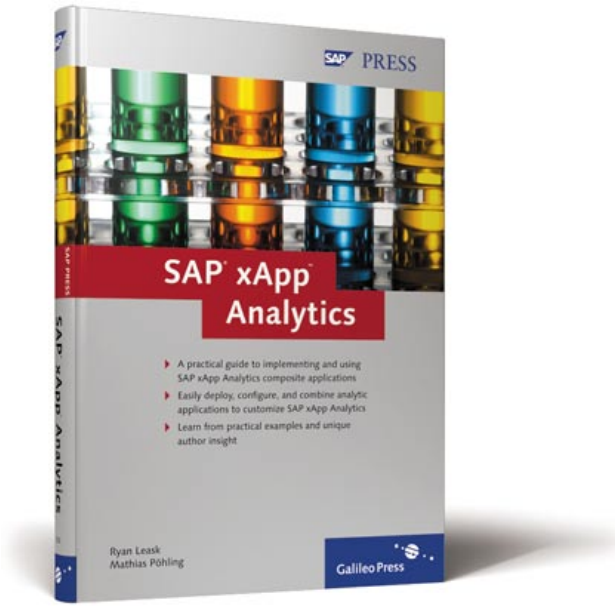
Ryan Leask, Mathias Pöhling

# SAP xApp Analytics

A practical guide to implementing and using SAP xApp Analytics

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# Foreword

by Henning Kagermann

Today's world of business gets more and more complex. Analytical applications are a key differentiator in the competition, because they give access to comprehensive information about customers, prospects, suppliers, partners, employees, and overall business indicators. They enable strategic and operational decisions to be made on an accurate, up-to-date, and consistent picture of corporate performance.

SAP® xApp™ Analytics provide clear and deep insights into business processes. They supply the user with the information necessary to take the appropriate measures in real time in order to implement the company strategy, and to work in concert with other participants in the processes and in the ecosystem. The application allows the user to look into the supply chain network and to cover all disparate functions, departments, and even organizations. The analyses functions are harmonized with the requirements of the user. They can easily be used, adjusted, and extended.

With SAP xApp Analytics, SAP demonstrates what a new generation of user-friendly User Interfaces (UI) looks like. SAP has partnered with Adobe Systems, Inc. to incorporate their Flash technology into the SAP UIs. This partnership has resulted in a new look and feel, which has been very well received by customers and partners.

As part of the underlying SAP NetWeaver technology, SAP xApp Analytics are simple to use and implement. The download and installation can now be done in a matter of minutes; customers can implement and go live with SAP xApp Analytics within weeks, instead of spending months or years on development. Less complex applications can even be created from scratch in under a minute.

Based on a strong technology foundation, SAP xApp Analytics demonstrate thought leadership in the field of Business Analytics. In addition, SAP xApp Analytics—being a part of SAP's Enterprise Service-Oriented Architecture (SOA) roadmap—clearly show how the full potential of Enterprise SOA can be used to create applications that were impossible to develop only a short time ago. I truly hope that this book not only helps you to find your way into

SAP xApp Analytics, but that you also develop a sense of the possibilities that are now within reach as a result of SAP delivering on its Enterprise SOA roadmap.

**Henning Kagermann**
CEO, SAP AG

# Foreword

by Sanjay Poonen

Welcome to the world of SAP® xApps™ Analytics. Perhaps it is a different world from the one that you're used to, but that's exactly the idea behind it!

I know it's different, because even inside SAP, Analytics have always challenged the norm. Initially, the concept of SAP xApp Analytics was conceived early in 2005, and in just twelve months, the vision had become a reality, and the first customers had successfully gone live. All of this is impressive in and of itself, but when you consider the speed with which a large company like SAP moved to make Analytics a reality, that is a true testament to the creditability and enthusiasm of the SAP xApp Analytics team.

