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## **The Total Economic Impact Of Alcatel-Lucent's 5620 Service Aware Manager (5620 SAM)**

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## Executive Summary

In December 2006, Alcatel-Lucent commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying the Alcatel-Lucent 5620 Service Aware Manager (5620 SAM). The 5620 SAM is an IP/MPLS management product that provides element management, service provisioning, service assurance, and OSS mediation for enterprise, residential, or transport multitechnology services over an IP/MPLS infrastructure. This study illustrates the financial impact of deploying 5620 SAM as an element, network, and service management solution for a service provider's operators.

In conducting in-depth interviews with four existing 5620 SAM customers who initially managed their Alcatel-Lucent-based IP/MPLS network without deploying the 5620 SAM, Forrester found that these companies achieved benefits in: productivity gains in provisioning and technical support; cost avoidance in script maintenance; and strategic flexibility in new product development, including reduced time to roll out new services. The four customers interviewed included: TELUS, a large public Canadian telecommunications company; TeliaSonera Sweden, a leading telecommunications company in the Nordic region; NextGenTel, a fast-growing private xDSL operator in Europe; and PT Prime, Portugal Telecom's business solutions branch. The study is based on a composite organization that incorporates data from all participants, so it might not reflect the exact situation of a given participant. The composite costs and benefits used in the study are realistic averages based on the costs and benefits provided by all participants.

## Purpose

The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of 5620 SAM on their organizations. Forrester's aim is to clearly show all calculations and assumptions used in the analysis. Readers should use this study to better understand and communicate a business case for investing in Alcatel-Lucent's 5620 SAM.

## Methodology

Alcatel-Lucent selected Forrester for this project because of its industry expertise and Forrester's Total Economic Impact™ (TEI) methodology. TEI not only measures cost and cost reduction (areas that are typically accounted for within IT), it also weighs the enabling value of a technology in increasing the effectiveness of overall business processes.

For this study, Forrester employed four fundamental elements of TEI in modeling 5620 SAM:

1. Costs and cost reduction.
2. Benefits to the entire organization.
3. Risk.
4. Flexibility.

Given the increasing sophistication that enterprises have regarding cost analyses related to IT investments, Forrester's TEI methodology serves an extremely useful purpose by providing a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

### Approach

Forrester used a five-step approach for this study:

1. Forrester gathered data from existing Forrester research relative to the Alcatel-Lucent 5620 SAM solution and the industry market in general.
2. Forrester interviewed Alcatel-Lucent 5620 SAM marketing, product line manager, and sales support personnel to fully understand the potential (or intended) value proposition of Alcatel-Lucent's 5620 SAM solution.
3. Forrester conducted a series of in-depth interviews with four service providers currently using the Alcatel-Lucent 5620 SAM solutions.
4. Forrester constructed a financial model representative of the interviews. This model can be found in the TEI Framework section below.
5. Forrester created a composite organization based on the interviews and populated the framework using data from the interviews as applied to the composite organization. The composite organization allows us to combine the relevant characteristics of the individual companies and to model the experience of a single organization, while preserving the experiences of each of the interviewed customers.

### Key Findings

Forrester's study yielded the following key findings:

- **ROI.** Based on the interviews with the four existing customers, Forrester constructed a TEI framework for a composite organization (see Appendix A) and the associated ROI analysis illustrating the financial impact areas. As seen in Table 1, the risk-adjusted ROI for our composite company is 73% with a breakeven point (payback period) of 10 months after deployment.
- **Benefits.** The benefits in this implementation included productivity gains in both provisioning and technical support, cost avoidance in script maintenance, and strategic flexibility in new service deployments.
- **Costs.** Costs in this implementation included software license and maintenance fees, hardware costs, and the internal labor required for implementation and ongoing maintenance.

Table 1 illustrates the risk-adjusted cash flow for the composite organization, based on data and characteristics obtained during the interview process. Forrester risk-adjusts these values to take into account the potential uncertainty that exists in estimating the costs and benefits of a technology investment. The risk-adjusted value is meant to provide a conservative estimation, incorporating any potential risk factors that may later affect the original cost and benefit estimates. For a more in-depth explanation of risk and risk adjustments used in this study, please see the "Risk" section.

**Table 1: Composite Company ROI, Risk-Adjusted**

Summary financial results	Original estimate	Risk-adjusted
ROI	90%	73%
Payback period (years)	0.8	0.9
Total costs (PV)	(\$1,403,370)	(\$1,444,528)
Total benefits (PV)	\$2,440,295	\$2,269,086
Total (NPV)	\$1,265,207	\$1,052,840

Source: Forrester Research, Inc.

