Appendix B

Measuring the Value of IT at ANWB

The aggregated BTRIPLEE framework, its valuation layers, and their associated classes of measures as described in the first six chapters of this book have been developed to consistently and systematically assess the business value and effectiveness of IT, and the effectiveness and efficiency of the activities that are performed to make IT available. A demonstration of the applicability of the BTRIPLEE framework and associated classes of measures in a real-life situation is described in this appendix, as a case study.

First, a brief profile of the Royal Dutch Touring Club ANWB (Koninklijke Nederlandse Toeristenbond ANWB) is provided, followed by a summary of the broad range of IT applications used by ANWB to support its business, its members, and other customers. Secondly, the approach, techniques, and information sources used to apply the BTRIPLEE framework, its valuation layers, and their associated classes of measures are described. Finally, the results of the validation are analyzed and evaluated, resulting in a conclusion of this chapter.

ANWB

The Royal Dutch Touring Club ANWB is an autonomous, commercially run membership association with more than three million members. It was established in 1883 to encourage bicycle riding, organize competitions for amateurs, print maps, and protect the rights of bicyclists. Since then, ANWB has evolved substantially.

Many of ANWB’s activities have celebrated their centenary. The club magazine, for example, has been published since 1885. Since 1893, when a campaign against the levying of tolls on Dutch roads began, the association has played an active role as an advocate for its members’ interests with the government. When the government failed to react to the campaign, the association itself attended to matters. This was the case with the construction of cycle paths and the erection of warning signs. In 1894, the first signposts were put up. In that same year, members
were able to insure themselves against the financial consequences of bicycle accidents, and thus ANWB moved into the field of insurance. With the ascent of motorcars and mass tourism, the provision of assistance developed into a core activity: assistance with breakdowns by “Road Services,” and personal help and legal assistance from the “Emergency Center.”

Today, membership has penetrated 45 percent of Dutch households and approximately 65 percent of households owning at least one car. More than 3,000 employees provide a broad range of services to members and other customers from the head office in The Hague, from 50 regional shops, from about 30 other agencies, and from a number of Internet and extranet sites.

Still serving the common interests of its members in the main areas of recreation, tourism, mobility, traffic, and public transportation, today’s focus is to assist members and other interested parties in attaining convenience. The core range of services of ANWB are managed by a number of Business Units, and include the supply of access to many kinds of information (about road and trip conditions to prevent travelers having problems; about hotels, restaurants, camping sites, and cars to prevent members and tourists taking inappropriate decisions, etc.) over the telephone (voice-response), by computer (Videotext and Internet), in magazines, brochures, maps, guidebooks, CD-I, etc. It also includes car breakdown assistance in The Netherlands, diverse assistance in case of emergency abroad, and a broad array of private insurance policies. Recent new services include a credit card for members, “Cars-on-call” (a car subscription service for members), and “Datakluis” (a service offered to members storing the details of important documents and items such as passport, driving license, credit cards, insurance policies, etc., in a computerized “safe”).

**IT AT ANWB**

ANWB is certainly an information-based organization: IT at ANWB is strategic in and of itself. To start with, almost all of the many ANWB products and services have huge information content. Moreover, IT supports all managerial business processes, with general ledger systems, accounts payable and accounts receivable systems, personnel information systems and payroll processing, inventory and logistics systems, etc. Next, ANWB employs a host of IT systems that directly support its primary processes. IT also enables ANWB to develop products and services effectively, disseminate products and services efficiently, and provide customer service through databases and multimedia distribution systems, including the Internet.

IT at ANWB includes the automated support and enabling of:

- membership administration;
- road assistance scheduling, tracing and tracking;
- emergency support and legal services scheduling, tracing and tracking;
- customized design and (electronic) publication of maps, guides, books, brochures, CD-Is, etc.,
• collection and dissemination of all kinds of tourist information through various media;
• direct marketing and brochure sales of products and services;
• real time information supply about road conditions, traffic jams, etc., through, amongst others, voice response systems and multimedia techniques;
• organization and administration of a variety of courses, training sessions, etc., for members;
• insurance policy administration and claims processing;
• tour operator activities, such as brochure preparation, trips reservation and administration, etc.;
• travel agency activities;
• signpost design and development through CAD/CAM.