I am also pleased to report that SAP AG was the first company to go live with SAP xApp Analytics. In 2005, we implemented six SAP xApp Analytics in our internal finance organization. As the test pilot for the new software, the implementation of these models took just six weeks. Our early customer experiences have been equally successful, even as the technology continues to advance from release to release.

Another impressive feature that you'll notice in SAP xApp Analytics is its incredibly modern user interface. I always find it amusing to watch how in awe customers are when they first see the UI. The new user-interface paradigms of SAP xApp Analytics combine the latest in modern Web 2.0 user interfaces, with robust backend infrastructure, to provide truly powerful applications.

SAP xApp Analytics are built on the SAP NetWeaver stack, and show the world just how easy composite application development can be. For example, we have customers taking xApp Analytics and customizing these composite applications in a matter of days. The norm in the IT industry is for it to take months, and sometimes years, for analytic applications to be built and tailored to the needs of business users. Now, in a paradigm shift, power users can assemble an analytic application in a matter of hours and test it with other business users, all without having to learn a line of code. Furthermore, these applications can access both SAP and non-SAP systems, and allow the user to actually take action on the underlying data. Analytics have

long been considered as read-only applications, but SAP is changing that perception by combining analytical capabilities with the operational execution of the business process.

Our vision is to make Analytics an integral part of every business process, that is, to make it so embedded that it is almost transparent to the user. A great analogy is the SimCity experience for a little kid. I watch my nephews play SimCity and wonder how it is that six-year-olds can build such complex cities? They actually simulate building cities with fairly sophisticated rules. They negotiate with a city planner, and while they're engaged in doing this, a fire starts and they're prompted to take action. We've got to make Analytics for the user as simple as the SimCity experience is to a kid, so that people can easily navigate through their decisions on a day-to-day basis in the context of their business process. Users should not even be thinking about Analytics—they just know that the underlying technology is helping them make quicker, more accurate decisions by helping them take the appropriate actions. Think of Analytics embedded into the business process for an HR manager or a supply chain manager. They see a few metrics, the system gives them a few intelligent suggestions they can act on, they make their decision, and then they go on with their life. That's how mainstream we're seeking to make Analytics. It's a different way of thinking for sure, but that's what makes it exciting!

Mathias Pöhling and Ryan Leask have been two star contributors on the SAP xApp Analytics team. They have successfully implemented several of our most complex customer xApp Analytics projects, and have a clear passion for the topic. I am excited to write a Foreword for the first book on this topic in the market, and know that many of you will find it useful, because it is grounded in practical experience.

Furthermore, not only do I trust that you will find this book practical and useful, but even more importantly, I hope it allows you to appreciate and experience in your own implementations the true potential that can be unleashed with SAP xApp Analytics.

**Sanjay Poonen**
SVP and GM of Analytics
SAP Labs, LLC

# 1 Why Analytics?

## 1.1 Starting from the Beginning

Before delving into "Why Analytics?" the question we really need to ask is "What is Analytics?" First, we can narrow our focus to specifically examine Business Analytics (BA); however, even then, there is not one, all encompassing, and accurate definition. It is a topic that covers many different technologies, and each vendor in this space will have their own definition of what should constitute Analytics. Another important distinction to examine is whether Analytics is the same as or even a subset of Business Intelligence (BI). It is certainly not our intention to explore the intricacies of defining these terms, but rather, to simply provide a clear understanding of how and where Analytics fits into an organization, especially when compared to Business Intelligence.