## Disclosures

The reader should be aware of the following:

- The study was commissioned by Alcatel-Lucent and delivered by the Forrester Consulting group.
- Alcatel-Lucent reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.
- The customer names for the interviews were provided by Alcatel.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Alcatel-Lucent 5620 SAM.
- This study is not meant to be used as a competitive product analysis.

## Alcatel-Lucent Service Aware Manager: Overview

The Alcatel-Lucent 5620 Service Aware Manager (5620 SAM) is a single management platform offering element, network, and service management for advanced Layer 2 and 3 network solutions and services based on Alcatel-Lucent's converged IP, Ethernet, and multiprotocol label switches.

This network management evolution makes it possible for service providers to increase their level of competitiveness by excelling in streamlined network commissioning, rapid service activation, efficient troubleshooting, and reduced costs for integration with operations support systems (OSS).

The 5620 SAM manages advanced services based on Alcatel-Lucent's converged IP/MPLS portfolio and increases the manageability of third-party customer premise equipment (CPE). It thus helps service providers manage multilayer, multitechnology services from a single platform:

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- Virtual private LAN services (VPLS), IP-VPNs, VLLs, and pseudowires over a variety of access methods such as Frame Relay, ATM, and Ethernet for managed data services.
- Broadcast TV, video on demand, and Internet-enhanced services for triple-play service delivery
- IP core infrastructure to carry fixed-mobile convergence traffic.

The Alcatel-Lucent 5620 SAM is a carrier-grade application that consists of four functional domains covering element management (SAM-E), provisioning (SAM-P), assurance (SAM-A), and OSS interface (SAM-O):

- SAM-E covers element management, providing network and service discovery, device commissioning, alarm management, performance metrics display, and mediation for OSS systems. In addition to managing Alcatel-Lucent's IP portfolio, it offers generic network element (GNE) management capabilities that extend service topology, alarm collection, and common session launch point to the Customer Premise Equipment attached to the Alcatel-Lucent IP router and Ethernet switches.
- SAM-P automates, accelerates, and facilitates the provisioning of the network infrastructure and IP-based services. To accelerate infrastructure build, SAM-P offers simultaneous configuration of multiple objects and scripting capability that automates the precise configuration of parameters, including those of third-party devices. Subsequent scripting operations can compare the configuration results with the expected outcome of the script to automate configuration audits.
- SAM-P combines service-aware templates with configurable service policies and automated triggering of testing procedures to accelerate manual or OSS-driven provisioning. By means of a point-and-click GUI, the 5620 SAM provides an autoprovisioning capability. The network can build itself through an overarching understanding of the service hierarchy. Going one step further is the ability to create and provision composite services. By combining elementary service components as building blocks, SAM-P masters the complexity of end-to-end management of large-scale and even hybrid services. Multiple services can be assigned to a subscriber to conveniently centralize customer-related information such as service status and service topology views.
- SAM-A encompasses service assurance, fault correlation, service OAM tools, service topology views, statistics collection, and accounting. Using network, routing, and service topology views, SAM-A makes fault and customer service impact correlation fast and simple for differentiated Ethernet and IP services by providing the operator with the ability to navigate from a reported event to affected resources, services, and customers. Also, by leveraging the advanced OAM functions available on the Alcatel-Lucent Service Routers, SAM-A I automatically applies the appropriate OAM test, rapidly verifying end-to-end service operation. Users of service-aware management are able to write service verification policies that can be generically applied to a richly modeled and complex service. Examples of service verification policies are those for full-mesh testing, local-mesh testing, and hierarchical testing of the outer VPLS tunnel in combination with local VPLS domain testing. The Service Test Manager can be used in combination with service verification policies to define and schedule tests and proactively detect gradual or momentary service degradations that deviate from configurable service-level agreements (SLAs).

- SAM-O completes the suite with an open eXtensible Markup Language (XML)/Java Messaging Service (JMS)-based OSS gateway to all Alcatel-Lucent 5620 SAM functionality and is accompanied by a software integration tool kit. SAM-O enables service providers to integrate the Alcatel-Lucent 5620 SAM into their operations and business support system (OSS/BSS) environments for flow-through management automation. Various established brand products from leading OSS independent software vendors such as IBM (formerly Micromuse and Quallaby), InfoVista, Axiom, Subex-Azure (formerly Syndesis), HP, Cariden, and EMC Smarts are precertified as interoperable OSS solutions through the Alcatel-Lucent OSS Connected Partner program. This program reduces OSS/BSS integration cost, time, and risk to a minimum. In addition, SAM-O provides the customer network management (CNM) tool kit to simplify the creation of enterprise service portals.

