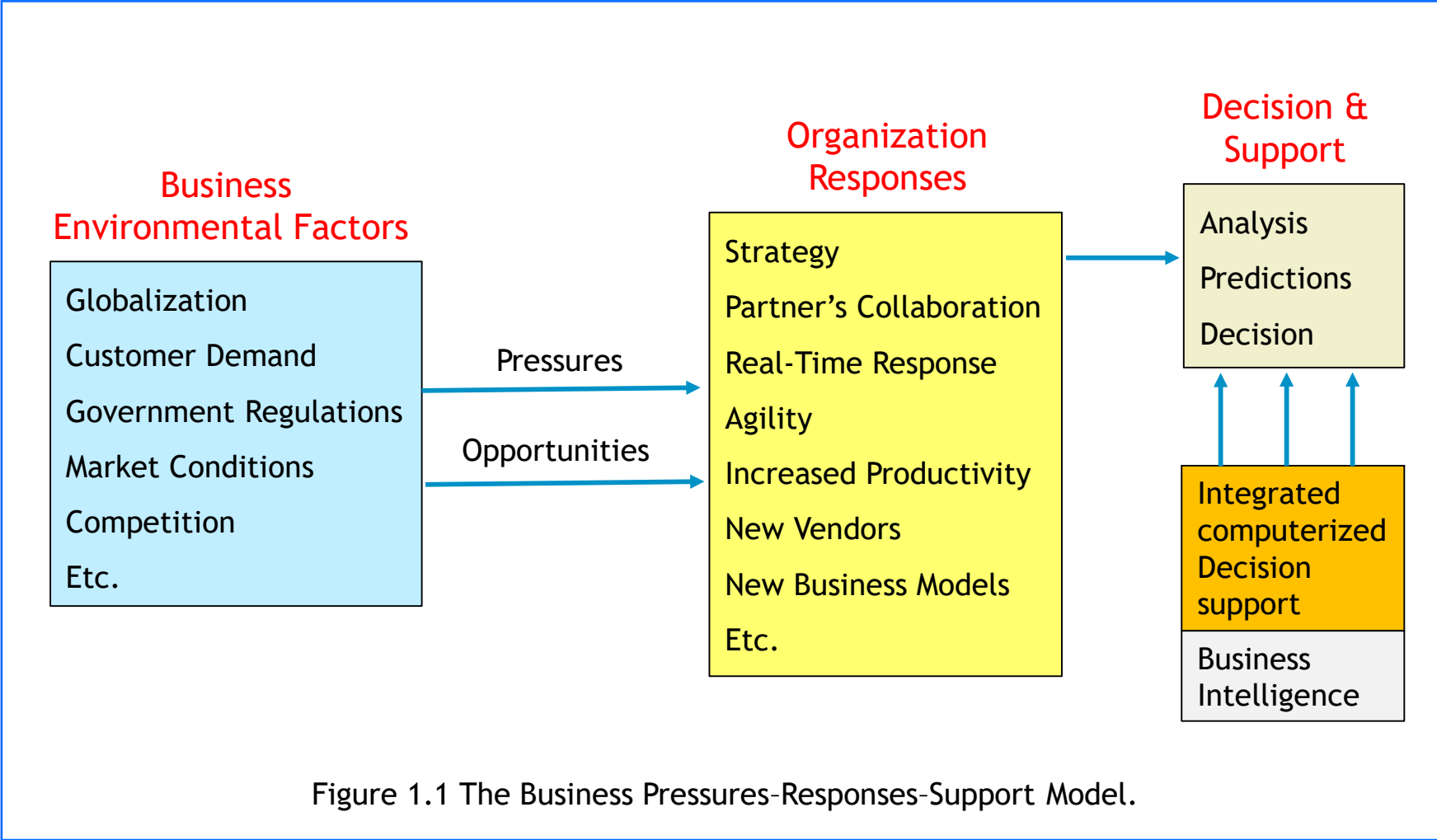


Figure 1.1 The Business Pressures-Responses-Support Model.

