

SPECIAL STUDY

Transparency in Logistics and Store Inventory at Vodafone Portugal

Anita Liess

IDC OPINION

The U.K.-based Vodafone Group is one of the largest telecommunications companies in the world and provides a range of mobile telecommunications services, including voice and data. Vodafone Group PLC has a significant presence in continental Europe, the United Kingdom, the United States, and the Far East. In 1992, the company ("Telecel" at the time) started commercial operations in Portugal and today Vodafone's wholly-owned subsidiary there ranks as the second largest mobile operator in the Portuguese telecommunications market. This case study evaluates the SAP Advanced Planning and Optimization (SAP APO) implementation at Vodafone Portugal and its effect on demand planning and logistics operations between the telecommunications provider and its agent stores.

Before the SAP APO implementation, Vodafone Portugal's demand planning processes were supported by Excel spreadsheets. The new Customer Operations Director, José Oliveira, decided to implement standardized tools that not only support and automate the demand planning process, but also integrate agent stores into Vodafone's extended supply chain.

As a result of the SAP APO implementation at Vodafone Portugal, IDC has identified key tangible benefits and calculated the following expected return on investment (ROI) over a five-year period:

<input checked="" type="checkbox"/> Return on investment:	133%
<input checked="" type="checkbox"/> Internal rate of return (IRR):	21%
<input checked="" type="checkbox"/> Payback period:	3.8 years
<input checked="" type="checkbox"/> Five-year net present value (NPV), after tax:	€627,500

These overall results were derived from the following main business benefits:

- The delivery time to stores improved from five working days before SAP APO to 1.5 days after the SAP APO implementation. This accelerated replenishment cycle for stores resulted in a higher revenue realization of €500,000 per year.
- In 2004, the first year of the SAP APO deployment, Vodafone launched 3G products — the next generation of handsets using UMTS technology — and the company had to store a tremendous amount of product value in its warehouses. However, the seven-day reduction in the average number of days in inventory lowered total inventory carry costs by more than €700,000 per year.
- With its SAP APO implementation, Vodafone Portugal was able to improve product margins, particularly in the corporate customer segment, resulting in a profit increase of €210,000 per year.

IN THIS STUDY

Introduction

The Vodafone Group PLC is one of the largest telecommunications companies in the world. Headquartered in Newbury, England, with roughly 60,000 employees, the Vodafone Group reported annual revenue of €50 billion in fiscal year 2003 (ended March 31, 2004), up from €44 billion in the prior year. The group has an equity interest in 26 country subsidiaries, and in addition has engaged a partner network in a further 14 countries. With such a widespread geographical coverage, the group provides services to more than 150 million individuals.

In December 2004, Vodafone's subsidiary in Portugal had approximately 3.6 million customers and ranked as the second largest operator in the Portuguese telecommunications market. Effective on May 21, 2003, Vodafone Portugal became a wholly-owned subsidiary of the group. The focus of Vodafone's operations in Portugal is on voice and data mobile services, offering a nationwide GSM cellular network as well as services around the UMTS license. The Customer Operations division manages approximately 50 of its own stores, 28 VMI-agent stores, and an additional 150 branded stores which basically serve three customer areas: consumer, corporate customers, and loyalty programs. This case study looks at Vodafone-owned stores and VMI-agent stores only, since these shops are integrated with Vodafone's IT systems.

With cutthroat competition in the telecommunications market during the late 1990s, Vodafone Portugal set on a course to sustain healthier operating profit margins. In 2003, the company centralized all operational responsibilities — primarily customer service, logistics, and distribution — into one department. Since the former disparate entities showed many heterogeneous working styles, one of the major challenges of this consolidation was the introduction of standardized business processes and the compilation and integration of all demand planning, distribution, and logistics-related business data to create transparency and visibility of past, current, and future operations transactions.

Initial Situation and IT Challenge

Before the SAP APO implementation, Vodafone Portugal's demand planning processes were supported by Excel spreadsheets. The new Customer Operations Director, José Oliveira, decided to implement a standardized tool that not only supported and automated the demand planning process across all Vodafone business units, but also integrated agent stores into Vodafone's extended supply chain. A critical part of achieving this was the consolidation and integration of supporting IT tools in order to effectively centralize the previously detached departments. Moreover, the integration of agent stores into Vodafone's planning and distribution systems would enable the telecommunications provider to gain insight into consumer demand patterns in different stores and regions.

