USING TIME-DRIVEN ACTIVITY-BASED COSTING AND CUSTOMER PROFITABILITY ANALYSIS FOR STRATEGIC PLANNING IN HOTEL MANAGEMENT

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Abstract: Business organizations are under constant pressure to optimize their resource utilization and find ways to maximize their profitability with minimum cost and effort. As a result, managerial accounting practices such as time-driven activity-based costing are being deployed to conduct customer profitability analysis to determine accurately how much profit is generated from each customer. Such accurate cost and profit information enables managers to pinpoint their strategies towards those customer segments that create maximum impact in terms of economic returns to the organization. This study uses a case study approach to understand how a luxury hotel uses customer profitability information derived from cost of serving customers using Time-Driven Activity-Based Costing to fine-tune their marketing strategies in order to enhance their profitability.

Keywords: Time-Driven Activity Based-Costing, TDABC, Customer Profitability Analysis, hotel management.

1. Introduction
There is a growing interest among academic scholars and industry practitioners to focus on market-oriented managerial accounting (Jarvinen and Vaatja, 2018). Particularly customer profitability analysis (CPA) (Foster and Gupta, 1994) has gained prominence, because marketing strategies have shifted from macro perspectives more towards micro-level perspectives to determine which customers or customer segments are yielding highest profits and to distinguish them from segments that are not bringing significant benefits to the firm (Ballings et al., 2018). However, research in market-oriented managerial accounting such as CPA has been limited, mainly due to adherence of most companies to traditional accounting systems that are unable to provide accurate cost information at the activity, product and/or service level (Afonso and Santana, 2016; Dalci et al., 2010; Kaplan et al., 2014). However, with adoption of relatively newer accounting methods such as activity-based costing (ABC) and time-driven activity-based costing (TDABC), determining exactly how much profit the company derives from each customer or customer group has become possible (Akhavan et al., 2016; Hoozee and Hansen, 2018).

Companies involved in managing hotels that rely on conventional accounting methods have found that their decisions related to pricing, marketing investments, risk assessment and customer service prioritization are based on aggregate data on customer profitability that lead to decisions where strategies are adopted to cater to all the customers with the same approach and same level of intensity. Such generic marketing strategies may lead to higher sales growth in terms of volume but often result in lower profits, because high-profit yielding customers are getting the same attention as customers that are costly to serve and maintain. To address such misdirected strategies, customer profitability analysis (CPA) provides a solution by presenting two types of insights; (i) degree of profitability for each customer, and (ii) distribution of profitability among customers within each customer base.
(Szychta, 2010). When management determines this information accurately, they are able to invest their resources and focus on those customer segments that generate highest profitability for the hotel. Knowledge of customer profitability in hotel management enables designing of differentiated value-driven strategies that maximize cash flow and profits for the organization.

The implementation of CPA depends on data at the transaction level, which is provided by accounting systems such as time-driven activity-based costing (TDABC) (Kaplan and Anderson, 2004; 2007). Such systems determine cost of individual products, services and activities that go with such products and services. This research work examines the current literature on CPA and TDABC, and presents a case study of how a 4-star hotel strategizes its’ marketing strategies based on results of customer profit analysis derived from information obtained from its’ TDABC system.

2.0 Literature Review

Scholarly works related to customer costing information and customer profitability has enabled strategic decision makers in designing sales and marketing strategies focus towards those customers that bring in the highest percentages of profits to the organization. However, much of the research work has centered around themes such as life-time customer economic value (Berger and Nasr, 1998; Pfeifer, 2005) and studying antecedents of customer profitability such as customer retention, loyalty and satisfaction (Anderson, Fornell and Rust, 1994; Bowman and Narayandas, 2004). Comparatively less attention has been given to empirical studies on Customer Profitability Analysis (CPA) (Cotton, 2005; Raaij et al., 2003; Dalci et al., 2010). With regards to determining customer cost and profitability information at the product, service or activity level, much credit can be given to development of managerial accounting concepts such as Time-Driven Activity-Based Costing (TDABC) and Customer Profitability Analysis (CPA). The following subsections summarize the literature on the two concepts.