### 1.1.1 Business Intelligence Overview

Today the industry at large is generally referred to as Business Intelligence. Basically, Business Intelligence comprises applications and technologies designed to gather, store, and analyze business data, with the goal of enabling better decision-making, and thereby improving organizational efficiency and allowing a company to gain a competitive advantage. From a technology perspective, Business Intelligence covers topics such as data warehousing, querying and reporting, Online Analytical Processing (OLAP), data mining, alerts, and planning. *Data Warehousing* was the accepted industry term prior to Business Intelligence being coined. In 1990, Bill Inmon coined the term *data warehouse*, and his definition follows:

> *"A (data) warehouse is a subject-oriented, integrated, time-variant and non-volatile collection of data in support of management's decision-making process."*

This is quite a precise definition, and we don't need to go into the semantics of it; but, basically, data warehousing refers to the central collection, consolidation, and storage of the huge volumes of data that an organization accumulates in multiple, disparate systems. Often, Business Intelligence software

is thought of as the frontend tools used by the end users for querying, and data warehousing is considered to be the backend supporting this.

The purpose of collecting business data into a data warehouse is to be able to analyze consolidated results, and gain insights from this analysis (to enable better decision-making). But, it is possible to have too much of a good thing, and if there is simply too much data available, then users can become overwhelmed. A company collects a phenomenal amount of data, and finding just the right information can be very challenging for a business. In fact, if business users cannot access the data because it is too hard to find what they are looking for, then having too much information can be just as much of a disadvantage as having too little information. Essentially, BI software has taken the analysis a step further, by providing more comprehensive and rigorous software to search through the data, looking for patterns and trends. This means that BI software is really designed to assist users, by helping them to make sense of all the information that is out there, and presenting it in the clearest and most concise manner possible. As we mentioned earlier, BI still incorporates the technologies of data warehousing, but it also covers an even wider range of principles and applications.

### 1.1.2 Challenges for BI

Unfortunately, BI has generally not had a significant focus or investment in IT. As Neil Raden points out, this is due to historical technology limitations that forced Analysis and Operations apart. BI has always been considered to be a totally distinct area from the operational execution of business processes. Consequently, companies have generally focused their attention on Enterprise Resource Planning (ERP) systems, which manage and optimize the day-to-day processes that enable the company to run efficiently. BI on the other hand, is thought of as after-the-fact analysis, where the data is accumulated and analyzed over time, and the insights gained from this analysis are eventually transferred back into the operational business to improve its efficiency.

Yet, even the managers in a company, who are there to specifically work at a strategic level (rather than at an operational level), may or may not use BI software. Another reason why BI has been held back is the potential for complication. To begin with, it means one or more (depending on the company and their objectives with BI) new pieces of software to learn. Furthermore, users don't enjoy sifting through volumes of data, looking for the information they need. It can be far too time-consuming to perform an in-depth anal-

ysis of the data; inevitably, what happens is that people will give up searching and continue to make decisions without all the necessary data. Dashboards have been used to address this issue. Dashboards are predefined applications, summarizing all the required information in a format that is easy to read and understand (typically they present the information in a collection of table and graphs). They are often used to deliver information to management, because they are an ideal way of summarizing all of the important information, and they enable the user to quickly comprehend the data while requiring little or no user interaction.

### 1.1.3 Resulting Artificial Wall Between Actions and Insights

Although BI applications play a very valuable role, and companies have been successfully using these technologies to gain valuable competitive advantages, the broader definition of Business Intelligence is that its purpose is to improve decision-making. Today, it is largely up to the analysts using the BI software to drive the insights gained back into the business. But, BI software is not really designed to support this part of the process. Rather, the BI viewpoint is that by analyzing and presenting the data in such a way that insights can be gained, it has done its job properly. But what good is it if opportunities or weaknesses are identified for the business, but they cannot be converted into improvements at the operational level? Or, if by the time the analyst is aware of the potential opportunity to benefit from these insights, the opportunity to do so has already slipped by.

Furthermore, we must consider the human factor (i.e., analysts are people, and therefore their skills at performing this task will vary; they can also just pick up and leave an organization and take their knowledge with them). So, there is a bit of a leap of faith that is going on here. That is, it assumes that when users have the right information, they will make the right decisions. The people who are truly making decisions on a daily basis are those executing the operational business processes. Yet, as already stated, BI software is not really designed to support operational decision-making. This situation has led to an artificial wall between the business insights gained by the business analyst and the actions taken by the business user, as depicted in Figure 1.1.