MEASURING THE VALUE OF IT AT ANWB
Recently, ANWB was involved in at least five large, time- and money-consuming but strategic IT projects:
• development and expansion of touristic Information Data base Access (IDA);
• re-development / replacement of the membership administration system (CARPLUS);
• development of ANWB’s logistics information systems (INFOLOG);
• implementation of a new IT infrastructure on behalf of the 50 ANWB regional shops;
• development of a new, state-of-the-art road assistance scheduling, tracing, and tracking information system (CIS).

Having experienced a large growth of IT costs over the past three years, two recently appointed board members decided to have several serious questions investigated and answered:
• Do we spend our money on the right IT?
• Does IT offer ANWB any strategic value?
• Are we able to effectively use our IT?
• Are we capable of managing and implementing our projects?

This situation clearly demonstrates the business relevance of applying the BTRIPLEE framework, its valuation layers, and their associated classes of measures. The first two questions are related to the Business value of IT, since this level of the BTRIPLEE framework links IT costs with the organization’s financial, business, and strategic performance. The third question has to do with the Effectiveness of IT, since this level explores the extent to which IT effectively supports business processes, activities, and employees. The fourth question deals with the Effectiveness and Efficiency of IT supply. This means that all levels of the BTRIPLEE framework, extensively discussed throughout the book, were relevant to answering all four questions.
Since this case study was performed as a consultancy engagement, and confidentiality has to be preserved, neither the specific findings nor specific recommendations to ANWB are made public in this book, except for some findings at the highest level to put things in context. Also, specific techniques and information such as questionnaires, workshop materials, and benchmark data are not published in order not to violate the professional, legal, and ethical obligations of the consultancy business and consultancy firms. Their characteristics are described, however, in order to be able to validate their relevance and applicability. Besides, as it is the intention of this case study to provide empirical evidence for the validity and business relevance of the BTRIPLEE framework, its valuation layers, and their associated classes of measures, the absence of specific example of those should not be perceived as a shortcoming.

The application of the levels of the framework and associated measures are discussed in the same sequence of the first six chapters of this book, and in line with the execution of the case study.

**Measuring the Business Value of IT**

To determine the business value of IT, ANWB’s IT costs had to be correlated with its performance on three related dimensions: financial, business, and strategic performance. ANWB’s question “Do we spend our money on the right IT?” had therefore to be converted into three sub-questions:

- How much do we actually spend?
- On what is that money spent?
- Is IT and are IT costs positively related with financial, business, and strategic success?

**Dynamics of IT costs**

To answer these questions, total annual IT costs were collected for a number of years and segmented by activity and by resource to understand the dynamics of IT costs at ANWB, to perform trend analysis, and to benchmark IT spending against other companies. ANWB’s centralized IT budget was easy to retrieve, since it was managed by the (centralized) IT department, but all business unit controllers had to be visited frequently to collect, check, and double-check information on decentralized IT spending. In order to make sure that all IT spending was collected, a standard chart of accounts was used to assist the controllers to reliably take stock of IT spending by activity (in this case: development, maintenance, operations, end-user computing support, and “other”), and by resource (in this case: hardware, personnel, outside services including software, and “other”). In total, it took an elapsed time of six weeks to build the aggregated picture of ANWB’s IT spending over a period of three years.

Benchmarking was performed with the help of the consultant’s database containing IT spending patterns of many companies around the world. We measured and compared overall IT costs as a percentage of revenue, annual growth rate of IT
costs, IT costs by resource (hardware, personnel, outside services, and other), and IT costs by activity (development, maintenance, operations, end-user computing support, and other). These ratios were relatively easy to calculate and to compare, once all central and decentral IT spending figures were collected.