In 2001, Vodafone Portugal migrated its existent SAP R/3 version (including the financials, controlling, materials management, and sales and distribution components) to SAP R/3 4.6.C, primarily due to the ending of the service cycles for the older release. The company has also performed an analysis and identification of new business requirements. As mentioned above, the restructuring of the operational organization required an adjustment of the underlying IT solutions, so Vodafone Portugal additionally agreed to a functional enhancement by implementing SAP APO.

Although Vodafone did evaluate other vendor's planning and optimization software, soon it became obvious that the integration to the existing SAP purchasing and distribution systems was a key selection criteria, leaving SAP as the sole vendor of choice.

The Solution

Solution Details

Vodafone Portugal implemented the following SAP APO functionalities:

- ☒ Demand planning (DP) to support sales forecast processes for all business units. Prior to implementing SAP APO, Vodafone carried out a monthly sales forecast per product. With the support of SAP's demand-planning functionality, the company was able to shorten the forecasting cycles to a weekly basis, and Vodafone today forecasts per product and per location.
- ☒ Supply network planning (SNP) to integrate agents' stores into Vodafone's IT landscape, increasing the transparency of agent stocks. Based on this data, Vodafone can better plan and optimize stock levels in accordance with real demand. Based on forecasts and pending orders, SAP APO can generate order suggestions for production orders, purchase orders, or transfer orders. This optimization runs twice weekly.
- ☒ Vendor managed inventory (VMI) to optimize agents' stocks based on an innovative methodology in terms of optimal stock management. Vodafone uses a safety stock of two weeks for one store. It looks at the sales history of the past week and forecasts for the next two weeks according to figures for previous periods. This way, Vodafone is coordinating its product distribution in a more purposeful manner and avoids both stock excesses and product shortages in its stores.
- ☒ As a prerequisite for SNP and VMI, Vodafone equipped its agents with Palm devices to enable weekly stock inventories to be transferred over an Internet portal directly into SAP APO.

Important Note: Vodafone decided not to implement the promotion planning and product life-cycle functionality of SAP APO, since the company's internal processes were perceived as too complex to be reflected in an IT system. The users in the different LOBs therefore continued to use their traditional spreadsheets to carry out forecasts in campaign months and manual corrections determining the end-of-life of a product.

Implementation Process

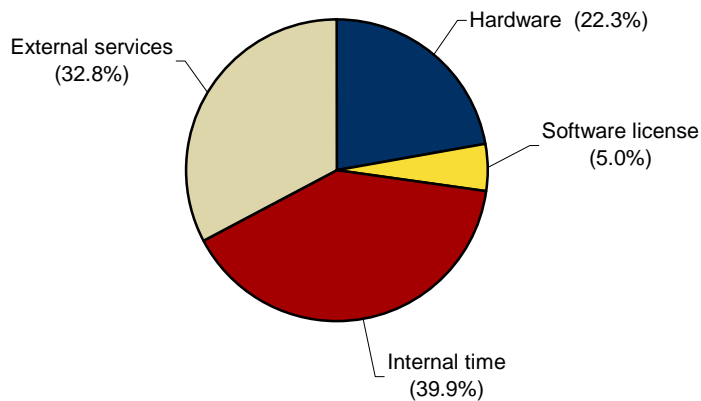
At the start of 2003, Vodafone Portugal began evaluating a potential SAP APO implementation. The company identified business requirements around the new demand-planning and distribution processes, across three distinct customer areas: consumer, corporate customers, and loyalty programs. After a short evaluation period spent mapping its application requirements against SAP APO capabilities, the telecommunications specialist opted for SAP's offering.

The total cost of the SAP APO implementation at Vodafone Portugal was €1.875 million, which is broken down in Figure 1. The majority of the cost was generated by implementation service costs. Five internal full-time employees as well as seven external full-time resources teamed up for the seven-month project implementation. As a result, the total cost of internal implementation services reached €748,000 and external implementation services totaled €616,000. The external services team at Vodafone Portugal was a combination of SAP Consulting resources, and consulting resources from a local third-party IT service provider specialized in middleware integration and maintenance. Since Vodafone outsourced its middleware maintenance, addressing the integration needs of SAP APO in particular required a relatively large amount of external staff days since the new system turned out to be more complex than expected. As a result, Vodafone today reports significant ongoing maintenance costs. In contrast to the SAP APO-related software license investments of €94,000, the SAP APO cost structure at Vodafone Portugal shows a remarkably high share of hardware investment corresponding to €418,000. This, however, reflects reality, as Vodafone had to install new SAP APO-related database systems and equip distributed VMI agent stores.