## Analysis

As stated in the Executive Summary, Forrester took a multistep approach to evaluate the impact that implementing the 5620 SAM can have on an organization:

- Interviews with marketing, product line manager, and sales support personnel.
- In-depth interviews with four service providers currently using the 5620 SAM.
- Construction of a common financial framework for the implementation of the 5620 SAM.
- Construction of a composite organization based on characteristics of the interviewed organizations.

## Interview Highlights

A total of four interviews were conducted for this study, involving representatives from the following companies:

1. TELUS is a large public Canadian telecommunications company that provides a wide range of wireline and wireless telecommunications products and services including data, Internet Protocol (IP), voice, video, and entertainment services. The company has approximately 31,000 employees. TELUS is primarily using the 5620 SAM for service activation and for assurance needs. It has increased automated provisioning and added granularity in detail alarming.
2. NextGenTel is a fast-growing private xDSL operator in Europe and is a fully owned subsidiary of a larger provider. This organization has approximately 210 employees across five cities, including 35 people in the technology department. NextGenTel's vision was to start its 5620 SAM usage with broadband service and gradually introduce VoIP, IPTV, and wireless services. Its selection of Alcatel-Lucent for its network architecture allows NextGenTel to offer differentiated applications such as broadband TV for residential customers and Layer 2 business services for enterprise customers on the same next-generation platform.
3. TeliaSonera Sweden is a leading telecommunications company in the Nordic region that also has a strong presence in providing mobile communications for other areas of Europe. This company offers services for the transmission and packaging of sound, images, data, information, transactions, and entertainment. TeliaSonera has found it especially beneficial

to use 5620 SAM for mediation, as well as to replace CLI. 5620 SAM also aids in the collection of key statistics.

4. PT Prime is Portugal Telecom's business solutions branch. Portugal Telecom is a large Portuguese public telecommunications provider that has three main business areas: wireline, mobile, and multimedia services. The company has approximately 28,000 employees and more than 30 million subscribers in total. The 5620 SAM usage at PT Prime focuses mainly on the enterprise market, although residential services are also delivered over the network. PT Prime uses 5620 SAM to improve its service provisioning.

The composite company in this analysis is a leading European telecommunications provider that includes international offerings in its portfolio; product lines include mobile, fixed voice, and broadband. The broadband division includes products aimed specifically at the enterprise market.

The four in-depth interviews uncovered that using the 5620 SAM:

- Dramatically improved the speed of provisioning services.
- Improved overall network visibility, allowing for more efficient management of errors and other problems.
- Reduced software development cost, as the 5620 SAM eliminated the need for some custom development.
- Provided strategic flexibility in the area of new product development because new services could be deployed more quickly and at lower cost.

## TEI Framework

### *Introduction*

From the information provided in the in-depth interviews, Forrester constructed a TEI framework for organizations considering implementation of 5620 SAM. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

### *Composite Organization*

Based on the interviews with the four existing customers provided by Alcatel-Lucent, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas affected financially. The composite organization that Forrester synthesized from these results represents a Europe-based telecommunications company with approximately 20,000 employees that focuses on delivering residential and business services. See Appendix A for more details on the composite organization.

### *Framework Assumptions*

Table 2 lists the discount rate used in the PV and NPV calculations and the time horizon used for the financial modeling.

**Table 2: General Assumptions**

Ref.	General assumptions	Value
	Discount rate	10%
	Length of analysis	Three years

Source: Forrester Research, Inc.

Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with finance to determine the most appropriate discount rate to use within their own organizations.

In addition to the financial assumptions used to construct the cash flow analysis, Table 3 provides salary assumptions used within this analysis.

**Table 3: Salary Assumptions**

Ref.	Metric	Calculation	Value
A1	Hours per week		40
A2	Weeks per year		52
A3	Hours per year (M to F, 9 to 5)		2,080
A4	Hours per year (24x7)		8,736
A5	IT worker		\$100,000
A6	Hourly	(A5/A3)	\$48

Source: Forrester Research, Inc.

## Costs

The costs in this implementation are fairly standard software product costs. There are costs associated with licensing, software maintenance, additional servers, and internal labor costs for implementation and ongoing maintenance. Significantly, there are no costs associated with professional services for configuration and implementation; Alcatel-Lucent includes these services with the licensing cost.