It appeared that over a period of three years, total IT spending had more than doubled in absolute terms and almost doubled as a percentage of revenue. However, when compared with data of other information-intensive organizations such as banks and insurance companies (available through the benchmark database), the total annual amount of money spent on IT as a percentage of revenue was not alarming. It seemed, based on these comparisons, that ANWB did not necessarily spend too much money on IT, but the growth of overall IT costs needed management attention—in particular because further growth had to be expected, since the systems under development at that time were going to be implemented and would consequently generate additional operational costs. Moreover, since analysis showed that especially decentralized IT spending had grown enormously (from 9 percent to 46 percent of centralized spending), our conclusion was that growth of decentralized IT costs needed improved control (46 percent is very high and far beyond the estimate of, for example, Gartners’ prediction of user-controlled IT costs). This conclusion was supported by the fact that it had taken us quite some effort to collect information on decentralized spending, and to make the overall picture visible to management, which was shocked as a result! A discussion with management confirmed that a currently lacking, systematic approach to overall IT cost control was needed. The associated measures of this aspect of the BTRIPLE framework were adopted for such a systematic control mechanism.

IT development costs appeared to have grown much faster than any other category of IT costs. In fact, IT development had grown tremendously, while maintenance of existing IT systems had been neglected. This meant that past investments in IT were insufficiently maintained, so that ANWB ran the risk that the IT capabilities in which it had invested so much would need to be replaced earlier than in the case of regular maintenance. To make this clear to ANWB management, the analogy of buying a car, and not having it maintained according to manufacturers’ instructions, was used. Everyone is aware that such practices are risky; such is also the case with IT systems. As a result, ANWB management initiated the necessary actions to limit system development activities and spend more attention on the maintenance of existing applications.

In conclusion, by analyzing the dynamics of IT cost, the questions “How much do we actually spend?” and “On what is that money spent?” could be answered on the basis of the theory described in Chapter 4. The question “On what is that money spent?” was answered by analyzing IT expenditure by IT activities and resources, rather than by the application of IT by business function or process. This perspective of IT spending is dealt with in the next sections.
Measures of financial performance through IT

To determine the value of IT, measured by improved financial performance as discussed earlier, IT costs were related with financial performance measures. IT costs were first expressed as a percentage of revenue, as discussed, which helped us to compare ANWB’s spending on IT with data of other companies.

The financial performance measures sales by employee, sales by total assets, ROI, ROA, and ROS, suggested in Chapter 4, were not all applicable at ANWB, since a part of total revenue is not generated by sales but rather by the annual membership fee and by interest income. We therefore replaced the denominator of sales by revenue, and two positive correlations between IT investment and financial performance ratios drawn in Chapter 4 were confirmed:

- **Revenue by employee** (surrogate measure for sales by employee) increased over the years, indicating that more business can be done per employee; while improved and more widespread IT (and, in particular, the number of PCs and computer terminals) has probably contributed to that economic advantage.

- **Profit as a percentage of revenue** (surrogate measure for ROS) increased over the years. IT might have helped in automating human tasks and as such decreased the costs of realized revenue, or prevented variable costs to increase while revenue (and the number of business transactions) grew.

As a general conclusion, the financial performance of ANWB appeared to be measurable, although not with all indicators suggested. In particular, we did not test the suggested measures Sales by total assets, nor ROA or ROI, since insufficient information was available.

Measures of business performance through IT

To evaluate the contribution of IT to improving ANWB’s business performance, Chapter 4 suggests evaluation of the relation between IT costs and multiple (including non-financial) business measures for different categories of business performance. As many non-financial performance indicators are specific to sectors we didn’t make comparisons with other organizations, but rather looked at historical trends.

This approach proved to be troublesome at ANWB. IT costs were related with a few non-financial business measures, all showing the same trend: IT costs per non-financial business measure had more or less doubled over the past three years. For example, IT costs per ANWB member nearly doubled because the growth of number of members was 2.6 percent per year, while IT costs had increased more than 100 percent over the past three years.