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The Business Pressures-Responses-Support Model

The **Business Pressures-Responses-Support Model**, as its name indicates, has three components: **business pressures** that result from today's business climate; **responses** (actions taken) by companies to counter the pressures (or to take advantage of the opportunities available in the environment); and **computerized support** that facilitates the monitoring of the environment and enhances the response actions taken by organizations.

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The Business Pressures-Responses-Support Model (cont'd)

- **The Business Environment**

The environment in which organizations operate today is becoming more and more complex. This complexity creates opportunities on the one hand and problems on the other. Take globalization as an example. Today, you can easily find suppliers and customers in many countries, which means you can buy cheaper materials and sell more of your products and services; great opportunities exist. However, globalization also means more and stronger competitors. Business environment factors can be divided into four major categories: markets, consumer demands, technology etc. These categories are summarized in Table 1.1.

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Table 1.1 Business Environment Factors That Create Pressures on Organizations

FACTOR	DESCRIPTION
Markets	Strong competition
	Expanding global markets
	Booming electronic markets on the Internet
	Innovative marketing methods
	Opportunities for outsourcing with IT support
	Need for real-time, on-demand transactions

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Table 1.1 Business Environment Factors That Create Pressures on Organizations (cont'd)

FACTOR	DESCRIPTION
Consumer demands	Desire for customization
	Desire for quality, diversity of products, and speed of delivery
	Customers getting powerful and less loyal
Technology	More innovations, new products, and new services
	Increasing obsolescence rate
	Increasing information overload
	Social networking, Web 2.0 and beyond

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Note that the intensity of most of these factors increases with time, leading to more pressures, more competition, and so on. In addition, organizations and departments within organizations face decreased budgets and amplified pressures from top managers to increase performance and profit. In this kind of environment, managers must respond quickly, innovate, and be agile.

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Organizational Responses: Be Reactive, Anticipative, Adaptive, and Proactive

Both **private** and **public** organizations are aware of today's business environment and pressures. They use different actions to counter the pressures. Vodafone New Zealand Ltd, for example, turned to **BI** to improve communication and to support executives in its effort to retain existing customers and increase revenue from these customers.

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Managers may take other actions, including the following:

- Employ strategic planning.
- Use new and innovative business models.
- Restructure business processes.
- Participate in business alliances.
- Improve corporate information systems.
- Improve partnership relationships.
- Encourage innovation and creativity.
- Improve customer service and relationships.
- Move to electronic commerce (e-commerce).
- Move to make-to-order production and on-demand manufacturing and services.
- Use new IT to improve communication, data access (discovery of information), and collaboration.
- Respond quickly to competitors' actions (e.g., in pricing, promotions, new products and services).
- Automate many tasks of white-collar employees.
- Automate certain decision processes, especially those dealing with customers.
- Improve decision making by employing analytics.

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A Framework for Business Intelligence (BI)

The decision support concepts presented previously have been implemented incrementally, under different names, by many vendors that have created tools and methodologies for **decision support**. As the enterprise-wide systems grew, managers were able to access user-friendly reports that enabled them to make decisions quickly. These systems, which were generally called **executive information systems (EIS)**, then began to offer additional visualization, alerts, and performance measurement capabilities. By 2006, the major commercial products and services appeared under the term **business intelligence (BI)**.

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Definitions of BI

Business intelligence (BI) is an umbrella term that combines architectures, tools, databases, analytical tools, applications, and methodologies. It is, like DSS, a content-free expression, so it means different things to different people. Part of the confusion about BI lies in the flurry of acronyms and buzzwords that are associated with it (e.g., business performance management [BPM]). BI's major objective is to enable interactive access (sometimes in real time) to data, to enable manipulation of data, and to give business managers and analysts the ability to conduct appropriate analysis. By analyzing historical and current data, situations, and performances, decision makers get valuable insights that enable them to make more informed and better decisions. The process of BI is based on the transformation of data to information, then to decisions, and finally to actions.