Of course, not every operational step in a company would be better off with BI, but there are many, many processes that could really benefit from such applications. This problem of not having analytical applications for the operational execution of the business is called the *Analytics Gap*.

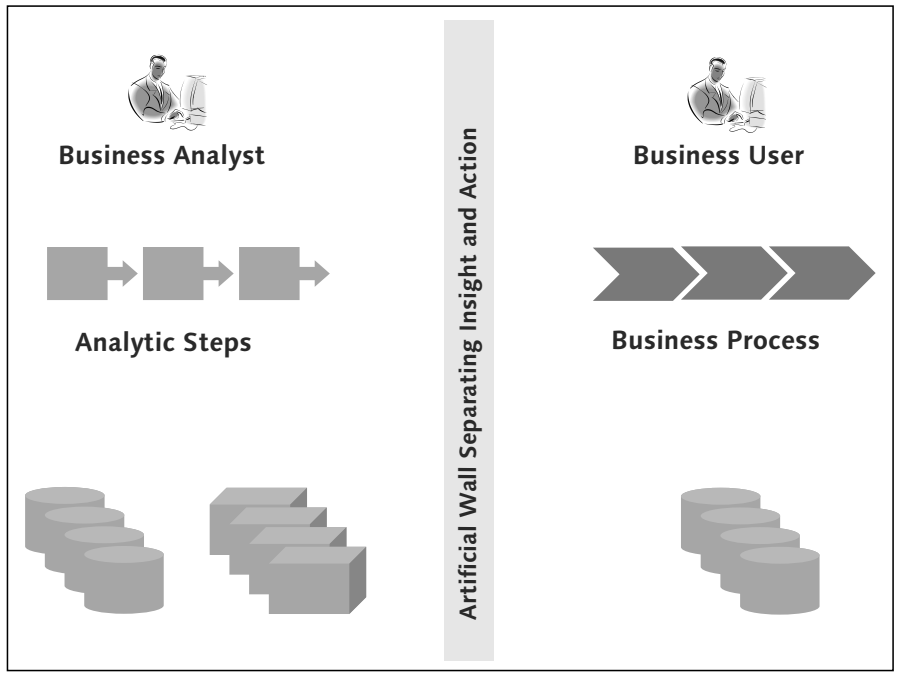


**Figure 1.1** Artificial Wall Separating Insight and Action

## 1.2 The Analytics Gap

The analytics gap has materialized because the people who are executing the operational side of the business are doing so without any analytical support. It is usually a select few analysts who have access to BI applications. They are generally performing more complex analyses of the data (i.e., slicing and dicing, creating ad-hoc reports, etc.), and really need the advanced offering of BI products. To learn how to use these applications can often require significant training and experience, as well as an understanding of the underlying data models. However, there are many steps in the business process where Analytics could be used to gain operational insights. This situation is depicted in Figure 1.2.

The analytics gap is represented by the box in the top left corner of this figure. It reflects the low overlap of traditional BI applications and the operational side of a business.