In October 2003, Vodafone went live with SAP APO and managed to complete the project in time and on budget.

FIGURE 1

Total Investment Cost Structure (%)



Source: IDC, 2005

Since year-end and the Christmas season are usually very busy with various campaigns in the mobile telecommunications industry, the timing of the go-live date in October was not optimal. In fact, line-of-business users kept their traditional spreadsheet working style during the first months of SAP APO deployment, thus delaying efficient adoption of SAP APO. In addition, the IT department detected quite a number of system instabilities in the first few months. There were job schedules that did not work properly and Vodafone had to reassure consistent master data referring to SAP APO as a prerequisite for realistic demand-planning numbers. Consequently, there was virtually no usage of SAP APO between October and December 2003; this study will therefore work with a go-live date of January 2004, with 2004 being the first full year of SAP APO deployment at Vodafone Portugal.

Business Benefits

At the time of this evaluation and after more than one year of deployment, Vodafone analyzed the most recent SAP APO usage, and revealed the average total number of transfer orders executed over SAP APO at about 38%. Further analysis showed that SAP APO usage was reaching 43% in months without campaigns, but as soon as seasonal marketing campaigns started the end users created transfer orders in their old-fashioned style, which again lowered SAP APO usage to 26%. This relatively low user-adoption rate suggests that Vodafone still has substantial benefits to reap if user adoption increases. In joint discussions, Vodafone Portugal showed it is very much interested in increasing the rate of SAP APO usage over the coming years. Driven by incentives and additional training sessions, Vodafone expects to increase SAP APO usage by 10 percentage points a year until 2008. While this rate might be considered relatively low, Vodafone prefers this moderate perspective for this case study as the rate will influence the value calculation in terms of a user adoption factor for all identified quantitative business benefits.

When looking at the benefits of the SAP APO implementation at Vodafone Portugal, most of the time the interviewees praised the qualitative aspects of the system and at the beginning of this analysis Vodafone could not comment on any tangible benefits.

Qualitative Benefits

As an overall statement about the project, Customer Operations Director José Oliveira commented that: "Due to various stakeholders affected by SAP APO-related business processes, the SAP APO implementation project at Vodafone Portugal was a difficult endeavor. Even so, the project objectives have been realized in time and within budget. Among the major achievements, we have identified the centralization of critical business information into one integrated system enabling a new age of transparency for all departments involved in the demand planning and forecasting process. As a result of this, we are confident that Vodafone Portugal is now well prepared for an integration into an extended supply chain management scenario of the Vodafone Group on a worldwide level."

A summary of the qualitative statements are listed below:

- ☒ *Better transparency and accuracy:* Vodafone perceives that SAP APO significantly improves the transparency and accuracy of demand planning numbers. Where previously Vodafone had hardly any information on demand, SAP APO provides historic data, current data, and forecasts for future demand based on past figures, while taking drivers of exceptional demand into account.
- ☒ *Improved forecast frequency and granularity:* The previous forecasting cycles per product were done on a monthly basis and provided total sales data over all stores. Today, SAP APO executes the forecasting process once a week per product and location, so that sales numbers per store become evident and Vodafone can implement a continued performance rating by individual store.
- ☒ *New level of reporting achieved:* SAP APO increased forecast frequency and granularity, offering a wealth of business information for analytic exercises and reporting purposes to improve and optimize demand-side logistical processes.
- ☒ *Improved negotiating power with suppliers:* Based on reliable demand planning figures, Vodafone is now able to better negotiate price/quantity conditions with suppliers, resulting in major deals and considerable discount rates. Since it was not possible to establish a connection between purchase discounts and the usage of SAP APO, this SAP APO value analysis did not consider the reduced material costs as a quantitative benefit area, but Vodafone still perceived it to be worthwhile mentioning in the qualitative benefits section.

