

# THE TRIDENT MODEL FOR CUSTOMER-CENTRIC ENTERPRISE SYSTEMS AT COMFORT TRANSPORTATION, SINGAPORE<sup>1</sup>

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## *Executive Summary*

*Enterprise systems (ES), such as enterprise resource planning (ERP), have now been around for about 10 years, providing the IT infrastructure foundation for a growing number of firms. These systems are beginning to evolve to become more customer-centric. This article introduces a model for viewing customer-centric enterprise systems (CCES). The model, called the Trident Model, integrates three perspectives.*

*The first perspective is the new marketing mix perspective called SIVA (solutions, information, value, and access). SIVA states that customers are interested in solutions to their problems rather than products. They want information about identified solutions rather than promotions. They view solutions in terms of their value rather than their price. And they want convenient access to the identified solutions. They are not so bothered about the place.*

*The second perspective is the organizational learning perspective, which states that enterprises need good organizational learning processes to keep up with their customers' changing needs and demands.*

*The third perspective is the customer groups perspective, which states that customers should be grouped by commonalities, with services customized for each group.*

*This article uses the Trident model to discuss the CCES at Comfort Transportation, Singapore, a technologically advanced company that provides taxi services in Asia. Comfort's CCES draws on a global positioning system (GPS), customer resource management (CRM), interactive voice response (IVR), and other advanced information technologies.*

## A BRIEF HISTORY OF CUSTOMER-CENTRIC ENTERPRISE SYSTEMS

In their continual quest for competitive advantage, businesses are realizing the emerging importance of becoming a customer-centric organization, that is, one that "conducts business through the consumer's eyes and shares unfiltered insight within the enterprise."<sup>2</sup> We view a customer-centric organization as one that continuously identifies its customers and their needs and iteratively plans, designs, implements and upgrades its systems in response to those identified needs, in an integrated manner. A customer-centric enterprise system (CCES) is a set of integrated information systems that support an organization's customer-centric viewpoint.

Apart from an integrated system that supports customer relationship management (CRM), organizations require a mindset change to become customer centric.<sup>3</sup> This mindset involves addressing and resolving issues faced by customers in their interactions with the firm. It also involves understanding customer needs, even anticipating them. In doing so, organizations can reduce the mismatch between their offerings and customers' wants and needs. In better understanding customers, customer-centric businesses are also in a better position to exploit opportunities to build customer loyalty and, thereby, enhance organizational performance. Hence, customer-centricity is more than a buzzword. It is an essential part of organizations that deal with customers (internal or external).

Does every organization need a CCES? The answer depends on the organization's philosophy toward its customers, how often it interacts with them, the scope

<sup>1</sup> Mary Lacity was the accepting Senior Editor for this article.

<sup>2</sup> Brown, S.A., *Customer Relationship Management: A Strategic Imperative in the World of E-business*, John Wiley and Sons Canada Limited, Ontario, Canada, 2000, p. 190.

<sup>3</sup> Goodhue, D.L., Wixom, B.H., and Watson, H.J., "Realizing Business Benefits through CRM: Hitting the Right Target in the Right Way," *MIS Quarterly Executive* (1:2), 2002, pp. 79-94.

of its business, and the nature of competition in its industry. A CCES appears crucial for organizations that interact with many customers everyday, especially organizations in the service industry.

## TOWARD A CUSTOMER-CENTRIC COMPETITIVE ADVANTAGE

To better understand the role of CCES in gaining competitive advantage, we developed a model that integrates three perspectives: *marketing mix*, *organizational learning*, and *customer groups*; see Figure 1. Together these three perspectives form the three prongs of a Trident, which in the ancient Greek and Roman mythology was an effective weapon carried by Neptune or Poseidon. This section describes Figure 1 by discussing each perspective's role in creating competitive advantage.

### The Marketing Mix Perspective

The customer-centric approach to marketing has its roots in relationship marketing and has been referred to as the 'new paradigm.' The purpose of relationship marketing is to establish, maintain, enhance, and commercialize customer relationships so that both buyers' and sellers' objectives are met.<sup>4</sup> A customer-focused approach involves defining the marketing process to reflect the buyer's point of view rather than the seller's point of view.<sup>5</sup>

Since the 1960s, marketing strategies have been highly influenced by Edmund Jerome McCarthy's 4Ps of marketing mix: product, price, place, and promotion.<sup>6</sup> This 4P framework, though, takes the seller's production perspective. Shifting to a customer perspective requires revisiting the 4Ps to decide whether or not they apply adequately to customer-centric marketing scenarios.<sup>7</sup>

Dev and Schultz<sup>8</sup> have rethought the 4Ps from the demand side. Their marketing mix has four quite-different key elements—*solutions*, *information*, *value*, and *access* (SIVA)—based on the four key questions

customers ask when considering a product. The SIVA mindset is that:

- Customers are interested in *solutions* to their problems rather than *products*
- Customers want *information* about identified solutions rather than *promotions*
- Customers view solutions in terms of the *value* they offer rather than their *price*
- Customers want convenient *access* to the identified solutions. They are not so bothered about the *place* aspect of traditional 4P marketing mix.<sup>9</sup>

Dev and Schultz further mention, coincidentally, that SIVA is the Hindu God of destruction and re-creation. He destroys to create something better. In the context of customer-centric marketing, Dev and Schultz see SIVA replacing the 4Ps.