### *License Cost*

The license cost for an implementation for the composite size organization is \$476,000. This reflects the wide variance in the license costs, which are dependant on the organization size and the extent to which the organization is using 5620 SAM. For the organizations interviewed for this study, the cost of licensing 5620 SAM varied from \$71,000 to \$984,000.

**Table 4: License Cost**

Ref.	Metric	Calculation	Per period
A1	License cost		\$476,000

Source: Forrester Research, Inc.

*Internal Implementation Cost*

Based on the customer interviews, it was estimated that for an implementation of this size, a total of three full-time resources would be required. Additionally, three resources would be used on a part-time basis — estimated at 30% of their total time. Using a fully burdened annual rate of \$100,000 per resource, this gives an internal implementation cost of \$390,000.

**Table 5: Internal Implementation Cost**

Ref.	Metric	Calculation	Per period
A1	Number of full-time people		3
A2	Number of part-time people		3
A3	Percentage of part-time people		30%
A4	Annual rate		\$100,000
A5	Number of years		1
At	Internal implementation cost	$A4 * A5 * (A1 + A2 * A3)$	\$390,000

Source: Forrester Research, Inc.

*Server Cost*

The number of additional servers required varied between one and two for the 5620 SAM implementation. In order to be more conservative, the higher number was used. With each server valued at \$20,000, the total server cost was \$40,000.

**Table 6: Server Cost**

Ref.	Metric	Calculation	Per period
A1	Number of servers needed		2
A2	Cost per server		\$20,000
At	Server cost	$A1 * A2$	\$40,000

Source: Forrester Research, Inc.

*Ongoing Internal Maintenance Cost*

The ongoing maintenance cost is the number of resources required to maintain 5620 SAM internally. The number of resources is estimated at one full-time equivalent and approximately 10% of the time of a larger group of 10 people. This gives an annual cost of \$200,000.

**Table 7: Ongoing Internal Maintenance Cost**

Ref.	Metric	Calculation	Per period
A1	Number of full-time people		1
A2	Number of part-time people		10
A3	Percentage of part-time		10%
A4	Annual rate		\$100,000
At	Ongoing internal maintenance cost	$A4 * (A1 + A2 * A3)$	\$200,000

Source: Forrester Research, Inc.

*Total Costs*

A summary of the total costs for this implementation is in the table below.

**Table 8: Total Costs**

Cash flow analysis (original estimates)						
Costs	Initial	Year 1	Year 2	Year 3	Total	Present value
License cost	(476,000)				(476,000)	(476,000)
Internal implementation cost	(390,000)				(390,000)	(390,000)
Server cost	(40,000)				(40,000)	(40,000)
Ongoing internal maintenance cost		(200,000)	(200,000)	(200,000)	(600,000)	(497,370)
<b>Total</b>	<b>(\$906,000)</b>	<b>(\$200,000)</b>	<b>(\$200,000)</b>	<b>(\$200,000)</b>	<b>(\$1,506,000)</b>	<b>(\$1,403,370)</b>

Source: Forrester Research, Inc.

**Benefits**

The benefits in this implementation spanned a large number of areas.

*Provisioning Productivity Benefit*

This benefit was one that all of the customers interviewed identified immediately. Before implementing the 5620 SAM, all customers were provisioning services using command line interface (CLI). After implementation, smaller customers reported increased speed by using the 5620 SAM interface to provision services, while larger service providers benefited from the 5620 SAM OSS provisioning interface and the dedicated Alcatel-Lucent 5620 SAM's OSS support team to greatly increase the speed with which OSS provisioning could be done. This was conservatively estimated at a 75% improvement; however, depending on the situation, it could actually be much greater. One interviewed customer said that provisioning that had previously taken approximately 15 minutes could now be done "in a minute or less." The size of the provisioning team was estimated at eight people; obviously, in an organization the size of the composite organization, there would be a much larger group of people involved in provisioning. However, the number of people using the 5620 for provisioning was based on estimates from customers. This number ranged from six to 10, which was why a total of eight was used. With an annual rate of \$100,000, this gives a benefit of \$600,000 per year.

**Table 9: Provisioning Productivity Benefit**

Ref.	Metric	Calculation	Per period
A1	Time to provision		0.25
A2	Percent improvement		75%
A3	Number of people		8
A4	Annual rate		\$100,000
At	Provisioning productivity benefit	$A2 * A3 * A4$	\$600,000

Source: Forrester Research, Inc.