This misalignment of numbers was mainly caused by the fact that IT investments do not have an immediate impact; the benefits of IT can take several years to show results. An econometric study of Brynjolfsson found lags of two to three years before the strongest impacts of IT were felt. Especially the benefits of infrastructure, while potentially large, are indirect and often not immediate. Looking at the IT cost structure of ANWB, 45 percent of total IT costs were spent on the development of new, partly infrastructure IT systems (relative spending on IT development was
about twice as high as in other organizations): the development and expansion of tourist information databases, the re-development of the membership administration system, the development of logistics information systems, the implementation of an IT infrastructure on behalf of the regional shops, and the development of a road assistance scheduling, tracing, and tracking information system. These development costs had been the major cause of the large jump in overall IT costs. Unfortunately, none of these systems was implemented (not in operational use) at the time of the study, so that business benefits could not have been reaped yet, neither could they be measured.

In conclusion, the valuation of the contribution of IT to improving ANWB’s business performance could not be effectively performed because ANWB faced a lag time between incurring costs (at the time of measuring) and reaping the benefits (to be expected later than the moment of measuring). This is always the case, but the time lag problem was extreme at ANWB, since the enormous growth of IT expenditure troubled the analysis of relationships between IT expenditure and its benefits.

Measures of strategic performance through IT

The third dimension of business value of IT deals with the question to what extent IT costs are distributed over the areas in which results are expected to generate strategic success. As stated in Chapter 4, the key to determining strategic business value of IT is to first determine the areas that contribute most to ANWB’s success.

We interviewed several members of ANWB’s management to confirm ANWB’s mission: to serve the common interests of its members in recreation, tourism, mobility, traffic, and public transportation. In order to do so, ANWB management believes it is of key importance to:

- maintain a large membership base, by keeping the annual membership fee as low as possible;
- satisfy members, by offering easy-to-acquire, superb products and services, either free of charge, or at relatively low prices;
- operate profitably, so as to be able to fund innovation and renewal, and achieve sustainable success.

In other words, those areas that contribute most to ANWB’s success are those that increase its ability to create more value for more members, to launch new products and services, and to improve operating efficiencies.

It appeared that allocating annual IT costs of each of these critical business areas (as suggested in Chapter 4) would be too complex and alien, mainly because of the unusual high number of shared, infrastructure IT systems at ANWB. Instead, as a practical yet viable interpretation of the theory developed in Chapter 4, we assessed which groups of business functions were of highest strategic importance, relative to others, and in which groups of business functions IT was concentrated most. This approach is compatible with the theory, which includes “priority business functions” as one of the viable options to choose CSFs. In other words: this
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An assessment of the relative strategic importance of each group of business functions (called business area), judged by ANWB’s management during a workshop, reflected the interpretation of “critical success factors.” For each business area, we took a snapshot of the current degree of automation, measured by the level of actual automation as a percentage of potential for automation. We also constructed an imaginary picture—a projection of the near future-consisting of the current IT concentration complemented with the impact of the systems under development. This picture would provide a basis to answer the question whether ANWB would be gaining strategic business value through IT, after completion and implementation of the IT systems under development.

To create this picture, the current degree and the perceived quality of IT support for each of the seven defined business areas was estimated by ANWB’s employees during a series of workshops. Then we included the potential effect of the systems under development (new initiatives), on the basis of discussions with the business area managers, and arrived at a future “IT concentration score” combining the IT in place and under development. If the IT concentration score of each business area were the same as the strategic importance of the business area itself, IT would be

