



Developing a Time-Driven Activity-Based Costing Model

A Case Study

Case study

Reference no 108-058-1

This case was written by Ashok Sar, KIIT University. It is intended to be used as the basis for class discussion rather than to illustrate either effective or ineffective handling of a management situation. The case was compiled from generalised experience.

© 2008, KIIT University.

No part of this publication may be copied, stored, transmitted, reproduced or distributed in any form or medium whatsoever without the permission of the copyright owner.



School of Management,
KIIT University, Bhubaneswar - India

DEVELOPING A TIME-DRIVEN ACTIVITY-BASED COSTING MODEL: A CASE STUDY

ABSTRACT

This paper covers the steps taken by a leading mid-sized Indian financial services company to develop a time-driven activity-based costing (TDABC) model. The company is referred to in this paper as 'Sun Financial Services (SFS)' in order to preserve confidentiality of the material. The concept of TDABC is defined, and the applicability of this concept to SFC is explored through three logical steps. First, the cost of supplying each type of employee resource is estimated. Second, the quantity of each type of customer transaction in the most recent period is obtained and a full product line P&L statement is drawn out. Finally, the sales and operations forecasts along with financial projections are made based on the action taken by management after learning the wide disparity in the product line profitability. The information concerning this paper are the results of the author conducting detailed discussions with the controller to collect data.

Kaplan and Anderson (2007) have defined time-driven activity-based costing (TDABC) as a new ABC variant that enables a firm to build powerful and flexible cost models quite simply. In this approach, managers directly estimate the resource demands imposed by each transaction, product or customer rather than assign resource costs 1st to activities then to products or customers. For each group of resources, estimates of only two parameters are required: the cost per time unit of supplying resource capacity and the unit times of consumption of resource capacity by products, services and customers. At the same time, the new approach provides more accurate cost-driver rates allowing unit times to be estimated even from complex, specialized transactions. This paper illustrates the TDABC approach by building a model for Sun Financial Services (SFS), a mid-sized financial services firm in India. SFS's financial results have been disappointing (see Table-1 for a monthly income statement). A time-driven ABC model is developed to understand the cost and profit drivers of SFS's operations. The model will accurately assign SFS's large costs of personnel and computing to its various product lines. SFS's resource base is shown in Table-3 (plus six computer servers). Clearly, the quantity of each type of personnel, computing resources, and space is substantial. For SFS to better manage its resource base, it must understand how the various resources are used by its various products and customers. This is exactly the role of activity-based costing.

Prof. Ashok K. Sar prepared this case as the basis for class discussion rather than to illustrate either effective or ineffective handling of an administrative situation. The material was compiled from published sources and generalized experience.

© 2008 School of Management, KIIT University. No part of this publication may be copied, stored, transmitted, reproduced or distributed in any form or medium whatsoever without the permission of the copyright owner.

COMPANY INFORMATION

SFS, a mid-sized financial services firm based in India has four core products and services: stock trading, mutual funds, investment account management, and financial planning. Three classes of professional employees, i.e., brokers, investment account managers and financial planner deal directly with customers for these products and services. The margins have taken a big hit after the recent debacle in the global financial market and the resultant impact on the Indian financial services market. A recent monthly income statement of the company is shown in Table-1 below.

Sl. No.	Particulars	Fig. in INR
1	Sales	12353607
2	Brokers	4455000
3	Account managers	630500
4	Financial planners	1364200
5	Principals	1240160
6	Customer service representatives	241120
7	Computer server/ ICT expenses	431024
8	Total costs	8,362,004
9	Margin	3,991,603
10	Margin %	32
11	SG&A (unallocated corporate expenses)	3,649,438
12	Operating income	342,164
13	Operating margin %	2.76

Brokers undertake stock trading and mutual fund transactions. They also provide advice and recommendations to clients. SFS's brokerage customers make their own buy and sell decisions. SFS charges a flat fee per stock trade that depends on the total amount of assets a customer has on deposit with SFS. For mutual fund transactions, SFS charges 0.75% of the value of the mutual fund shares when purchased, and a brokerage commission of 0.05% on an average (the commission varies with type of customers).