PT Prime highlighted the provisioning benefit, as illustrated by the following quote:

*"We usually do not invest in IP management software offered by equipment vendors, as there is generally little additional value over and above what the node management interface can offer. However, the business case for introducing the Alcatel-Lucent 5620 SAM was positive, even if we only considered service provisioning and OSS integration. It was the most cost-effective and the shortest time-to-market solution that helped us meet our cost and timeline targets when introducing a new service type. On the upside, it also provided a comprehensive monitoring solution that enabled us to proactively test network and service performance so that we can consistently deliver high service availability to our customers. This 5620 SAM has really met our need for a carrier-class IP management solution."* (Jose Palma, PT Prime, engineering department)

*Field Technician Time Savings Benefit*

Based on the improved network information available from 5620 SAM, organizations were able to reduce the number of trips made by field technicians for both discovery and repairs. This was because of the improved information available centrally, which reduced the need for actual excursions for on-site diagnostics and repairs. The reduction in trips resulted in significant savings

for the organization. With a group of 30 field technicians at a fully burdened rate of \$60,000, a rate of 20% fewer trips gives a technician time savings of \$360,000 annually. In general, this number can vary widely, based on the number of technicians and the degree of benefit, but the numbers used in this study were confirmed by the interviewed organizations.

**Table 10: Field Technician Time Savings Benefit**

Ref.	Metric	Calculation	Per period
A1	Number of technicians		30
A2	Annual rate		\$60,000
A3	Percentage of trips reduced		20%
At	Technician time savings	$A1 \cdot A2 \cdot A3$	\$360,000

Source: Forrester Research, Inc.

The quote below illustrates TeliaSonera Sweden's experience with this benefit:

*"While the ability to provision services via SAM-O alone was sufficient to make a positive business case, another driver for implementing the 5620 SAM was to improve network visibility and thus increase service quality. We leverage the 5620 SAM's comprehensive service mediation capability to automate service provisioning originating in our OSS service provisioning system and to provide real-time service quality feedback to our OSS fault management system. The 5620 SAM's proactive interoperability certification with market-leading OSS provisioning applications reduces the cost and time, not to mention the risk, of deploying new services on Alcatel-Lucent's Service Routing portfolio. We expect to achieve our target savings once the 5620 SAM is operationalized to its full extent." (David Eldh, TeliaSonera Sweden products and production, network development IP core and metro)*

**Script Development Cost Avoidance Benefit**

All of the organizations interviewed used a CLI-driven approach with scripts developed that they would run to provision various products. When using 5620 SAM, these scripts were unnecessary. All of the organizations we interviewed continued to use a combination of 5620 SAM and CLI; however, the reduced number of scripts yielded a cost savings. On average, an organization would develop four scripts per year. Each script would require two days for development and testing. It was estimated that 50% of these scripts could be eliminated through the use of 5620 SAM. Using an annual fully burdened rate of \$100,000 for the development resource, this yields a benefit of \$1,538 annually.

**Table 11: Script Development Cost Avoidance Benefit**

Ref.	Metric	Calculation	Per period
A1	Number of scripts per year		4
A2	Number of days required per script		2
A3	Percentage improvement		50%
A4	Annual rate for development resource		\$100,000
At	Script development cost avoidance	$A1 * A2 * A3 * A4 / 260$	\$1,538

Source: Forrester Research, Inc.

The following quote from NextGenTel illustrates this benefit:

*"We have typically developed our own systems and CLI scripts for provisioning and managing our IP network. But we revised that strategy when we looked at introducing multicast-based services and VPN services such as VPLS or Ethernet pseudowires. The development costs for provisioning were prohibitive, whereas the 5620 SAM provided us with out-of-the-box functionality, preintegrated with the entire Alcatel-Lucent IP portfolio, ready to provision any Layer 2 or 3 services. We now have improved tools to commission the network and to diagnose any network or service issues." (Jorn E. Hodne, NextGenTel, technical chief)*

***Integration Development Cost Avoidance Benefit***

Without 5620 SAM, more integration would be required between the various interfaces used. This integration work would require a significant amount of effort. One customer estimated the following scenario without 5620 SAM: A team consisting of one full-time person and three part-time people (at 30%) for seven to eight months would be required to do the integration work to approximate the necessary functionality of 5620 SAM, specifically for provisioning. At a fully burdened annual rate of \$100,000, this gives a benefit to the organization of \$54,000.

**Table 12: Integration Development Cost Avoidance Benefit**

Ref.	Metric	Calculation	Value
A1	Number of full-time people		1
A2	Number of part-time people		3
A3	Percentage of part-time		30%
A4	Length of project		0.6 years
A5	Annual compensation rate		\$100,000
At	Integration development cost avoidance	$A4 * A5 * (A1 + A2 * A3)$	\$54,000

Source: Forrester Research, Inc.