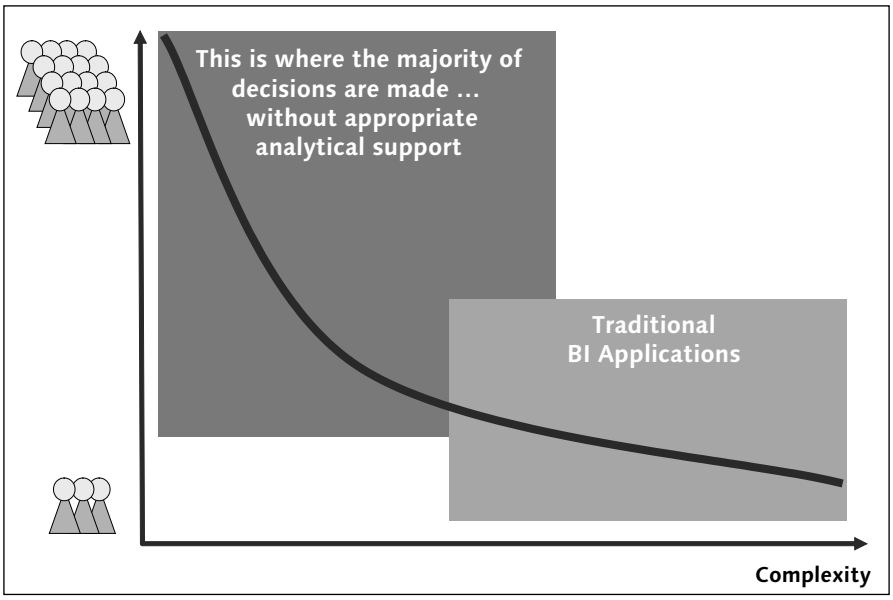


**Figure 1.2** The Analytics Gap

### 1.2.1 Why Does the Gap Exist?

So, you ask: Why does this gap exist? There are many factors contributing to the current analytics gap.

To begin with, the way in which BI tools have evolved over time has certainly been a major factor. Operational people generally need the most granular data, on a real-time basis, in order to make decisions to run the business on a day-to-day basis. Analytical people, on the other hand, generally need historical data, collected and analyzed over time, in order to draw insights from it. BI systems have been built on exactly this premise. Therefore, the data in the BI systems often doesn't meet the requirements necessary to support operational execution.

**Note**

This is *not* to say that data warehouses store only historical, aggregated data. With ever-improving hardware performance, many data warehouse systems do (and should) contain granular data where it is needed. But, for the data to be truly effective for operational needs, it often needs to be accurate up-to-the second, which cannot be said for data warehouses.

Again, this is not a negative reflection of BI systems, but just a matter of having the right tool for the right purpose. BI systems have generally been designed to support analytical requirements, not operational ones.

Undoubtedly, another factor that has contributed to the analytics gap is cost. Trying to deploy very sophisticated BI tools to everyone in the organization would generally not be the most cost-effective approach. The functionality that is delivered and available in BI systems would often be excessive for operational needs. It doesn't make sense to pay for licenses of such systems if the user is simply not willing or able to use this functionality. Additionally, costs are not just limited to licensing, as there are development, support, documentation, and training costs to be considered as well. Thus, cost is another reason why we see a relatively low adoption rate of BI software across a company's entire workforce.

### 1.2.2 A Business Analytics Example

Many operational business processes could definitely benefit from analytical insights. An example of just one step in one operational business process, which could benefit from analytical insights, is that of a Credit Manager analyzing blocked sales orders. This is where a customer placing an order to purchase some items may want to put the cost of the order on credit rather, than paying up front.

The company needs to the evaluate whether the customer is creditworthy. Therefore, the customer's sales order will undergo an automated credit check. If the credit check is not definitive, the sales order will be temporarily blocked where it can then be manually examined by a Credit Manager. It is then the Credit Manager's job to decide whether the order should be released (credit approved) or blocked (credit rejected). To make an effective decision, the Credit Manager needs an overview of the most important information about the customer.

This information needs to come from both operational systems (including information such as the customer's credit limit and current credit exposure), as well as analytical systems (information such as the trend of the customer's credit score over the last several months). To collect and consolidate all of this information from the different systems can be a time-consuming process. What would ultimately enable the Credit Manager to do his job effectively would be to have a single application where the current list of all blocked orders is visible, and when an individual order to be processed is

selected, the Credit Manager would get all the necessary information, right there and then, to help him decide whether to release or block the order.