Investment account managers actively manage clients' investments, buying and selling stocks to meet client objectives. These employees meet initially with customers to learn about their investment goals, interests, and risk tolerance. Then they meet quarterly to review account performance and investment strategy. SFS charges an annual asset management fee of 1.25% of assets under management to each customer, regardless of the account balance.

Financial planners prepare financial life plans for customers. Financial planner help customers determine how much to save, develop a budget, and ensure that they have enough insurance. They also do the tax planning and undertake associated tasks. These employees serve as primary care physicians for clients' financial health. SFS charges an initial fee of INR1,200 for the first financial plan and then bill their planners' time at per session/ conference basis for ongoing advice. The conference charge varies based on

client and transaction type. Planners typically meet quarterly with clients to discuss updated plans.

SFS has several groups of support staff, who directly support the aforementioned professional staff. **Principals** manage and supervise brokers, investment account managers, and financial planners. **Customer service representatives** handle customer requests over the telephone for sales and account services. Besides, there are support staff members in functions such as finance and administration, legal, secretarial, MIS, etc.

SFS uses two types of computer equipment. Servers, which process customer transactions, maintain customer accounts, and perform various administrative functions. Server capacity is measured in millions of computer instructions processed (MIPS). Every employee works on a desktop computer, provided by the company.

SFS is housed in a rented building. The building has individual offices for each direct labor employee and principal; conference rooms for face to face meetings with customers to open accounts or service existing accounts and common space for the administrative services and facilities. Miscellaneous corporate expenses (SG&A) include administrative expenses for electricity, maintenance, finance, human resources, audits, taxes, professional fees, and compliance.

TIME-DRIVEN ACTIVITY-BASED COST MODEL

A time-driven ABC model for SFC is developed using the following sequence of steps. First, the cost of supplying each type of employee resource is estimated. Table-2 illustrates the basic process for principals.

Table-2		
Calculation: Cost per unit time of supplying a resource capacity - Principal		
$Capacity\ Cost\ Rate = \frac{Cost\ of\ capacity\ supplied}{Actual\ capacity\ of\ resource\ supplied}$		
Sl. No.	Particulars	Fig. in INR
1	Annual compensation (including fringe benefits)	18,00,000
2	Occupies 126 sq. ft. of space @ 240/sq. ft./year	30,240
3	Computer consultant support	30,000
4	Annual cost	18,60,240
5	Monthly cost	1,55,020
A principal works 20 days per month, 8.5 hours a day. After training, breaks, etc., has 7.5 hours of productive time available per day.		
$Cost\ Rate = \frac{INR\ 1,55,020\ per\ month}{20 \times 7.5 = 150\ hours\ per\ month} = INR\ 1,033\ per\ hour$		

Add the total compensation of the employee plus all the indirect resources that support the employee, yielding a total of INR1,55,020 per month. The indirect resources include the cost of the space occupied by the employee and the cost of the employee's desktop computer, applications software, and IT consultant support used by each employee.

In general, the total cost of an employee includes other directly traceable support resources such as human resources, supervision, and finance.

SFS then divides the total monthly cost of supplying each employee by the employee’s monthly capacity. Principals work about 240 days per year (365 – 104 for weekends – 21 for holidays and vacations), or 20 days per month. Each principal shows up for 8.5 hours of work each day, but not all that time is available for working with customers. Some amount of time (assumed to be one hour per day for principals) is used for breaks, training, and education. After subtracting unavailable time, each principal has a capacity of 150 hours per month (7.5 hours per day for 20 days a month).

Knowing the cost of supplying a principal (INR1,55,020 per month) and the capacity per broker (150 hours per month), the capacity cost rate of the employee simply as INR1,033 per hour available for work is calculated. Similar calculation is made for other direct employees, i.e., brokers, investment account managers and customer service representatives (other calculations have been omitted from the paper to avoid repetition). Table-3 shows the capacity cost rate calculation for each SFS employee type.