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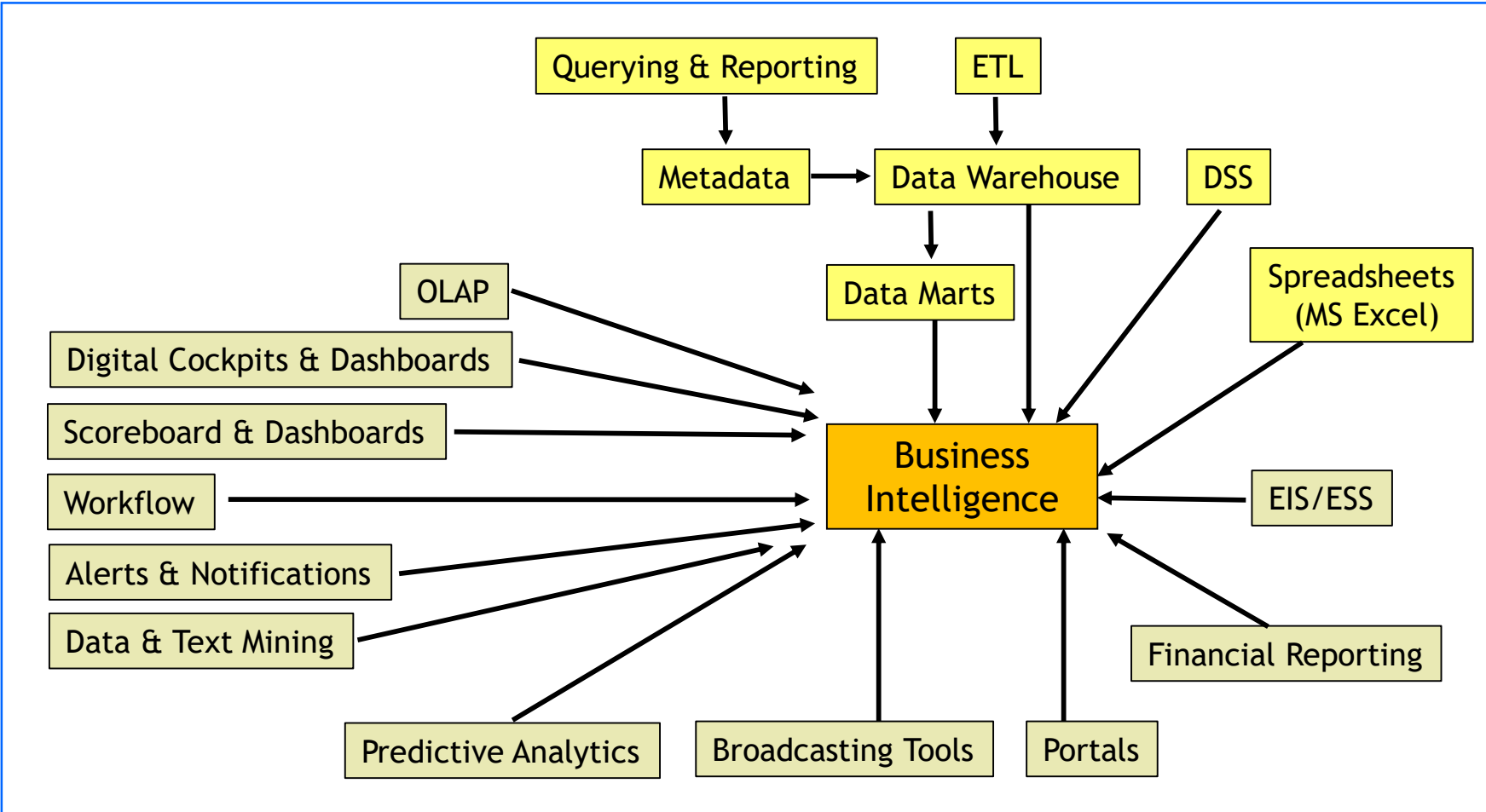


Figure 1.2 Evolution of Business Intelligence (BI).