A technician at TELUS expressed the following on integration cost:

*"Without the 5620 SAM, we would have had to get the OSS provisioning application to completely model the new service and its dozens of QoS parameters, which is very expensive. But using the 5620 SAM's QoS policies and service templates has reduced the OSS integration cost. We can also reduce MTTR and provide better customer service with the 5620 SAM's customer impact information, OAM diagnostics, and proactive service testing."* (National IP core networks technician, TELUS)

***Total Benefits***

A summary of the total benefits for this analysis can be found in the tables below. This does not include the flexibility benefit, which is discussed in a later section.

**Table 13: Total Benefits (Excluding Flexibility)**

Benefits	Cash flow analysis (original estimates)					Present value
	Initial	Year 1	Year 2	Year 3	Total	
Provisioning productivity benefit		600,000	600,000	600,000	1,800,000	1,492,111
Technician time savings		360,000	360,000	360,000	1,080,000	895,267
Script development cost avoidance		1,538	1,538	1,538	4,615	3,826
Integration development cost avoidance		54,000			54,000	49,091
<b>Total</b>		<b>\$1,015,538</b>	<b>\$961,538</b>	<b>\$961,538</b>	<b>\$2,938,615</b>	<b>\$2,440,295</b>

Source: Forrester Research, Inc.

## Risk

Risk is the third component within the TEI model; it is used as a filter to capture the uncertainty surrounding different cost and benefit estimates. If a risk-adjusted ROI still demonstrates a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as “realistic” expectations, since they represent the expected values considering risk. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates.

For the purpose of this analysis, Forrester risk-adjusted cost and benefit estimates to better reflect the level of uncertainty that exists for each estimate. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points.

For example, take the case of the provisioning productivity benefit. The \$600,000 value used in this analysis can be considered the “most likely” or expected value. However, this benefit can vary based on the amount of improvement in provisioning that an organization might actually see. This variability represents a risk that must be captured as part of this study. Forrester uses a risk factor of 102.6% on the high end, 100% as the most likely, and 80% on the low end. This has the effect of decreasing the benefit estimate to take into account that original benefit estimates are more likely to be revised downward than upward. Forrester then creates a triangular distribution to reflect the range of expected benefit, with 94.2% as the mean (94.2% is equal to the sum of 102.6%, 100%, and 80% divided by three). Forrester applies this mean to the most likely estimate, \$600,000, to arrive at a risk-adjusted value of \$565,333.

The following *general* management and process risk was considered in this study:

- Lack of corporate discipline in creating processes and procedures to best take advantage of the benefits.

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- Failure to reduce administrative and capital cost savings.
- Internal inertia, conflicting priorities, and turnover, reducing the organization's ability to achieve the benefits.

The following risk specific to the 5620 SAM was considered in this study:

- There is a risk that costs will be greater than anticipated. Forrester experience indicates that project size will be a significant risk factor for cost.
- There is a risk that benefits will not be realized, since estimates will not be tracked and will not directly translate to quantifiable savings within the organization.

The following tables show the values used to adjust for uncertainty in cost and benefit estimates. Different cost and benefit estimates have different levels of risk adjustments. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Risk adjustments for benefits reduce the original benefits estimates and increase cost estimates.

**Table 14: Risk-Adjusted Costs**

Cash flow analysis (risk adjusted estimates)						
Costs	Initial	Year 1	Year 2	Year 3	Total	Present value
License cost	(476,000)				(476,000)	(476,000)
Internal implementation cost	(398,000)				(398,000)	(398,000)
Server cost	(40,000)				(40,000)	(40,000)
Ongoing internal maintenance cost		(213,333)	(213,333)	(213,333)	(640,000)	(530,528)
<b>Total</b>	<b>(\$914,000)</b>	<b>(\$213,333)</b>	<b>(\$213,333)</b>	<b>(\$213,333)</b>	<b>(\$1,554,000)</b>	<b>(\$1,444,528)</b>

Source: Forrester Research

**Table 15: Risk-Adjusted Benefits**

Cash flow analysis (risk-adjusted estimates)						
Benefits	Initial	Year 1	Year 2	Year 3	Total	Present value
Provisioning productivity benefit		565,333	565,333	565,333	1,696,000	1,405,900
Technician time savings		327,000	327,000	327,000	981,000	813,201
Script development cost avoidance		1,456	1,456	1,456	4,369	3,622
Integration development cost avoidance		51,000			51,000	46,364
<b>Total</b>		<b>\$944,790</b>	<b>\$893,790</b>	<b>\$893,790</b>	<b>\$2,732,369</b>	<b>\$2,269,086</b>

Source: Forrester Research

## Flexibility

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could turn into a business benefit for a future additional investment. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix B).