2.1 Time-Driven Activity Based Costing

TDABC has its’ roots in ABC (Activity Based Costing) which was developed to provide greater insights into product and or service cost based on activities involved in producing and delivering the product or service (Cooper and Kaplan, 1988; 1991; 1992). Under this system cost pools are identified and costs of activities are determined based on cost-drivers that are apportioned to cost-objects. Compared to traditional costing methods ABC systems offers a more accurate manner of assigning indirect costs to products and services by looking at cost-drivers that explain the causal relationships between resources and activities and also between activities and cost objects (Szychta, 2010; Przytula, 2005). Despite the benefits of ABC, it has been criticized for being too complex to implement and being a cumbersome continuous process because it needs to be updated with re-interviewing and re-surveying (Gervais et al., 2010; Stouthuysen et al., 2010). In fact, many organizations that rolled out ABC have reverted back to the traditional accounting system after facing numerous difficulties (Szychta, 2010; Kaplan et al., 2014).

Kaplan and Anderson (2004; 2007) recognized that besides the complexity and high cost, ABC was not flexible because when activities contain several sub-tasks with different cost drivers, there is a possibility of misallocation of costs. In light of such limitations, Kaplan and Anderson developed the TDABC system which is based on the time required to perform each activity in the value-chain of the company in producing and delivering the product or service (Barrett, 2005). TDABC allows cost driver rates to be based on the practical capacity of the resources supplied to perform a certain activity (Afonso and Santana, 2016). The activities are derived from process map, where the demand for resources are expressed in units of time required for each activity instead of tracking costs to activities (Barret, 2005). The objective is to calculate the cost per unit capacity (capacity cost rate) and multiply it by the time taken to perform the activity, where all personnel, material, space and equipment costs are factored in. TDABC eliminates the need to conduct costly interviews and surveys and can be developed through data obtained from business intelligence applied to existing database or through estimates made by managers where particular activities are performed by estimating the practical capacity of committed resources using simplified method or analytical method (Szychta, 2010).

2.2 Customer Profitability Analysis

Corporate strategists recognize that not all customers generate equal amount of profits for the firm, yet often low-profit yielding customers often demand more time and resources compared to customers that generate more profits (Kaplan, Jahneke and Thomas, 2012). Considering that time is a valuable and irreplaceable resource, decision-makers have to distinguish between customers that yield higher profits and those that are at the lower end of the spectrum or
even not generating profits, in order to maximize customer relations efforts to those that are contributing to the bottom-line (ICAEW, 2002). Therefore, customer profitability analysis (CPA) is a managerial accounting process that determines the amount of profit generated by each customer or customer segment by attributing costs to each customer or segment (Foster et al., 1996). CPA enables organizations to take targeted actions directed at different profitability segments, by understanding which customers are making the greater contribution to the firm’s total profits.

Academic research work has led to proposition of many methods for analyzing profitability linked to customer segmentsby offering a customer-oriented view of managerial accounting (Boardman and Vining, 1996; Paltschik and Storbacka, 1992; Rust et al., 2000; Storbacka, 1995), while others have focused on empirical studies mostly through case studies (Cooper and Kaplan, 1991; Hallowell, 1996; Noone and Griffin, 1999; Raaij et al., 2003). However, above studies specifically dealt with market-oriented accounting framework based on contribution method approach.In determining dependable profitability information on customer accounts several approaches are relied on, for instance estimation can be made based on: full costing, variable costing and activity-based costing (Horngren et al., 2005; Raaij et al., 2003; Varila et al., 2007). Despite the fact that, different approaches lead to different estimates of customer profitability (Atkinson et al., 2004; Atrill and McLaney, 2005), yet strong arguments are made in favor of cost information based on TDABC for enabling reliable customer profitability analysis (Helgesen, 2006; Jarvinen and Vaatja, 2018).