This sounds very similar to a dashboard that could be implemented to potentially achieve this result; however, what would really be useful is if the Credit Manager could make his decision without having to leave the application. All the information would be in one place, so why not guide the Credit Manager's decision-making and present her with a list of possible decisions from which to choose. In this particular scenario, there are three possible decisions. The Credit Manager may first want to check the sales order again with the most recent credit information to see whether the order still needs to be examined. The other two options are to either release or block the order. The Credit Manager now has everything she needs to carry out this operational step, without having to leave the application. As you can see, the analytical application that we just described is clearly much more than a dashboard, since the ability to make decisions has been directly incorporated into the application.

## 1.3 Closed-Loop Analytics

This example of the blocked sales order application highlights how both analytical information and decision-making can be embedded into a single application. This situation is called *Closed-Loop Analytics* because the analytical application can directly impact the outcome or action that is taken.


**Figure 1.3** Closed-Loop Analytics

Figure 1.3 illustrates how a closed-loop scenario works. A business user (e.g., a Credit Manager) has to perform an operational step in a business process

(e.g., block or release sales orders that failed a credit check). To do this, she can run the analytical application to help her **analyze** all the required data (e.g., analyze the customer's credit score, credit limit, credit exposure, etc). By having all the required data in one place, the Credit Manager will be able to gain valuable **insight** (e.g., the customer's recent credit behavior indicates his business appears to have cash flow problems). The Credit Manager will now be presented with all of the available actions that she might want to take, so she can now **decide** what to do (e.g., the decision is whether to release or block the order, and in this case, she decides to block the order). Arguably, the most important step is now for the Credit Manager to **execute** her decision (e.g., proceed with blocking the order in the system). This is therefore considered a closed-loop application, because the entire process—from analysis to execution—is completely driven inside one application.

### 1.3.1 Embedding Analytics

To achieve this closed-loop scenario, the analytics gap described in Section 1.2 needs to be closed off, and analytical applications must be embedded into the operational execution of the business processes. The Credit Manager example is just one step in one business process where this could happen. Analytics can really be used everywhere in an organization. This means that analytical applications should be deployed to most business users in an organization, and not just to the business analysts. This way, the business user has direct access to the analytical information. There are reasons this has not been done in the past, namely, because of course, as previously described, for additional costs, and training because business users just won't have time to sift through the masses of data searching for the right information. Often, their decisions also need to be based on real-time operational data rather than on typical analytical data. So what has changed that allows us to now address these concerns?

#### Self-Intuitive Applications

First, it is imperative that the analytical applications are very self-intuitive. The business users should not be exposed to data models or complex OLAP controls. The goal here is for the application to help the business user do her job faster and more efficiently, and not to take up more of her time! As we already mentioned, users don't enjoy tinkering with BI applications and looking through data in search of the information they need. They simply want to find the right information at the right time. To make the applications

truly self-intuitive this may mean a reduction in functionality. Although this concept can be hard to accept at first, reduced functionality does not necessarily mean reduced productivity! The data just needs to be displayed in the optimal way as to convey it's meaning to the user. Neil Raden states:

> *"Visualization of data is the quickest way to understand information, and it's easy to use."*

We must also point out that we are in no way suggesting that BI tools should have reduced functionality. What we're saying is that business users don't need to be exposed to all the available functionality at once. Business analysts, on the other hand, will continue to want and need the advanced functionality provided by BI tools, so nothing is changing in this respect. We are also not saying that a business user can't use sophisticated tools and algorithms to analyze data. There will still be situations where more advanced functionality would be helpful to a user. However, for most operational tasks, if the analytical information that users want to see can be presented to them in a logical, concise manner, then they won't need the more advanced capabilities. We cannot stress enough, the importance in understanding the business processes when designing the analytical application. If users are not going to be searching through the data, then it is critical that they are presented with the right data the first time around. This knowledge comes from knowing the business processes. Furthermore, the application User Interface (UI) itself must be easy to understand and user friendly. There should be little or no training required to use the application, because it should be so logical that it is self-intuitive.