Table-3		Figures in INR, hour wherever applicable					
Resource quantities, capacities and cost rates							
	Compensation		Monthly rent for	Monthly	Total Monthly	Hours per	Capacity cost rate
*	Annual	Monthly	Office	IT Cost	Cost	Month	(INR/hour)
Brokers-50	1020000	85000	1600	2500	89100	150	594
Account Managers-5	1464000	122000	1600	2500	126100	150	841
Financial Planners-10	1584000	132000	1920	2500	136420	150	909
Principals-8	1800000	150000	2520	2500	155020	150	1033
Customer Service Representatives-4	624000	52000	1600	1200	54800	165	332

* Number of resources, viz., there are 8 principals working in SFS.

The capacity cost rate calculations (in Tables-2 and 3) are straightforward for any similar company. The numerator of the ratio represents the monthly compensation cost of each employee type, plus all the support costs (occupancy, technology, supervision, and indirect support: human resources, information technology, finance, etc.) incurred to have that employee available for productive work. For the denominator, project team analysts estimate the number of days the employee typically shows up for work each month, calculate the down time for breaks, training, and other non-customer-related activities, and obtain the number of hours (or minutes) available for productive work each month.

However, the existence of peak or seasonal capacity, in which the company provides a resource to meet a peak demand, but the resource is less than fully utilized during the slack or non-peak period can be a complicating factor. Thus, it is necessary to extend the

costing model to handle a peak/lean capacity situation. The same is illustrated by developing the capacity costing rates for SFS's computer servers, which are used heavily during the eight hours of the business day, especially when the stock exchanges are open for trading, but are used much less intensively in the remaining sixteen hours of the day. It has been observed that the servers are used intensively during 9 a.m. to 5 p.m. and hardly at all from 5 p.m. to 9 a.m. the following morning. SFS, to meet the peak period demand, has purchased 6 servers, although only two are busy during the evening and early morning slack period.

Based on amortization, each server costs INR8,64,000 per year (INR72,000 per month) in hardware, software, and maintenance and has a capacity to process 50 MIPH (millions of instructions per hour – converted from the MIPS specification of the servers). Servers do not take vacations and hence are available for 22 days per month, 24 hours per day, for a total of 528 hours per month. The different demand periods require a calculation of two different cost rates.

The simple calculation occurs for the slack, or off-peak, period during which two servers are busy. Each of the two servers costs INR136 per hour to operate (obtained by dividing INR72,000 per month by 528 hours per month), or INR2.72 per MIPH processed (INR136 per hour divided by 50 MIPH, its processing capacity).

For the peak period, the numerator—the cost of supplying capacity for the eight hours—includes 6 servers x INR136 per hour x 8 hours. But in addition, the cost of supplying the peak capacity includes the cost of 4 idle servers (6 – 2) for 16 hours of slack (also at INR136 per hour). Peak load capacity is much more expensive, because the resources are used for only one-third of their available capacity. Here is the full calculation for the cost of providing peak capacity:

$$\text{Peak Hour Rate} = \frac{[(6 \times 8 \text{ hours}) + ((6 - 2) \times 16 \text{ hours})] \text{INR136}}{[6 \text{ servers} \times 8 \text{ hours} \times 50 \text{ MIPS per hour}]} = \text{INR6.35 per MIPH}$$

The calculation has been demonstrated for only two periods of capacity utilization, but the calculation extends simply to handle complex patterns of peak and seasonal capacity usage.

Now that SFS has obtained capacity cost rates for all its resources, the second parameter for its TDABC cost model is estimated: the quantity of resource capacity used by each customer transaction or interaction. Table-4 shows time estimates for several of SFS's personnel types: brokers, investment account managers, financial planners, and customer service representatives. Similar estimates can be made for the server capacity required (MIPH) to process each type of transaction.