3.0 Research Design and Case Study

The research method applied was a qualitative approach through interviews with managers and content analysis of documents provided by the hotel management (e.g., Dalci et al., 2010). The subject of the case study was chosen after determining if the organization had implemented TDABC and CPA in their organization to deploy in their management planning and marketing strategies. The organization studied in this case is a 120 room 4-star hotel located in Georgetown in the Island of Penang in Malaysia. The hotel is owned by a holding company that owns several hotels along with interests in other businesses such as construction and healthcare services. The researcher was given access to information by the hotel’s management upon request on the assurance that all information will be used for academic research purposes only and name of the hotel will be kept anonymous.

The hotel experiences a 70% annual occupancy rate. The facilities include three banquet halls, meeting rooms, executive center for business travelers, gymnasium, swimming pool, SPA, two restaurants, a café and a bar along with other amenities that are typically offered by hotels of such standard. The hotel employs 61 full-time employees comprising of a general manager, an assistant general manager, manager of food services, manager accounts and finance, several supervisors, head of security and other managerial staff in accounts, food services, human resource management, maintenance, etc. The study was conducted starting from end of 2018 up to first quarter of 2019.

The management uses customer information in their database to compute profits generated from each customer. The profits are calculated by using TDABC to determine how much cost was incurred to serve each customer, and then subtracting from the net amount charged from them. The new TDABC system was adopted by the hotel about 18 months ago. For ease of planning the customers are divided into six (6) segments and customer profitability is averaged out in each segment. The customer segments are:

Segment-1: Senior and mid-level managers and executives of companies that travel for business purposes. These customers spend very little time in their rooms, they tend to use hotel’s café at the lobby, laundry services and executive meeting rooms that are frequently used to entertain visitors. Largest portion of the hotel’s revenues comes from this group (39%). Most of these guests are under corporate discount packages that range from 25% to 40% discount on their room rates only, depending on the annual volume of business generated.

Segment-2: Guests that are brought in by travel agents under group tours. These customers seldom use the food services of the hotel (except for the buffet breakfast) whether it is room service or the restaurants. These guests use the hotel swimming pool and other facilities that are free of charge for in-house guests, thus requiring towels and frequent cleaning of the pool area, lobby area and lobby toilets. When these customers occupy rooms, additional service-staff have to be brought in to ensure breakfast buffet services are maintained smoothly. This segment comprises of 27% of the guest traffic, and the hotel typically gives a 25% discount on the total bill to the travel...
agents who may or may not pass on a portion of the discounts to the guests. Such a large discount on total bill is based on industry practice.

Segment-3: These guests make reservations through online websites or through direct calls made to the hotel’s reception. These customers make up 18% of the customers. They typically come and stay with family or friends and use most of the hotels’ facilities such as SPA, gymnasium, swimming pool, restaurants, etc. These customers often use the tour packages and transportation of the hotel that is added to their bill. Often, they request housekeeping to make up their rooms more than one time a day, especially those with children. Online booking websites are paid a 10% to 12% commission for these customers.

Segment-4: Guests who stay at the hotel when seminars, conferences, weddings and other social events are being held. These guests only pay for the room rent and their food and beverages are usually covered under the payments made for the banquet halls or ballroom. This segment comprises of 12% of the hotel revenues. No discounts are given for the rooms for guests that decide to stay. However, for wedding ceremonies honeymoon suites are complimentary for one night.

Segment-5: Walk-in customers comprise of 4% of the revenue. These customers either are brought by taxi drivers from the airport or when during the holiday season such as Chinese New Year or December 31st, lots of visitors go to Penang and most of the other hotels are fully occupied. During this time, customers are referred by other hotel that do not have vacancy at their own facility. No discounts are offered to these customers, and they have to also pay for breakfast.