Figure B.1: Strategic Impact of IT

<table>
<thead>
<tr>
<th>Business Area</th>
<th>Strategic Importance</th>
<th>Degree of Automation</th>
<th>Quality</th>
<th>New Initiatives</th>
<th>IT Concentration Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Membership Administration and Support</td>
<td>● ●</td>
<td>● ●</td>
<td>●</td>
<td>Yes</td>
<td>● ●</td>
</tr>
<tr>
<td>Membership Representation</td>
<td>● ● ●</td>
<td>● ● ●</td>
<td>● ● ●</td>
<td>No</td>
<td>● ● ●</td>
</tr>
<tr>
<td>Sales of Products</td>
<td>● ● ●</td>
<td>●</td>
<td>●</td>
<td>Yes</td>
<td>● ● ●</td>
</tr>
<tr>
<td>Sales of Services</td>
<td>● ● ●</td>
<td>●</td>
<td>●</td>
<td>Yes</td>
<td>● ●</td>
</tr>
<tr>
<td>Road Assistance and Emergency Center</td>
<td>● ● ●</td>
<td>●</td>
<td>●</td>
<td>Yes</td>
<td>● ● ●</td>
</tr>
<tr>
<td>Signposting</td>
<td>●</td>
<td>● ● ●</td>
<td>●</td>
<td>No</td>
<td>● ●</td>
</tr>
<tr>
<td>Facilities &amp; Support</td>
<td>● ●</td>
<td>● ● ●</td>
<td>●</td>
<td>Yes</td>
<td>● ● ●</td>
</tr>
</tbody>
</table>

● = Low  
● ● = Medium  
● ● ● = High
strategically aligned with ANWB’s objectives. Figure B.1 shows the results of this exercise. The approach applied is consistent with the theory of Chapter 4 (and reflected in Figure 4.10) in terms of the philosophy to categorize different types of IT according to their strategic impact. It only differs slightly in terms of its practical implementation.

Figure B.1 tells us that ANWB’s IT was only partly strategically aligned with its objectives:

- **Membership administration and support**, although important, was not considered to be of strategic relevance. Because the medium level of IT coverage (degree of automation) of a relatively low quality was not satisfactory, the decision to re-develop a new membership administration system seemed to be right. But as the business area was not very strategic (only a medium strategic score), abundant IT spending on a new membership administration system should not occur. As a result of this analysis, complemented with some further investigations, ANWB decided to stop the development project and start over again, aiming at a more functional system with fewer bells and whistles than the system under development, and much lower estimated annual costs of operations and usage.

- **Membership representation** scored as a strategic business area. IT coverage was sufficient, quality was fine, so the IT money spent in that area was well invested from a strategic point of view.

- **Sales of products** was a strategic business area as well. IT coverage was at the average level, and quality was marginal. Two initiatives were underway: the development of ANWB’s logistics information systems, and the implementation of a new IT infrastructure on behalf of the regional shops. As such, these investments made sense from a strategic point of view.

- **Sales of services**, again, was strategic, while current IT support clearly was insufficient from coverage and quality perspectives. The development and expansion of tourist Information DataBase Access made sense from a strategic point of view.

- **Road assistance and Emergency Center**, one of ANWB’s core businesses and thus strategic in itself, needed to upgrade the supporting IT, not only because the current IT was insufficient, but also because organizational changes caused the business area to work in a completely different way. The IT investments were of strategic significance.

- **Signposting** was of less strategic importance than other business areas. IT was quite well developed, probably an over-investment from a strategic point of view.

- **Facilities and support** include financial, human resources, facilities, and IT management. These are the business areas, which historically got most attention, and many of the business functions were well supported by IT. The logistics information systems under development, linking the sales locations with warehousing and purchasing functions, were new initiatives that caused the IT concentration score to be “high,” not fully in line with the “medium” strategic value of support processes.
Reviewing this list, it can be argued that ANWB had invested and was investing in the right strategic areas, with the exception of over-investments in Membership administration and support, Signposting, and Facilities and support. As a result, the answers to the first two questions:

- Do we spend our money on the right IT?
- Does IT offer ANWB any strategic value

were found by applying measures linked to the first level of the BTRIPLEE framework. First of all, we concluded that overall IT cost was not abnormal, but that IT cost growth needed management attention. In particular, decentralized IT cost needed management control, and development costs had to be partly shifted to maintenance in order to protect earlier investments in IT. Secondly, a positive correlation between IT cost and financial performance was not rejected. Thirdly, it was simply too early to correlate IT cost with business performance improvement, caused by the fact that current IT costs do not yet have an immediate impact. Finally, the analysis of IT costs and strategic performance showed that ANWB’s IT was fairly well aligned with its strategic objectives.