Quantitative Benefits

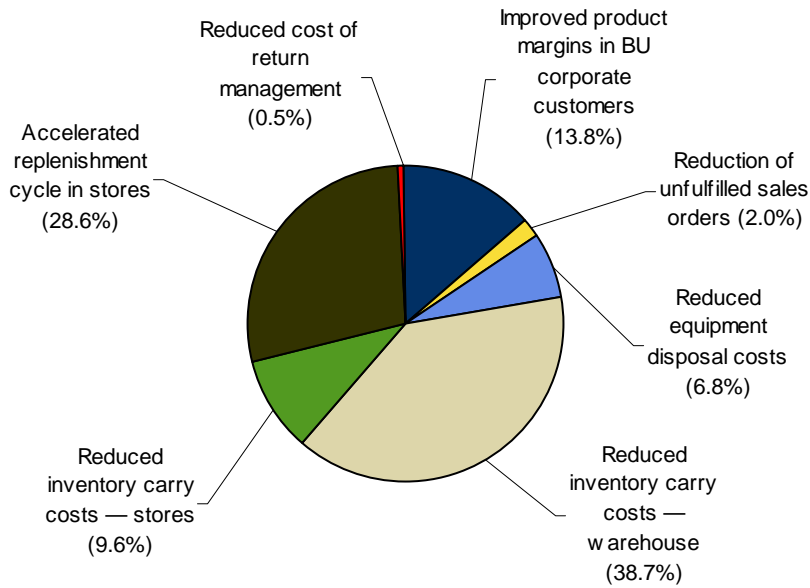
When IDC looked at the identification of quantitative benefits of the SAP APO solution at Vodafone Portugal, the potential benefits were categorized as:

- ☒ Reduced material costs, primarily resulting from reduced acquisition costs or increased sales revenue.
- ☒ Better lead cycles, resulting from accelerated operational processes like shortened delivery time, reduced number of days in inventory, and better coordination of transportation.
- ☒ Improved process efficiency, achieved through time savings for employees and basically resulting in a productivity increase.

The identified benefits at Vodafone Portugal are illustrated in Figure 2 and will be described in more detail in the next section of this document.

FIGURE 2

Total Benefit Structure (%)



Source: IDC, 2005

For the logistics manager, Mafalda Alves Dias, the SAP APO solution was essential to increase Vodafone's competitiveness. She is convinced that "with a penetration rate of 90% and more, the reality is that the mobile telecommunications market is highly mature and the only way to increase a provider's market share is to decrease the number of unfulfilled sales orders and to accelerate the replenishment cycles in stores." These benefits were achieved through SAP APO, and they contributed 30.6% to the overall quantitative benefits at Vodafone Portugal.

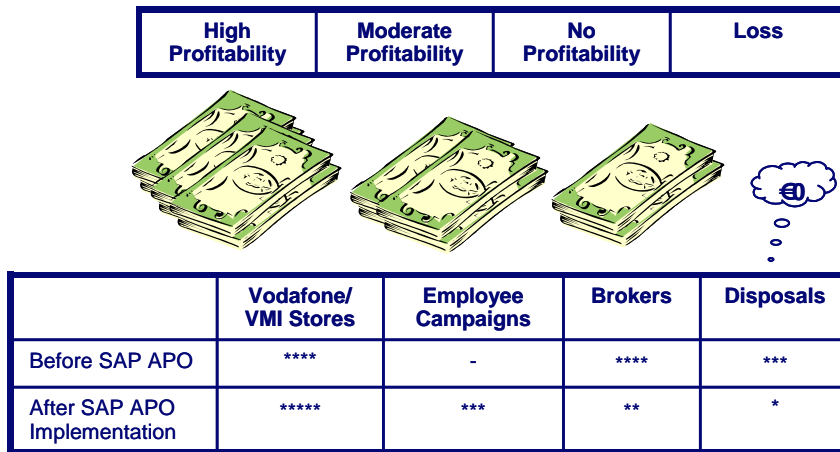
Reduced Material Costs

As mentioned in the qualitative benefits section already, Vodafone certainly was able to reduce material costs due to its improved negotiating power with suppliers. However, the compilation of data to calculate a quantitative benefit in this area turned out to be too abstract. For that reason, the reduced material costs section focuses primarily on reduced equipment disposal costs, as well as on better sales figures based on improved product margins and a reduced number of unfulfilled sales as a result of SAP APO.