### The Organizational Learning Perspective

With customers' expectations increasing and breakthroughs in IT continuing, firms need to depend more on their learning capabilities to improve their performance.<sup>10</sup> Efficient organizational learning processes are difficult to imitate because their cause-and-effect relationship with enterprise performance is ambiguous. Yet, organizational learning can lead to a long-term competitive advantage.<sup>11</sup>

From the customer-centric viewpoint, firms need to learn more about their customers' needs faster and more efficiently to beat their competition. Companies have adopted CRM applications to gather and analyze this information to learn faster.

For example, staff can analyze information to learn about different customer groups. Operational CRM deals with day-to-day operations and can be used to improve service delivery. Its feedback loops can be used to customize and personalize service delivery more efficiently and effectively. Analytical CRM provides a learning feedback loop that creates customer intelligence, which can enhance future customer operations. Effective customer-centric

4 Grönroos, C., "Relationship Marketing: The Strategy Continuum," *Journal of the Academy of Marketing Science* (23:4), 1995, pp. 252-254.

5 Dev, C.S. and Schultz, D.E., "A Customer-Focused Approach Can Bring the Current Marketing Mix to the 21<sup>st</sup> Century," *Marketing Management* (14:1), 2005a, pp. 16-22.

6 McCarthy, E.J., *Basic Marketing*, Homewood, IL, Irwin, 1960.

7 Grönroos, C., "Quo Vadis, Marketing: Toward a Relationship Marketing Paradigm," *Journal of Marketing Management* (10), 1994, pp. 347-360.

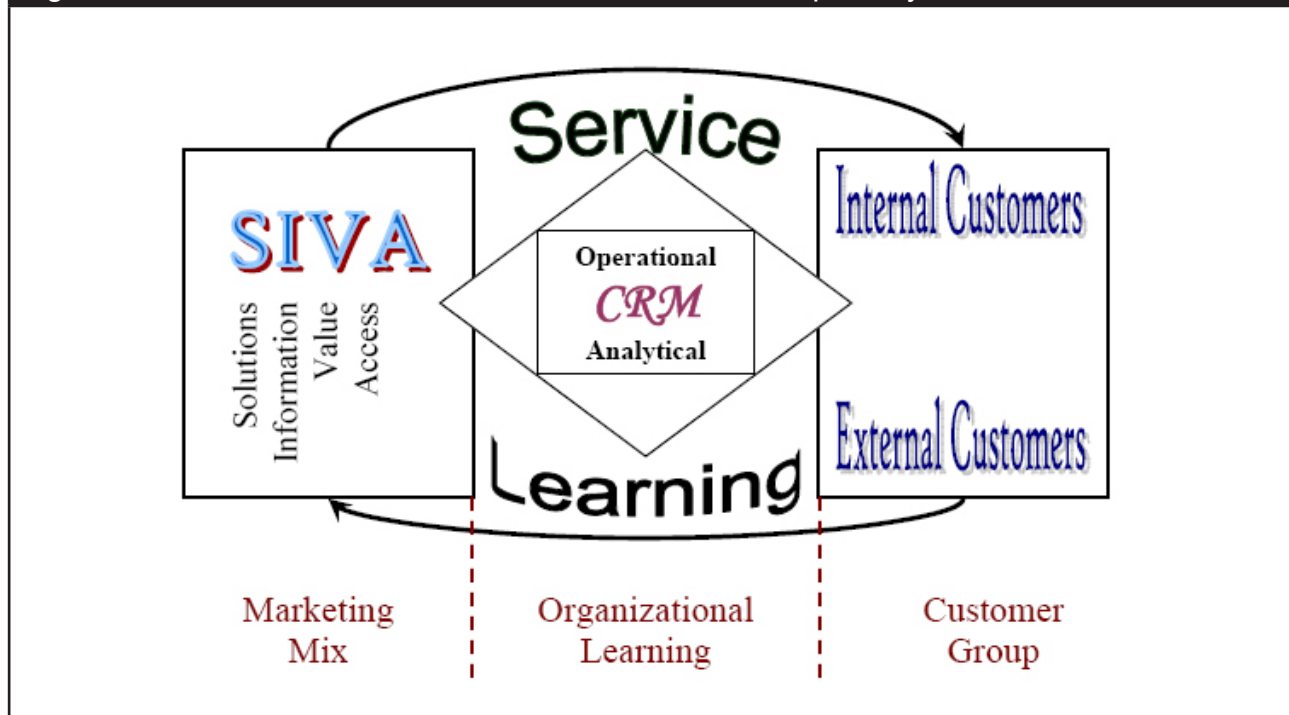
8 Dev, C.S. and Schultz, D.E., "Simply SIVA," *Marketing Management*, (14:2), 2005b, pp.36-41.