Data was provided by the hotel’s accountants who spent 3-4 hours each working day for several days with the researcher to explain how the cost pools were developed and how time estimation for each activity along with resource allocation, etc. were done based on the principles of TDABC. The data related to cost allocations were reviewed and corroborated through interviews. Interviews were conducted with the assistant general manager, food services manager, front desk supervisors, housekeeping supervisor, etc. To corroborate sales figures provided, the annual report of the hotel was checked to ensure that figures matched with numbers provided by the accountants. The researcher was allowed to view the customer bills and vouchers, along with monthly statements, however no documents were to be copied or taken without permission from the general manager.

2.3 Application of TDABC and CPA
The hotel divides its’ cost centers into seven (7) major areas; (i) sales and marketing (e.g., contact and negotiations with business to business clients, promotional activities, etc.), (ii) front office (e.g., reservations, check-in and check-out, greeting guests, responding to guest service requests, etc.), (iii) housekeeping (e.g., room cleaning, etc.), (iv) food services (e.g., room service, restaurant management, food and beverage supply chain management, etc.), (v) banquet halls (e.g., customer negotiations and books, managing events, etc.), (vi) facilities and security (management of assets and infrastructure, facilities such as swimming pool, guest vehicles, security, etc.), (vii) external relations (e.g., insurance, regulatory compliance such as fire and emergency services, government licensing and inspection authorities, etc.).

To determine the cost incurred to serve each customer, the management applies time equations used in TDABC to reflect the resource demands of each activity (Byron et al., 2008; Varila et al., 2007). The average times were used to make calculations under TDABC where time units are calculated in terms of minutes. For instance, the receptionists working at the front desk work 8 hours a day, which is obviously the theoretical capacity, whereas TDABC is based on practical capacity (i.e., after subtraction of personal time and breaks) (Eeveraert et al., 2008; Sarokolaei et al., 2013). The assignment of costs of separate cost areas were assigned based on the relevance of each customer segment. For example, the cost of banquet halls would be only applied to segment-4, as these facilities are only applicable to this segment. To illustrate how costs were assigned to each segment, the following example demonstrates how front office costs were assigned.

2.3.1 Front Office Costs
The activities under the front office comprises of direct and indirect costs such as personnel, telephone, electricity, stationary, repair, procurement, and depreciation of equipment and furniture. Additionally, costs need to be allocated from other cost centers such as administration, security, food services, etc. The cost information is based on the
practical capacity of the staff working at the front office. The above method is aligned with guidelines from Kaplan and Anderson (2004) and Huang et al., (2014) Under the front office, the tasks are: handling reservations, taking calls from room guests and providing information, welcoming and check-in of customers, opening customer account with credit card information or security deposit and preparing files for accounts, closing customer accounts, check-out and ensuring customers are accorded courtesy during departure.

Length of time spent with each customer at the front desk depends on the customer segment and also whether the customer is a first-time guest or a repeat customer. For instance, if a customer comes in without reservation (Segment-5) total time taken on the average is 23 minutes, while a customer coming in through online reservation requires 16.5 minutes (Segment-3), while customers under Segment-1 (corporate repeat customers) require maximum of 9 minutes because their rooms are usually ready and billing matters are already settled through corporate accounts. Meanwhile, group travelers under travel agents consume significant time of front office personnel (20.5 minutes). Therefore, the total time taken by front office is calculated by summing up average times taken for each segment under each task (Table 1.0).