- ☒ *Improved product margins in business unit (BU) consumer and corporate customers:* For the analysis at hand, Vodafone aggregated its handset products into high-end value, medium-value, and low-value product groups. Although, SAP APO is expected to boost sales quantities, the sales quantity figures in 2004 were highly affected by the launch of 3G products, the next generation of handsets using UMTS technology. The comparison of quantities sold in 2003 and in 2004 could absolutely not be associated with the SAP APO implementation and was not meaningful. Therefore, only 5% of the variance in sales quantities from 2003 to 2004 was associated with SAP APO in this calculation and due to improved product margins (as a result of reduced material spend) Vodafone was able to increase operational profit, particularly derived from the high-end and medium-value product categories.
- ☒ *Reduction of unfulfilled sales orders:* Market penetration of mobile handsets in Portugal is above 100%, which implies a high level of maturity. For vendors and suppliers in this market this means that it is most difficult to increase sales revenue by further increasing the market penetration rate. Therefore, Vodafone focused on increasing its sales revenue primarily by lowering the number of unfulfilled sales orders. As a result of SAP APO, the number of Vodafone's BU consumers' unfulfilled sales orders decreased by 10%, and the number of BU corporate customers' unfulfilled sales orders reduced by 20% in 2004 compared to 2003.
- ☒ *Reduced equipment disposal costs:* Increased transparency of products in stock enabled Vodafone to better manage obsolete or end-of-life (EOL) products. Before implementing SAP APO, the company could not identify EOL products across all stocks and Vodafone had to throw away obsolete products or sell them to brokers for a minimal price once a year. Now SAP APO keeps the stocks visible and reveals in time if handsets are about to be discontinued. This enables Vodafone Portugal to actively manage older handset models, and through proactive disposal management the company is able to realize benefits from reduced disposal value, additional revenue from brokers, and additional revenue from employee campaigns initiated during 2004. The profitability of handsets and their respective product life cycle stages by distribution channel are outlined below. The asterisks in Figure 3 indicate how SAP APO helped Vodafone to transfer handset quantities from low profitability channels to higher profitability channels, resulting in a substantially improved disposal value every year.

FIGURE 3

Handset Profitability by Distribution Channel and Handsets Sold Before and After SAP APO



Note: Asterisks represent volume sold via the respective channel.

Source: IDC, 2005

Better Lead Cycles

The major source of quantitative business benefits as a result of the SAP APO implementation was the improvement of lead cycles, resulting in approximately €1.2 million worth of benefits per year. The big-ticket items came from reduced inventory carry costs in Vodafone warehouses and from accelerated replenishment cycles in stores.

- ☒ *Reduced inventory carry costs — warehouse:* Due to the launch of 3G devices in 2004, the average value of products stored in warehouses increased by 15% and the inventory carry costs would have increased accordingly. Using SAP APO, Vodafone decreased the number of days in inventory across all products by seven days, and therefore was able to decrease the inventory carry costs in warehouses compared to 2003 (assumption: the total fixed storage costs stayed the same in 2003 and 2004).

- ☒ *Reduced inventory carry costs — stores:* In contrast to the increase of product value in warehouses and as a result of optimized distribution management, the average value of products stored in Vodafone stores and VMI stores increased by only 7%. Thanks to SAP APO, the number of days in inventory decreased by seven working days and the resulting inventory carry costs in stores were reduced considerably.

- ☒ *Accelerated replenishment cycle in stores:* By using SAP APO, the delivery time for products from warehouses to stores decreased from five working days to 1.5 working days. With optimized in-stock levels, the stores were able to almost double their revenue from €672 to €1,154 per day. IDC applied an efficiency rate of 8% to the increased sales value assigned to accelerated replenishment cycles.

- ☒ *Reduced cost of return management:* The optimized distribution of handsets across all stores and the reduction of human errors in demand planning resulted in fewer incorrect product transfers from warehouses to stores. Though the lowered transportation costs do not represent a major value, this improvement is still worth mentioning.

Improved Process Efficiency

Based on interviews with a number of SAP APO end users, there were no time savings reported at all. Rather, employees mentioned that the time they need to carry out the demand planning was static. Previously, the forecast cycle was done once a month and now the employees need to update the demand planning figures on a weekly basis. In addition, prior to implementing SAP APO, the forecast was done per product only and today the forecast is done per product and per location. As a result, the expected time savings in process execution have been consumed by increased detail and frequency of forecast.

Future Plans

First and foremost, the overall goal of Vodafone Portugal with regard to its SAP APO implementation is to improve the SAP APO usage rate, increasing the transfer orders triggered by SAP APO. As a matter of fact, the SAP APO usage rate during months without sales campaigns is pretty satisfactory, but as soon as campaigns start, the transfer orders from warehouses to stores are dictated by manually prepared Excel spreadsheets. With this in mind, Vodafone could further increase its benefits from SAP APO by implementing promotion planning functionality.

Vodafone's marketing department plans for vendor managed inventory (VMI) agent stores to amount to 50% of all branded stores by the end of 2005. So far, however, the company has managed to engage 28 agent stores to participate in Vodafone's VMI program, which equals 15% of the total 178 stores. With plenty of stores still to engage VMI, the IT department is aware of the fact that as the number of VMI stores increases, the workload for the current systems and for the weekly batch run will rise proportionately. Considering the duration of the present batch run of 12 hours, the boost in data would overload current IT systems and the IT manager is already preparing for an update of existing technology from batch to real-time transactions. In addition to this technological hindrance, Vodafone is even likely to face moral issues with branded stores; the new transparency of sales numbers per store and the resulting agent rating process at Vodafone created doubts among VMI store managers, who increasingly decide to not participate in VMI anymore.