Brokers' time	60 minutes/ new account opened + 5 minutes/ trade (stock or mutual fund) + 20 minutes/ meeting with existing customer
Investment account managers' time	240 minutes/ new account opened + 10 minutes/ meeting with existing customer + 10 minutes/ trade
Finance planners' time	600 minutes/new account opened + 90 minutes/existing account per month
Customer service representatives' time	12 minutes (set up new stock or mutual fund account) + 18 minutes (set up new investment management or financial planning account) + 5 minutes/trading call + 7 minutes/investment management call + 10 minutes/financial planning call
Principals' time	10 % time of brokers' time for stock trading as well as mutual fund trading 20 % time of account managers' time 6 % time of financial planners' time
Computer Server usage	The estimates are based on log-in periods concerning each primary activity, viz., stock trading, mutual fund trading, invest account management and financial planning. The associated data are stored in the log files and retained for 2 months, after that they are deleted.

Finally, the quantity of each type of customer transaction in one month of the company is captured. The details are shown in Table-5 below.

	Stock Trading	Mutual Fund Trading	Investment Management	Financial Planning
Number of transactions	78264	8588	1423	2328
Number of new accounts opened	226	128	32	86
Number of total accounts	6856	4826	386	427
Number of customer service center calls	2850	1682	128	86
Number of customer meetings	1258	765	325	416

The model cross-multiplies the number of each type of transaction by the hours required per resource per transaction (see Table-6), obtaining the demand for resource capacity (hours of time) for each resource type by each type of product. In the final calculation, the TDABC model multiplies the hours of each resource used by each product by the

capacity cost rate per hour of each resource, obtaining the cost of resources used by each product in the most recent period.

Table-6
Calculation: Hours of resource time utilized by each product

	Stock Trading	Mutual Fund Trading	Investment Account Management	Financial Planning	Total	Available productive time	Capacity used%
Brokers	7167	1099			8266	7500	110.21
Account Managers			690		690	750	92.02
Financial Planners				1484	1484	1500	98.93
Principals	717	110	138	89	1054	1200	87.81
Customer Service Representatives	283	166	25	40	513	660	77.75
MIPH-peak	36612	2373	7605	929	47520	52800	90.00
MIPH-nonpeak	10513	11215	7641	1255	30624	35200	87.00

The output from the model is shown in Table-7, which is a full-product-line P&L statement. The far-right column in Figure-7 replicates SFS’s summary monthly P&L from Table-1. The interior columns show that SFS’s products use the company’s resources in significantly different quantities. In particular, the core stock trading and mutual fund products are efficient with respect to personnel and computing usage, and they show high profit margins. The newly introduced products—investment management and financial planning—use expensive personnel resources very intensively and are operating at breakeven or loss levels.

Table-7							
SFS: Profitability from a Time-Driven Activity-Based Cost (TDABC) model							
	Stock Trading	Mutual Fund Trading	Investment Account Management	Financial Planning	Cost of resources used	Cost of unused capacity	Cost of resources supplied
Sales	7287000	3158087	380520	1528000	12353607		12353607
Brokers	4257396	652608			4910004	-455004	4455000
Account managers			580200		580200	50300	630500
Financial planners				1349649	1349649	14551	1364200
Principals	740720	113544	142653	92020	1088936	151224	1240160
Customer service reps.	103280	60560	8963	14662	187465	53655	241120
Computer server expenses	261085	45574	69078	9313	385049	45975	431024
Total costs	5362481	872285	800894	1465644	8501303	-139299	8,362,004
Margin	1924519	2285801	-420374	62356	3852304		3,991,603
Margin %	26	72	-110	4	31		32
SG&A (unallocated corporate expenses)							3,649,438
Operating income							342,164
Operating margin %							2.76

Managers looking at the product-line P&L statement in Figure-7 get an immediate message. The new investment management and financial planning services that had been introduced to grow SFS's business are either breaking even or losing money. They require substantial resources— people and computer capacity—whose costs are not being covered by the fees and transaction income from the new services. The model revealed that SFS's traditional product lines of stock trading and mutual fund sales were quite profitable but that the newly introduced product lines were either highly unprofitable (account management services) or barely breakeven (financial planning services).