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A Brief History of BI

The term BI was coined by the Gartner Group in the mid-1990s. However, the concept is much older; it has its roots in the MIS reporting systems of the 1970s. During that period, reporting systems were static, two dimensional, and had no analytical capabilities. In the early 1980s, the concept of **executive information systems (EIS)** emerged. This concept expanded the computerized support to top-level managers and executives. Some of the capabilities introduced were **dynamic multidimensional (ad hoc or on-demand) reporting, forecasting and prediction, trend analysis**, drill-down to details, status access, and critical success factors. These features appeared in dozens of commercial products until the mid-1990s.

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A Brief History of BI (cont'd)

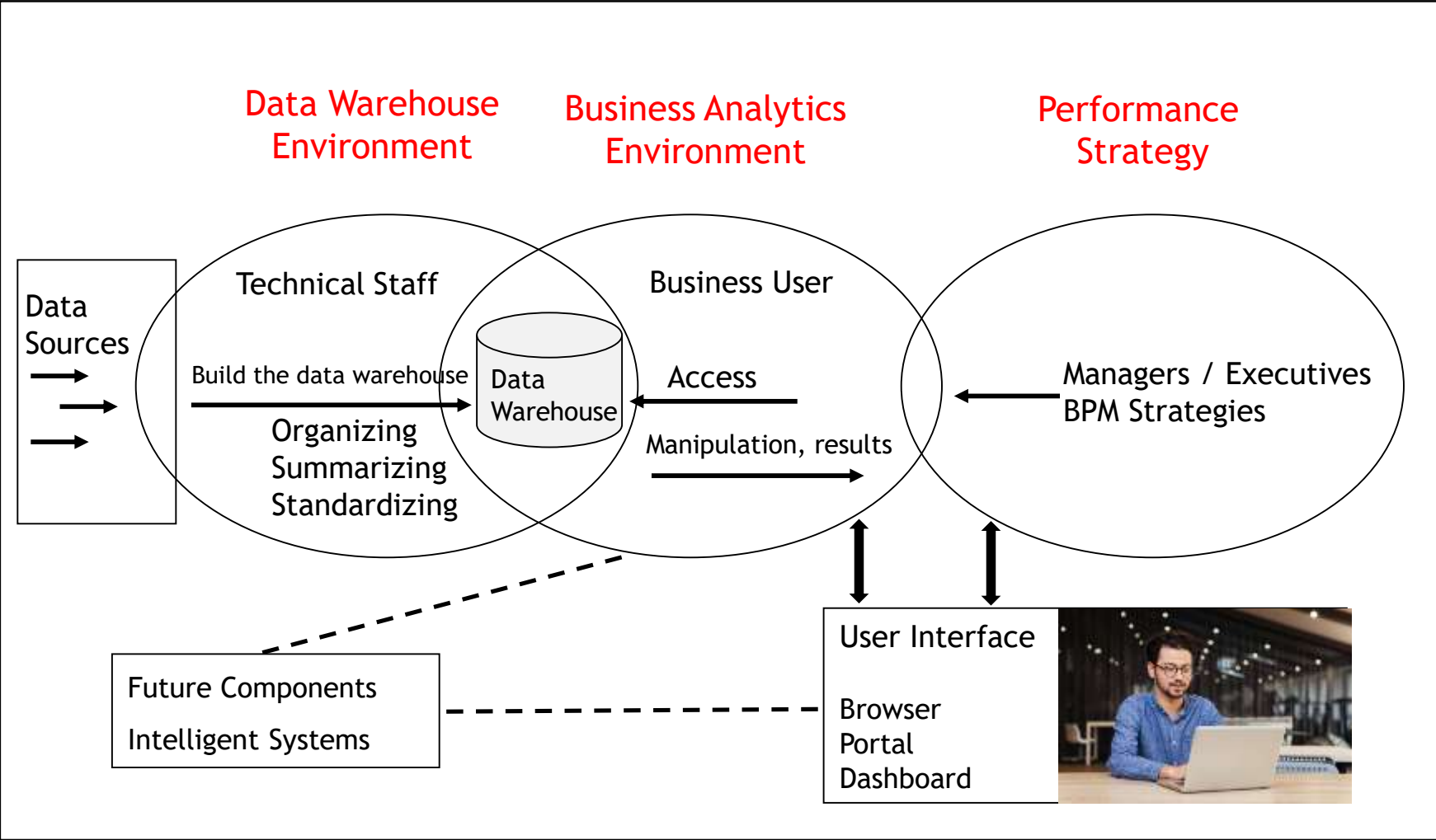
Then the same capabilities and some new ones appeared under the name **BI**. Today, a good BI-based enterprise information system contains all the information executives need. So, the original concept of EIS was transformed into BI. By 2005, BI systems started to include **artificial intelligence capabilities** as well as **powerful analytical capabilities**. Figure 1.2 illustrates the various tools and techniques that may be included in a BI system. It illustrates the evolution of **BI** as well. The tools shown in Figure 1.2 provide the capabilities of BI. The most sophisticated BI products include most of these capabilities; others specialize in only some of them.