Finally, the qualitative section in this document discusses the empowerment of Vodafone Portugal with regards to supplier negotiations. With more reliable demand planning, Vodafone Portugal is not only able to decrease per unit prices but is also now capable of participating in extended supply chain processes across its own company borders. For example, Vodafone Portugal at present is in serious talks with Nokia to set up collaborative planning procedures, using RFID technology, in order to coordinate and track just-in-time (JIT) delivery from the handset producer to the telecommunications provider.

Lessons Learned

Vodafone identified the following key lessons learned during the SAP APO implementation and its deployment so far.

The SAP APO implementation at Vodafone Portugal enabled transparency and visibility, which motivated employees involved in the demand planning process and in the logistics department. Everybody was able to put his individual planning tasks into a wider perspective, and SAP APO made it easier to investigate the current status along the entire supply chain. Vodafone provided analytical functions to build reports for better insight and decision support of its daily work, not only for business users but also for senior management and store managers. In particular, store managers appreciated the SAP APO-based information details as they, in fact, save hard dollars by having an appropriate number of the right product types available in stock. Therefore, Vodafone believes analytical functionality and the ability to drag-and-drop reports, on top of the basic SAP APO functions, increase the adoption rates and usage of the software.

A key driver for a successful SAP APO implementation starts with the identification of user requirements and ends with extensive training sessions. Already, during the implementation process at Vodafone Portugal, IT encountered problems in identifying and realizing the relevant business requirements among BU consumers, and as a result, the SAP APO implementation image for the consumer unit had to be customized extensively. Though the training sessions in all corporate divisions were the same, Vodafone recognized a vast difference in SAP APO utilization across different business units. For example, while the BU corporate customers seem to profit from the SAP APO system and are able to yield benefits, the SAP APO deployment among BU consumers indicates some inefficiencies. Today, Vodafone believes that the SAP APO BU consumer implementation would reap more benefits if the SAP APO image for the division was realized more along the software package standard, with less customization.

Appendix: ROI Details

The objective of the ROI analysis is to demonstrate and quantify the value of a software solution based on observed and quantified data. IDC applies certain assumptions across SAP ROI case studies to ensure comparable results:

- ☒ An average corporate tax rate of 40%. Most European countries have corporate tax rates in the range of 30% to 40%. IDC has selected 40% to ensure a conservative, yet comparable after-tax view of the net benefits of a software solution.
- ☒ A discount rate of 10%. The 10% rate reflects an average cost of capital of approximately 5% plus an added risk premium of five percentage points. The risk premium reflects the fact that future projected cash flows could change due to unforeseen developments and events.
- ☒ An analysis period of five years. Research shows that investments in enterprise applications have useful lives in the five- to ten-year range, depending on the industry, application area, and size of organization. The five-year analysis period represents a common, conservative assumption of the useful life of an investment in ERP software.

After conducting multiple on-site interviews, IDC applied the incremental, observed, and quantifiable costs and benefits in an ROI calculation. The result of this calculation is shown in Table 1.

The IRR of 21% was calculated using the internal rate of return method and represents the average annual rate of return after taxes. It is comparable to the annual after-tax yield of investment alternatives, such as stocks and bonds.

The net present value after taxes of €627,500 represents the net benefit of the entire project to Vodafone Portugal in today's money. The project added €627,500 to the total market value of Vodafone, assuming a transparent equity market.

TABLE 1

Common Assumptions

Average corporate tax rate	40.0%					
Discount rate	10.0%					
Cash flows (€000)	Initial	Year 1	Year 2	Year 3	Year 4	Year 5
Net cash flow after taxes	-€1,875.4	€504.6	€594.6	€693.6	€734.2	€853.9
Discounted net cash flow after taxes	-€1,875.4	€ 458.8	€491.4	€521.1	€501.5	€530.2
Five-year net present value after taxes	-€1,875.4	-€1,416.7	-€ 925.3	-€404.2	€97.3	€627.5
Annual rate of return after taxes	21%					
Five-year net present value after taxes (€000)	€627.5					

Source: IDC, 2005

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Marketing Department

Tel: +44 (0) 20 8987 7100

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