9 Daden. SIVA marketing model. *Daden Consulting*. Available at <http://www.daden.co.uk/consulting/pages/000163.html> (2005). Last visited on 18 August, 2005.

10 Ellinger, A.E., Ellinger, A.D., and Keller, S.B., "Logistics Managers' Learning Environments and Firm Performance," *Journal of Business Logistics* (23:1), 2002, pp. 19-37.

11 Zahay, D. and Griffin, A., "Customer Learning Processes, Strategy Selection, and Performance in Business-To-Business Service Firms," *Decision Sciences* (35:2), 2004, pp. 169-203.

Figure 1: The Trident model for a customer-centric enterprise system



systems include both service delivery feedback loops and information capture and analysis capabilities.<sup>12</sup>

### The Customer Groups Perspective

Stakeholder theory states that groups with a common interest can affect an organization. To achieve enterprise goals, managers need to respond to each group appropriately.<sup>13</sup> Stakeholder groups can also influence the success or failure of IT initiatives.<sup>14</sup>

Customer groups are stakeholder groups. The 80/20 rule applies: 20% of the customers provide 80% of the sales.<sup>15</sup> This rule applies to organizational customers as well. Firms therefore need to identify their profitable customers and build their CRM systems with a view toward engaging these customers in long-term relationships.

Often, profitable customers can be divided into distinct groups. One group, for example, is *internal*

*customers*. These are intermediaries that provide services to end customers on behalf of an enterprise. The end customers form another customer group: *external customers*. To be successful, a firm not only needs to differentiate customer groups, but it also needs to customize its behavior toward each group in its interactions with them. The firm's CCES and its business processes must also address the needs of distinct customer groups.

In summary, Figure 1 shows the marketing mix perspective on the left with its four components—SIVA—that define the foundation of customer-centric service delivery.

The organizational learning perspective, shown in the middle, provides feedback and learning from customers about the services they receive and the systems that affect that service. This perspective compels the organization to rethink and improve its customer-centric solutions.

As shown, CRM is a key system for providing customer-centric service delivery because it integrates the information repositories of different organizational functions and delivers desired information and service to customers. The operational portion of CRM comprises all systems that assist in service and information delivery. The analytical portion of CRM analyzes the needs of the customer groups and is