### Table 1.0: Front Office Cost Allocations based on TDABC for each Customer Segment

<table>
<thead>
<tr>
<th>Customer Segment</th>
<th>Time for reservation activities</th>
<th>Time for information &amp; phone call</th>
<th>Time for welcome check-in</th>
<th>Time for customer acc. docs</th>
<th>Time for check-out &amp; payment</th>
<th>Total unit time</th>
<th>Quantity of Activity</th>
<th>Total minutes</th>
<th>Rate (MYR/min)</th>
<th>*Cost Allocation</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
<td>9.0</td>
<td>7,123</td>
<td>64,107</td>
<td>0.9544</td>
<td>61,183</td>
<td></td>
</tr>
<tr>
<td>S-2</td>
<td>2.0</td>
<td>4.0</td>
<td>5.0</td>
<td>2.5</td>
<td>7.0</td>
<td>20.5</td>
<td>5,864</td>
<td>0.9544</td>
<td>114,730</td>
<td></td>
</tr>
<tr>
<td>S-3</td>
<td>1.0</td>
<td>3.5</td>
<td>4.5</td>
<td>2.5</td>
<td>5.0</td>
<td>16.5</td>
<td>2,311</td>
<td>0.9544</td>
<td>36,392</td>
<td></td>
</tr>
<tr>
<td>S-4</td>
<td>3.0</td>
<td>3.0</td>
<td>4.5</td>
<td>2.5</td>
<td>4.0</td>
<td>16.0</td>
<td>1,019</td>
<td>0.9544</td>
<td>15,560</td>
<td></td>
</tr>
<tr>
<td>S-5</td>
<td>5.0</td>
<td>3.0</td>
<td>7.0</td>
<td>3.0</td>
<td>5.0</td>
<td>23.5</td>
<td>733</td>
<td>0.9544</td>
<td>16,090</td>
<td></td>
</tr>
</tbody>
</table>

Time is in minutes and cost*in Malaysian ringgit (MYR)

Source: Courtesy of hotel management

Similar, time-cost allocations are made for the other cost centers (i.e., housekeeping, food services, sales and marketing, banquet halls, facilities and security, etc.). Based on time equations (Kaplan and Anderson, 2004; Huang et al., 2014), the total revenue, cost, profits and relative profitability are calculated for each customer segment (Table 2.0).

### Table 2.0: Total Profits Generated by each Customer Segment

<table>
<thead>
<tr>
<th>Customer Segment</th>
<th>Annual Revenue</th>
<th>Annual Cost</th>
<th>Annual Profit</th>
<th>Relative Profitability</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>5,556,525</td>
<td>2,226,128</td>
<td>3,330,397</td>
<td>58.8%</td>
</tr>
<tr>
<td>S-2</td>
<td>2,854,183</td>
<td>2,002,215</td>
<td>851,968</td>
<td>15.0%</td>
</tr>
<tr>
<td>S-3</td>
<td>2,069,455</td>
<td>1,479,816</td>
<td>589,639</td>
<td>10.4%</td>
</tr>
</tbody>
</table>
The implications of the customer profitability analysis are significant as far as strategies related to pricing, discounts and promotional policies, customer service policies, personnel planning, etc. The relative profitability figure indicates that the highest contribution to the hotel’s profits comes from corporate clients; segment-1 (58.8%). Upon closer examination of the reasons for such a high relative contribution of this customer segment reveals that although corporate clients are getting discounts of 25 to 40% on their room rates, these customers spend substantial amounts on other facilities. For example, they tend to book meeting rooms for discussions with other business visitors and also entertain people for snacks at the café and for lunch or dinner at the hotel’s restaurants. Furthermore, these clients use the laundry service for drycleaning of suits and executive clothing. Some of the executives also use the SPA facilities where a fair amount of billing is generated. Lastly, once organizations sign agreements with the hotel, their executives always stay at the same hotel every time they visit the city.

The second highest relative profit is generated by customer segment-2 (guests under tour packages provided by agents), which is 15%. This segment of customers, demand a lot of time from hotel service staff and don’t typically use the restaurants except for breakfast that is included in room charges. They rarely use laundry services, and require extra attention from housekeeping for room cleaning and upkeep of swimming pool area. Therefore, despite the fairly high revenue stream from this segment, the cost of serving these customers is relatively higher. The hotel personnel consider this customer segment as high maintenance guests.

The third highest relative profitability is generated by individuals or families that come in through online booking or direct reservations (segment-3), that is 10.4%. This segment also generates a fairly high revenue stream and they use other facilities of the hotel such as tour packages, vehicles, etc. These customers, take their breakfast at the hotel that is covered under their room rates, but typically avoid incurring expenses of dining at the hotel’s restaurants. Segment-4 represents customers connected to events at the banquet halls. Although this sector makes a relatively lower contribution to the overall profits (9.6%), yet in terms of profit on sales, the figure is quite attractive (35.6%) which is much higher than segment-2 and 3 (around 28%). The last category of customers that are walk-in guests, are not predictable and are a small portion of the revenue.