### *Flexibility Benefit*

For this analysis, benefit quantifies the strategic advantage that organizations can expect to receive by using the 5620 SAM. One major area of development affected by the 5620 SAM is the development and launch of new products. The 5620 SAM gives an organization greater flexibility with its network and product offerings, and it can streamline the process and reduce the expense associated with it. This benefit varied between the different organizations. One organization stated that a product launch that might have otherwise required \$1,000,000 in investment could be achieved with only \$200,000. However, to balance the total benefit and provide a more conservative estimate, the total cost of launch was estimated at \$400,000 without 5620 SAM and \$200,000 with 5620 SAM. Using the Black-Scholes equation to estimate the value of this option over three years gives a total benefit of \$251,111.

**Table 16: Flexibility Benefit**

Ref.	Metric	Calculation	Per period
A1	Asset value (benefit)		\$400,000
A2	Cost to acquire		\$200,000
A3	Expiration (time to expire, in years)		3.0
At	Flexibility		\$251,111

Source: Forrester Research, Inc.

### TEI Framework: Summary

Considering the financial framework constructed above, the results of the costs, benefits, risk, and flexibility sections using the representative numbers can be used to determine a return on investment, net present value, and payback period. Table 17 shows the consolidation of the numbers for the composite organization.

**Table 17: Consolidated Results For The Composite Organization**

Summary financial results	Original estimate	Risk-adjusted
ROI	90%	73%
Payback period (years)	0.8	0.9
Total costs (PV)	(\$1,403,370)	(\$1,444,528)
Total benefits (PV)	\$2,440,295	\$2,269,086
Total (NPV)	\$1,265,207	\$1,052,840

Source: Forrester Research

## Study Conclusions

Forrester's in-depth interviews with 5620 SAM's customers yielded several important observations:

- Based on information collected in interviews with current 5620 SAM customers, Forrester found that organizations can realize benefits in the form of productivity gains in both provisioning and technical support, cost avoidance due to reduced software development, and strategic flexibility in new product development.
- Of the customers interviewed, several factors contributed to the difference in ROIs. These factors included the size of the organization, the maturity of their product offerings, and the degree to which they were using the 5620 SAM within the organization.

The financial analysis provided in this study illustrates the potential way an organization can evaluate the value proposition of Alcatel-Lucent's 5620 Service Aware Manager. Based on information collected in four in-depth customer interviews, Forrester calculated a three-year risk-adjusted ROI of 73% for the composite organization with a payback period of approximately 10 months. All final estimates are risk-adjusted to incorporate potential uncertainty in the calculation of costs and benefits.

Based on these findings, companies looking to implement the 5620 SAM can see both cost savings and productivity benefits. Using the TEI framework, many companies may find the potential for a compelling business case to make such an investment.

## Appendix A: Composite Organization Description

In this TEI study, Forrester has created a composite organization to illustrate the quantifiable costs and benefits of implementing Alcatel-Lucent's 5620 Service Aware Manager. The composite company is intended to represent a telecommunications provider and is based on characteristics of the interviewed customers.

The composite company in this analysis is a leading European telecommunications provider that includes international offerings in its portfolio; product lines include mobile, fixed voice, and broadband. The broadband division includes products aimed specifically at the enterprise market.

Forrester assumes that the composite organization is a public company, with annual revenues of approximately \$6 billion. Markets are characterized by high maturity and high levels of penetration. The total organization consists of approximately 30,000 people.

The primary focus of the divisions using the 5620 SAM is to enhance fixed services with a new IP-based network. The broadband customer base is made up of approximately 1.5 million subscribers, both residential and commercial.

## Appendix B: Total Economic Impact Overview

Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility. For the purpose of this analysis, the impact of flexibility was not quantified.

### Benefits

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

### Costs

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the forms of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

### Risk

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: the likelihood that the cost and benefit estimates will meet the original projections and the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the underlying range around each cost and benefit.

### Flexibility

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprisewide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point in time. However, having the ability to capture that benefit has a present value that can be estimated. The flexibility component of TEI captures that value.

## Appendix C: Glossary

**Discount rate:** The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their organization to determine the most appropriate discount rate to use in their own environment.