#### Hiding the Technicalities

Where the data that the users want to see is being sourced from should not come into play for these applications. It should be transparent to the users. From their perspective, they don't want to have to deal with "transactional (or operational) systems" and "analytical systems," each of them having different types of data, each with their own UIs. They just want the data, regardless of its source. The analytical applications should be able to source data from whichever system is required. In other words, analytical data (i.e., historical, aggregated data) and transactional data (i.e., real-time, granular data) should be able to be combined seamlessly into one application.

### Taking Action

Finally, the user should be able to take action from within the analytical application. When whole business processes are broken down into smaller steps, there are many operational decisions to be made and actions to be taken. To support the improved decision-making goals of BI tools, the ability to act on the information should be an inherent part of the application. Merely giving users the information, but assuming that this automatically leads to the right decisions and actions will not suffice. When looking at the blocked sales order scenario, it is clear what is expected of the user of the application. The user must examine a customer's credit history to determine whether a sales order that is currently blocked should be allowed to go through. The user has all the necessary information to make an informed decision, so she can act on that decision. Aside from the application's affording the user with more effective decision-making skills, this newfound ability to take action based on informed decisions also enables her to become more productive. Not only does she no longer have to source data from different systems, but she can act on the insights she gained without even leaving the application.

## 1.4 Business Intelligence or Business Analytics?

Is there really a difference between BI and BA? This is a heavily debated question; however, in the authors' opinions, there is a distinction. Let's examine this further.

Analytics are the business applications of the technology on which they are based. These applications cannot be generic because they must be industry-specific, application- specific, and job-specific. Business Analytics can leverage the strength of BI technology, but they are not confined to just BI systems. They must be composite applications that can source their data from whichever type of system has the information that the user needs to perform his job. Therefore, BI is just one of many possible data services for analytic composite applications. Furthermore, Business Analytics are really designed to be embedded in the operational side of the business. To truly enable operation execution, they must allow the user to directly take action on the data. BI systems, on the other hand, focus on the read-only, analysis of data. There are some aspects of BI where data might be changed (such as planning applications), but on the whole, BI systems are not designed to allow the user to

take action. And unlike business analytic applications, BI applications are not embedded in the operational side of the business.

Despite the difference between BI and BA, Business Analytics in no way detracts from the goals or methods of BI. The role of BI is just as critical as ever, and BA and BI must work together in order to give a company a true competitive advantage. From a pure technology perspective, there are many points where BI and BA overlap, so whether the distinctions that we just outlined become blurred and imperceptible, resulting in one technology platform is yet to be seen. Currently, however, there is still a distinction in the technology for BI and BA.

## 1.5 Benefits of Using Analytics

Hopefully, you can now see the benefits of using Analytics in your business processes. Analytic applications are focused on the business users and their specific job roles in the context of the business process. To date these users have generally had to manage without the aid of Analytics in their decision-making process. But, analytic composite applications can change this. By providing accurate, comprehensive, timely, and actionable information to business users, they will be able to make faster and more informed decisions. The potential benefits to the operational side of the business are enormous.

Furthermore, the actions that the users take can now be much more closely defined and monitored. That is, users are given a much more guided decision-making process, leveraging the use of composite applications. This provides management with a means to directly influence the way in which the operational side of the business gets run. In this sense, management can align the corporate strategy more closely with the daily running of the business. It also affords companies the opportunity to really adapt to change, when the key measures that users are relying on and the decisions that are based on this information are both integrated into the same composite application. If a change arises in business conditions, then the metrics themselves—how they impact the decision-making process and what decisions should be taken—can all be easily adapted. It becomes much clearer to users how they need to act, and thus their actions can be more closely aligned with organizational strategy and company expectations.

Yet for Analytics to really be able to achieve these goals, there is one important factor that still needs to be addressed: Total Cost of Ownership (TCO).

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