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The Architecture of BI

A BI system has **four** major components: a **data warehouse**, with its source data; **business analytics**, a collection of tools for manipulating, mining, and analyzing the data in the data warehouse; **business performance management (BPM)** for monitoring and analyzing performance; and a **user interface** (e.g., a dashboard) . The relationship among these components is illustrated in the next figure (Figure 1.3).

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The Origins and Drivers of BI

Where did modern approaches to **data warehousing (DW)** and **BI** come from? What are their roots, and how do those roots affect the way organizations are managing these initiatives today? Today's investments in information technology are under increased scrutiny in terms of their bottom-line impact and potential. The same is true of **DW** and the **BI** applications that make these initiatives possible.

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The Origins and Drivers of BI (cont'd)

Organizations are being compelled to **capture, understand, and harness** their data to support decision making in order to improve business operations. Legislation and regulation (e.g., the Sarbanes-Oxley Act of 2002) now require business leaders to document their business processes and to sign off on the legitimacy of the information they rely on and report to **stakeholders**. Moreover, business cycle times are now extremely **compressed; faster, more informed, and better decision making** is, therefore, a competitive imperative. Managers need the **right information** at the **right time** and in the **right place**. This is the mantra for modern approaches to BI.

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The Origins and Drivers of BI (cont'd)

Organizations have to work **smart**. Paying careful attention to the management of BI initiatives is a necessary aspect of doing business. It is no surprise, then, that organizations are increasingly championing BI. Examples of many **applications** of BI are provided in Table 1.2 .

Table 1.2 Business Value of BI Analytical Applications

Analytic Application	Business Question	Business Value
Customer segmentation	What market segments do my customers fall into, and what are their characteristics?	Personalize customer relationships for higher satisfaction and retention.

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Table 1.2 Business Value of BI Analytical Applications (cont'd)

Analytic Application	Business Question	Business Value
Propensity to buy	Which customers are most likely to respond to my promotion?	Target customers based on their need to increase their loyalty to your product line.
		Also, increase campaign profitability by focusing on the most likely to buy.
Customer profitability	What is the lifetime profitability of my customer?	Make individual business interaction decisions based on the overall profitability of customers.
Fraud detection	How can I tell which transactions are likely to be fraudulent?	Quickly determine fraud and take immediate action to minimize cost.

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Table 1.2 Business Value of BI Analytical Applications (cont'd)

Analytic Application	Business Question	Business Value
Customer attrition	Which customer is at risk of leaving?	Prevent loss of high-value customers and let go of lower-value customers.
Channel optimization	What is the best channel to reach my customer in each segment?	Interact with customers based on their preference and your need to manage cost.

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THANK YOU