Learning of the wide disparity in product line profitability, and the changes in the economic environment of business after the crisis in the financial services industry under reference, SFS managers plan to take several actions, including raising prices on stock trading, placing greater emphasis on increasing mutual fund sales, establishing a minimum account balance for investment management services, and re-pricing its financial planning services. The sales and operations forecasts are shown in Table-8 and financial projections are shown in Table-9. The proposed changes reflect the changes from these actions.

	Stock Trading	Mutual Fund Trading	Investment Management	Financial Planning
Monthly sales (INR)	7687000	5658000	960000	2428000
Number of transactions	72000	14000	1200	2328
Number of new accounts opened	226	128	32	86
Number of total accounts	6856	4826	386	427
Number of customer service center cells	2850	1682	128	86
Number of customer meetings	1258	765	325	416

	Stock Trading	Mutual Fund Trading	Investment Account Management	Financial Planning	Cost of resources used	Cost of unused capacity	Cost of resources supplied
Sales	7687000	5658000	960000	2428000	16733000		16733000
Brokers	3947328	920502			4867830	-412830	4455000
Account managers			548955		548955	81545	630500
Financial planners				1349649	1349649	14551	1364200
Principals	686773	160153	134971	92020	1073917	166243	1240160
Customer service reps.	103280	60560	8963	14662	187465	53655	241120
Computer server expenses	248385	59544	71254	9313	388495	42529	431024
Total costs	4985766	1200759	764143	1465644	8416310	-54306	8362004
Margin	2701234	4457241	195857	962356	8316690		8370996
Margin %	35	79	20	40	50		50.93
SG&A (unallocated corporate expenses)							3649438
Operating income							4721558
Operating margin %							28.22

For companies, desire to grow sales and profit is very natural. It is said, the conventional wisdom drives strategists to grow, just like riding a bicycle, where one either paddles forward (grow) or falls down (out of business). Sun Financial Services’ experience is not unique. Many companies adopt strategies to introduce new products, services, and

channels without fully understanding the economics of their new offerings. Initially, the offerings from the new strategy are seductive. They generate new sources of income, diversification, and growth beyond the company's commoditized core products and services, and any added costs are generally hidden in overhead or indirect cost accounts. The bill for growth comes when the company must add personnel, equipment, software, and technology to produce, deliver, and service the new offerings. The TDABC model enables companies to see whether the incremental value they generate from their new offerings exceeds their incremental costs. Often, the costs of the new strategy exceed the value it creates. When this occurs, companies get a signal to reconsider their strategies.

Thus, as companies prepare for their monthly strategy review meetings and their annual meeting to test and adapt the strategy, they need analytical studies of the causal relations among the performance measures in their existing strategy map to see whether the hypothesized linkages are being realized in practice. Among the most important causal relationships, and fortunately one of the easiest to document, are the economics of current products, services, and customers. The TDABC model described here usually reveals unprofitable products and customer relationships, inefficient processes, and excess capacity. These problems do not typically go away by themselves. Managers must take conscious, targeted actions to improve inefficient processes, reduce the supply of unused excess capacity, and transform unprofitable products and customers into profitable ones. An accurate TDABC model of current operations provides a vital input for managerial deliberations about strategic (and operational) options. Also, the model can be used with forecast sales and operating data to estimate future demand and the cost of the resource capacity required to process the demands from transactions.

REFERENCES

Hope and Fraser, *Beyond Budgeting: How Managers Can Break Free from the Annual Performance Trap* (Boston: Harvard Business School Press, 2003).

J. Hope and R. Fraser, “Who Needs Budgets?” *Harvard Business Review* (February 2003): 108–115.

Kaplan and Anderson, *Time-Driven Activity-Based Costing: A Simpler and More Powerful Path to Higher Profits* (Boston: Harvard Business School Press, 2007).

Kaplan, “Introduction to Activity-Based Costing”, Harvard Business Publishing (July 2001)

Roztock, Porter, Thomas and Needy, “A process of Smooth Implementation of Activity-Based Costing in Small Companies” *Engineering Management Journal* (December 2004) Vol.16, No.4.