**Net present value (NPV):** The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

**Present value (PV):** The present or current value of (discounted) cost and benefit estimates given an interest rate (the discount rate). The PV of costs and benefits feed into the total net present value of cash flows.

**Payback period:** The breakeven point for an investment. The point in time at which net benefits (benefits minus costs) equal initial investment or cost.

**Return on investment (ROI):** A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

### *A Note On Cash Flow Tables*

The following is a note on the cash flow tables used in this study (see the Example Table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in Years 1 through 3 are discounted using the discount rate shown in Table 2 at the end of the year. Present value (PV) calculations are calculated for each total cost and benefit estimate. Net present value (NPV) calculations are not calculated until the summary tables and are the sum of the initial investment and the discounted cash flows in each year.

### **Example Table**

Ref.	Category	Calculation	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

## Appendix D: About The Project Manager And Contributors

### **Shaheen Zojwala Parks Consultant**

Shaheen is a consultant for Forrester's Total Economic Impact products and services. The TEI methodology focuses on measuring and communicating the value of IT and business decisions and solutions and providing a return on investment (ROI) business case based on the costs, benefits, flexibility, and risk of investments.

Shaheen came to Forrester with experience in consulting, marketing, and sales. As a product manager in strategic marketing at Teradyne, Shaheen managed several new products and helped to develop the corporate strategy in the five-year company plan. She also worked on sales analytics and set the quota levels for the North American sales force. Prior to joining Teradyne, she worked as a software consultant for Lucent Technologies, in the Kenan Systems group, where she implemented billing and customer care software for large telecommunications firms.

Shaheen holds a B.A. in mechanical engineering and materials science from Harvard University, an M.S. in materials science engineering from the Massachusetts Institute of Technology, and an M.B.A. from the MIT Sloan School of Management.

### **Michele Pelino Senior Analyst**

Michele primarily contributes to Forrester's offerings for the Technology Marketing professional and is a frequent contributor to offerings for the Strategy professional. Focused on the needs of the telecom and networking industry, Michele's research covers service provider information technology systems and the impact of next-generation networks on the strategic future of the telecom industry. Michele's coverage of service provider information technology initiatives includes operational support systems (OSS), billing support systems (BSS), service delivery platforms (SDP), and IP multimedia subsystems (IMS). She also focuses on strategic issues facing the telecom industry and addresses emerging competition from cable companies, satellite providers, and new entrants; the telecom usage patterns of small and medium businesses; and business models enabled in the next-generation communications world.

Michele has more than 12 years of professional experience focusing on the telecommunications industry. She has assisted domestic and international service providers in addressing strategic issues, conducting competitive assessments, evaluating product concepts, and developing marketing positioning messages on topics such as IPTV service, customer experience processes, and network infrastructure equipment demand.

Most recently, Michele was a senior consultant for Adventis, a strategic telecom consultancy, serving national and international communications and technology clients. Prior to that, she was director of Internet market strategies at the Yankee Group, where she assisted clients in identifying opportunities to leverage the Internet to reach businesses and consumers, generate revenues, and improve efficiency. Michele started her consulting career in Booz Allen & Hamilton's telecommunications group, where she helped telecom companies implement a federally mandated wireline and wireless service prioritization system used during national emergencies.

Michele has an M.B.A. from Boston University. She also holds a B.A. from St. Mary's College of Maryland.

### **Robert Whiteley** **Senior Analyst**

Robert primarily contributes to Forrester's offerings for the IT Infrastructure and Operations professional. He is a leading expert on network operations and architecture. Specifically, he focuses on infrastructure for application delivery, remote access, and network security. Robert helps Forrester clients develop and improve their strategy around network investment and optimization.

In his research, Robert covers such network-related topics as WAN optimization, network access control (NAC), IP address management (IPAM), and application accelerators. In the past, he has written extensively on the SSL VPN and the enterprise router and switch spaces.

Prior to his current role, Robert was an analyst with the Telecom & Networks team, conducting interviews with IT executives to understand their IT strategies and buying behaviors. Robert joined Forrester from Network Strategy Partners, a boutique management consulting company specializing in telecom, where he was a senior network analyst. He helped clients by custom-building ROI and TCO tools, authoring white papers, and providing analysis for sales and marketing presentations.

Robert has been widely quoted in the press, including business media outlets such as *The Wall Street Journal* and industry media outlets such as *Network World*. Robert regularly speaks at Forrester events, on behalf of clients, and at industry events like Interop.

Robert received his Bachelor of Science degree in computer engineering from Tufts University.