Based on the customer profitability analysis, the hotel has recently ramped up its’ marketing efforts in two areas:

(i) Pursuing more corporate clients as this segment of customers are easy to manage and generate substantially high amounts of profits for the hotel. Recently the hotel recruited more marketing executives to contact and follow up with corporate clientele that need to visit the Penang area which has a large industrial and commercial zone that attracts business travelers. The hotel is offering additional perks such as free airport pick-up and drop-off services, discounts for using the banquet halls for corporate programs.

(ii) The other customer segment, the management is focused on is bringing in more events such as seminars, conferences, weddings, parties, etc. The marketing team are going through event management companies and also ramping up social media advertisements targeted at this group.

With regard to segment-2, the hotel management decided not to make any additional invests in promotional activities to this segment because the business comes in through travel agents who are incentivized by discounts offered to them and also, they rely on feedback they receive from their previous clients. The fourth customer segment typically peruse the online booking platforms such as Agoda.com and Booking.com and read reviews written on TripAdvisor, and are therefore better accessed through social media-based targeting.

3.0 Discussionsand Conclusion

The foregoing case study illustrates the fact that not all customers are of the same value to a business organization. Higher sales growth in terms of volume does not necessarily translate to higher profits for a firm. Therefore, organizations that measure customer profitability are able to distinguish between different customers or different customer segments and tailor their marketing strategies to create maximum impact in terms of
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profitability. In the case of the hotel, the management was able to identify the customer segments that required minimum effort to generate maximum profits and ensure that they did not waste their time on focusing on those that demanded more time with lower benefits for the firm.

This type of analysis can also be done at the product or service level depending on the nature of the business. Organizations that still use traditional accounting systems will find it difficult to accurately pinpoint how much profit each customer generates. However, with the advent of systems such as ABC (activity-based costing) and later TDABC (Time-driven activity-based costing) it has become quite feasible to generate accurate figures on how much it costs to serve each customer. This has been augmented by the enhancement in computing power and data analytics software that enables mining through large databases to understand past customer behavior and predict future behavior in terms of purchase.

However, this study has a few limitations that are pertinent. Firstly, TDABC provides retrospective information on cost, and therefore any customer profitability analysis will only reveal information on what has happened in the past, but will not be able to predict what the customers are likely to do in the future. Therefore, customer profitability analysis should be supported with data analytics to predict future revenue, cost and profitability trends. Secondly, it would be more meaningful to conduct a longitudinal study of such a case. However, since the TDABC system was introduced only 18 months ago by the hotel, it was not feasible to study the customer profitability over time. Lastly, it would be interesting to be able to conduct a comparison between organizations that still use traditional accounting and with those that use TDABC to see how the net profits of the hotels differ based on the accounting systems being used. Such studies were not possible mainly due to inaccessibility of data from other comparable organizations that are typically reluctant to share objective financial data of their organization even for academic research.

The outcome of this study has revealed that when organizations are able to delve into micro-level cost information, they can develop their strategies on how they want to position their organization in the market. The organizations can decide on whether they want to be a cost leader or differentiate themselves through focusing their products and services to a certain segment of the market that will yield the highest benefit to the organizations. Of course, targeting only high-profit customers does not suggest in any way that other customers are to be ignored. In fact, some lower-profit customers can have a snowball effect and attract high-profit customers. For example, segment-4 are individuals that make their own bookings and stay with family mostly for leisure purposes. Such clients may be corporate clients who are making direct reservations. Therefore, such customers may serve as a conduit to lead for more profitable segments such as corporate clients. In summation, the outcome of the study presents an example of how an organization is using customer profitability analysis to fine-tune its’ marketing strategies to impact the firm’s bottom-line.

REFERENCES