**Measuring the Effectiveness of IT**

The third question to be answered, “Are we able to effectively use our IT?” needs measurement at the IT effectiveness level of the BTRIPLEE framework. Measures are focused on the three perspectives of:

- business processes and business activities,
- users of IT,
- IT supply.

These three perspectives were included in the measurement of IT value at ANWB. At this level, we measured the availability of IT to business processes and activities (IT coverage), user satisfaction with IT, and effectiveness of IT from technical perspectives, as discussed in Chapter 5.

**IT effectiveness from a business process and business activities perspective**

To determine the effectiveness of IT, first the availability of IT--to support the 29 operational processes and 19 management processes that we collectively defined--was evaluated through the measurement of the level of current IT support and the exploration of remaining opportunities for further IT support. In fact, this was a more detailed analysis of the IT support in the business areas mentioned before, using the same approach, but in greater detail. As said, we also investigated the level of IT support in the near future, supposing that the systems under development were implemented and used. We measured:

- actual IT support, by firstly reviewing the output of processes, then estimating the amount of human work that would have been required to produce that output, and finally, estimating the human labor eliminated by IT,
The measurement was performed in a series of workshops, during which first the degree of actual IT support was discussed with users and business area management for each process and its underlying activities. With the help of examples depicting potential IT support opportunities, as illustrated in Figures 5.1 and 5.2, and examples of the application of IT at other companies supplied by us as knowledgeable consultants, we then brainstormed about the potential of further IT support. The resulting picture of actual IT support as a percentage of potential IT support showed a relatively high degree of coverage of existing IT in many of the management processes compared to operational processes. This was surprising, since most cases of IT effectiveness measurement that I experienced show that operational processes are further automated than management processes. When we completed the picture with the additional, projected level of IT support of the systems under development, and supposing that these were implemented and used, this difference of coverage disappeared. This analysis demonstrated to ANWB management that a balanced approach to IT coverage in both operational and managerial processes had been followed--to some extent unconsciously, but nevertheless successfully.

**IT effectiveness from a user perspective**

IT effectiveness from a user perspective was measured at ANWB in two ways:

- To measure the perceptions of ANWB employees of the overall effectiveness of IT, 120 employees were surveyed anonymously about their usage of IT; their experience and general satisfaction with IT; the effectiveness of the education, training, and support they got to use IT properly; their commitment to take on responsibility for implementation efforts; etc. Unfortunately, this survey was not as successful as we hoped it would be, primarily due to the response rate, which was only 24 percent (50 percent is generally considered a minimum to ensure that the opinions of IT enemies or friends are not over-represented).

- We measured in more detail the satisfaction of users of 21 identified IT applications by asking them to rate the performance of the IT application on the user satisfaction attributes discussed in Chapter 5: reliability of the IT application, reliability of information, accessibility of information, security of information, and ease of use. In this case, the response rate was very high, since the survey was not anonymous, and follow-up could be done (and had to be done) in letters and phone calls to non-respondents. Many of the selected applications can be considered to be “infrastructure applications,” as they are shared by many different business areas and processes, so that the specific requirements of IT infrastructure, as defined in Chapter 5, were addressed. The results of the first survey revealed a lack of interest in IT and IT applications in general, and a shortfall of commitment to take on responsibility for successful IT usage. This low commitment might also have been the reason for a low
response rate of 24 percent of returned questionnaires, but this was not further investigated. As said, measurement results represented only 29 employees (out of 3,000), which is insufficient to draw reliable conclusions. ANWB management felt that the quantitative findings confirmed their expectations, however, so that management judgment took over from hard measurement in this case.

The results of the second survey successfully revealed the satisfaction levels of users of the 21 IT applications. Some of the applications were rated good, average or insufficient on all or most of the user satisfaction attributes; others received a more varied appraisal. In any case, the effectiveness of each application could be expressed successfully, and an extrapolation could be made to convey an overall effectiveness satisfaction rating for the whole. Two important applications in particular showed severe shortcomings, so that a more thorough audit was started to investigate causes and effects of the low effectiveness of these applications in question. Also, some satisfaction attributes were rated consistently poor for all applications, e.g., ease-of-use and availability of appropriate documentation, depicting a general dissatisfaction about these specific effectiveness attributes for the complete application portfolio.

In conclusion, effectiveness of IT in general, and of the most important IT applications in particular, could be measured successfully from a user perspective. Analysis revealed both the overall as well as the specific effectiveness of IT and its usage to ANWB management. As a result, a number of practical actions to be taken were recommended.

**IT effectiveness from an IT supply perspective**

We also looked at the operational- and maintenance-related effectiveness attributes of the 21 identified IT applications, as well as their architectural effectiveness attributes, as discussed in Chapter 5. Structured questionnaires, filled in by and later discussed with maintenance professionals, system managers, and operations management, asked them to rate several specific and relevant effectiveness aspects of maintainability, architecture, and operability. The answers successfully led to the determination of the more technical-related quality aspects of the individual IT applications, as well as to the common and therefore overall technical quality of the application portfolio, including aspects of flexibility and portability (and thus: scalability), reflected in the architectural aspects of the 21 applications.

As a result, the third question, “Are we able to effectively use our IT?” could successfully be answered through the use of measures of the three perspectives (business processes and business activities, users of IT, and IT supply) of the IT effectiveness level of the BTRIPLEE framework, as demonstrated.

**Measuring the Effectiveness and Efficiency of IT Supply**

The fourth question, “Are we capable of managing and implementing our projects?” was answered through the use of the concept of the Balanced Scorecards for IT supply and the associated measures of IT supply effectiveness and efficiency.
The effectiveness and efficiency of two important IT supply processes of ANWB’s internal IT supply organization (ANWB-ACS) were measured: IT Development Management and IT Infrastructure Management. For both IT supply processes a number of measures were applied, reflecting the distinct perspectives of the Balanced Scorecard concept. The two (out of five possible) IT supply processes and their respective scorecards are perceived to be representative to reliably validate the concepts described in Chapter 6.

**Effectiveness and efficiency of IT Development Management**

IT development in general was measured using indicators of three perspectives of the IT Development Management Scorecard:

- **Customer perspective**: For seven recently developed IT applications, the costs per Function Point delivered (see Chapter 6) were measured and benchmarked against a database containing IT development measures of other organizations. Costs were expressed in the time spent per Function Point, rather than hard currency, since staff-months are more universal measures and easier to compare than are units of currency at a given moment. Similarly, the elapsed time to develop these applications was measured by Function Points delivered by calendar month, and benchmarked. These measurements were performed successfully, and deviations from averages were discussed with the project leaders involved. Some deviations could be explained, others not directly, causing follow-up investigations into cause and effect relationships.

- **Internal perspective**: A further break-down of quantified performance indicators by development phase demonstrated some interesting deviations from benchmarks, e.g., the feasibility study phase of an average project at ANWB took twice as long as at other companies, although ANWB did not spend more time on it; neither ANWB’s IT department nor the users spent a lot of effort on testing and implementing IT applications, but it took them a relatively long time compared to other organizations. Also, performance to budget was measured and discussed, resulting in quite some discussion about the role of the users versus the IT professionals, scattered responsibility for budgets, freezing functional specifications during development, and the like. Finally, the existence and actual application of methods, procedures, techniques, rules, and other management controls were verified, using a series of measures on interval scales.

- **Innovation and learning perspective**: The number of training days per employee per year was measured and benchmarked, showing under-investment in that area.

The effectiveness of the projects under development was further and more specifically investigated by reviewing four of these projects:

- re-development/replacement of the membership administration system (CARPLUS),
- development of ANWB’s logistics information systems (INFOLOG);
implementation of the new IT infrastructure on behalf of the regional shops;
• development of the new road assistance scheduling, tracing, and tracking
information system (CIS).

In workshops attended by both users and IT professionals, a series of effectiveness factors were discussed for each project. Measures were selected (with the help of the Scorecards in Appendix C) for effectiveness factors such as risk management, project management, availability of facilities and support, allocation of required skills, commitment and involvement of users, etc. The effectiveness measures were rated on an interval scale, so that projects could be compared with each other, and overall effectiveness expressed and reported to management.

The application of the Balanced Scorecard measures for IT development, in conjunction with the benchmarking of IT development performance against other organizations, appeared to be a successful approach for demonstrating the effectiveness and efficiency levels of IT development at ANWB. Not all measures were used (which is impossible anyway), but only those applicable to answer management’s questions and those that could be used practically within the timeframe available. As the systems under development mainly represented large, infrastructure systems, the majority of measures used came from the internal and customer perspective Scorecards, as was indicated in Chapter 6.

**Effectiveness and efficiency of IT Infrastructure Management**

The measurement of IT Infrastructure Management, called Data Center Operations at ANWB, focused on three main aspects:
• level of service to users (the customer perspective),
• technology resources employed in relation to the workload (internal and financial perspectives),
• human resources employed in relation to the workload (internal and financial perspectives).

The level of service to users was measured using the indicators of response time for on-line services (overall and during peak times) and availability of IT services. Measures were compared with benchmarks, as usual.

The measurement of technology resources employed focused on available and used CPU MIPS, disk space, tape capacity, printing capacity, etc., in relation to the workload (measured in used capacity of the mainframe computers).

The measurement of human resources employed focused on the number of people performing data center-related tasks, in relation to the workload.

Finally, as with IT development effectiveness and efficiency, the existence and actual application of methods, procedures, techniques, rules, and other management controls were verified, during workshop discussions with Data Center Operations’ management and employees, using a series of measures on interval scales. Specific measures of the innovation and learning perspective were not applied in this case.

Again, measurement at this level did not face severe problems, other than discussions with IT professionals on definitions of measures and the interpretations of results, which is common.
As a result, the fourth question, “Are we capable of managing and implementing our projects?” was answered through the use of measures of the IT supply effectiveness and supply level of the BTRIPLEE framework. In fact, we also looked at the efficiency and effectiveness of IT supply beyond the project and implementation phases, namely the operational stage of IT systems once they are managed by IT infrastructure management processes. Both the IT development and IT infrastructure measures, classified by the Balanced Scorecard concept, proved to be workable and demonstrated their value in the measurement of IT supply effectiveness and efficiency measurement at ANWB, leading to an action plan for improvement in both.

CONCLUSION

The concepts of the valuation of IT, extensively discussed in Chapters 3, 4, 5, and 6, were applied at the Royal Dutch Touring Club ANWB, a truly information-based organization. The objective of this case study was aimed at providing practical evidence for the application and business relevance of the BTRIPLEE framework and classes of associated measures, in terms of content, context, and process.

The value of IT proved to be measurable at all levels of the BTRIPLEE framework. The questions raised by ANWB’s board members could be answered satisfactorily, while it was necessary to invoke all three levels of the BTRIPLEE framework and associated classes of measures to answer these questions, underpinning the business relevance of the BTRIPLEE framework and each of its levels.

Overall, ANWB management took far-going actions in relation to the management, application, and supply of IT, in order to obtain higher value from their IT expenditures. These actions included, but were not limited to, ANWB-wide control of IT costs, a re-distribution of IT supply efforts in favor of maintenance at the cost of new development of IT capabilities, the restriction of the scope of some projects under development, and the actual stop, re-definition, and re-start of a major infrastructure IT system under development at the time of measuring.

ANWB also decided to adopt the major components of the approach described to measure the value of IT more systematically and consistently.

REFERENCES