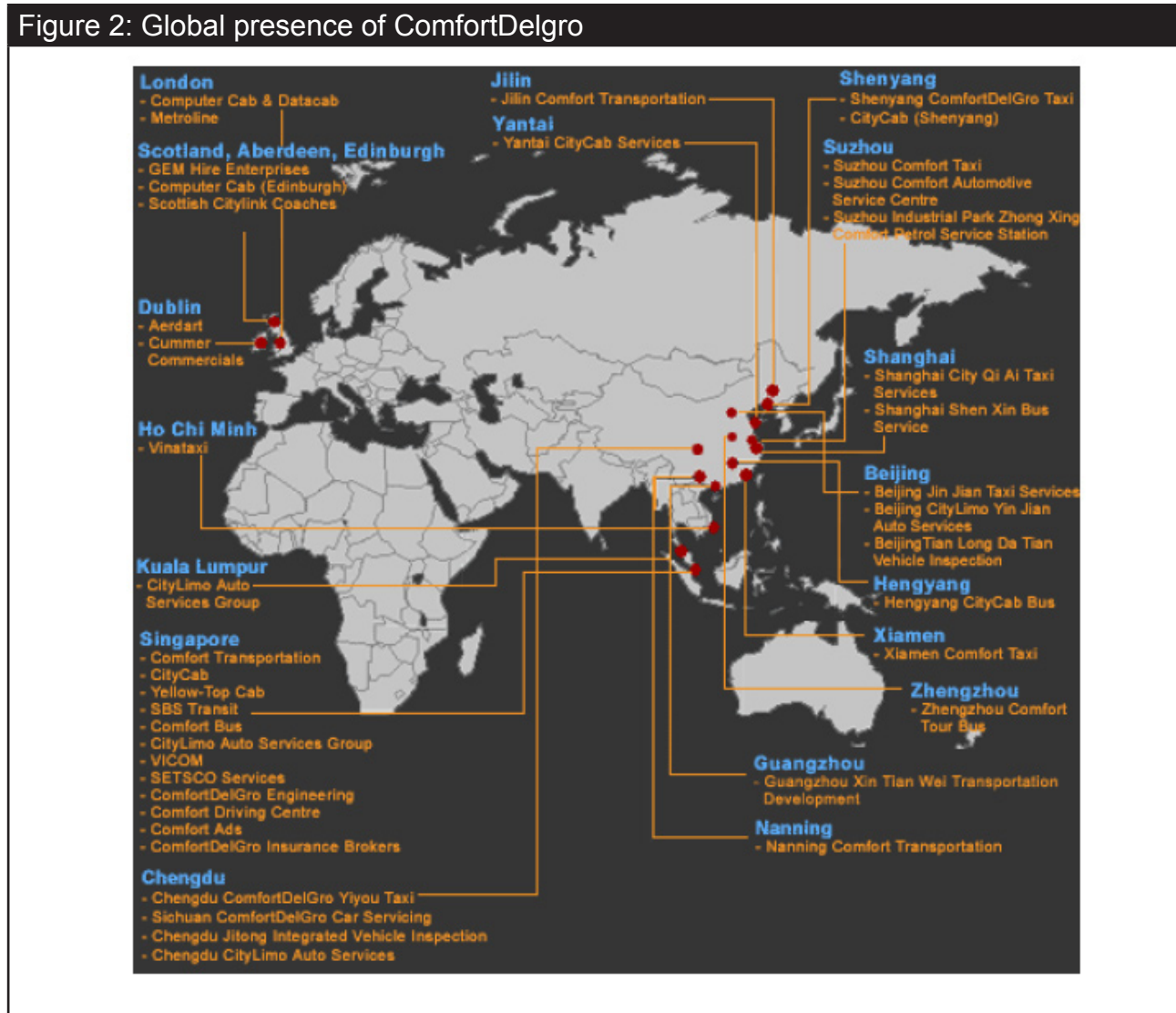
12 Norris, G., Hurley, J. R., Hartley, K.M., Dunleavy, J.R., and Balls, J.D., *E-business and ERP – Transforming the Enterprise*, John Wiley & Sons, New York, 2000.

13 Freeman, R.E., *Strategic Management: A Stakeholder Approach*, Pitman Publishing, Boston, 1984.

14 Heeks, R., "Information Systems and Developing Countries: Failure, Success, and Local Improvements," *The Information Society* (18), 2002, pp. 101-112.

15 Ryals, L. and Knox, S., "Cross-functional Issues in the Implementation of Relationship Marketing Through Customer Relationship Management," *European Management Journal* (19:5), 2001, pp. 534-542.

Figure 2: Global presence of ComfortDelgro



used to make the systems and the organization more customer-centric.

The customer groups perspective, shown on the right in the figure, define these groups.

The three perspectives represent the three prongs of the Trident model. Incidentally, SIVA, the Hindu God of destruction and re-creation referred to by Dev and Schultz, also uses a three pronged spear (Trident) to conquer. Together the three prongs (perspectives) of the Trident model can be used by CIOs to effectively leverage the CCES to the advantage of their companies.

The Trident model is used to analyze and understand the case of Comfort Transportation, Singapore.

## CASE STUDY: COMFORT TRANSPORTATION, SINGAPORE<sup>16</sup>

Comfort started as a taxi cooperative in 1970, with 1,000 taxis. In 1993, the cooperative was incorporated as NTUC Comfort and became one of Comfort Group's wholly owned subsidiaries. On March 29, 2003, Comfort Group merged with Delgro Corporation to become ComfortDelgro, now the world's second largest publicly listed land transport company with a global presence; see Figure 2.

Comfort is the largest taxi operator in Singapore. It offers a range of taxi services, from taxi services for the mass market to niche taxi services for corporate users. It serves 600,000 commuters a day with a fleet of 11,700 taxis and has a market share of 58%. Its taxi drivers are not employees, though. They rent a

<sup>16</sup> The research method for studying Comfort Transportation is described in the Appendix.

taxi from Comfort and provide services to commuters on the company's behalf. Comfort's reputation for providing excellent customer service is evident from the increasing number of accolades from customers—in the form of “bouquets” (thank you letters) given to its taxi drivers—as shown in Figure 3. Figure 3 also provides an overview of Comfort's taxi operations in Singapore.

<b>Figure 3: Overview of Comfort Transportation</b>	
<b>Taxi Fleet Size</b>	
Comfort	10,823 taxis
Yellow-Top Cab	1,059 taxis
Total Fleet Size	11,882 taxis
<b>Taxi Trips</b>	
Average number of trips per taxi	34 per day
Average number of passengers per day	580,920
<b>Taxi Bookings</b>	
Average number of calls per day	45,000
Successful matching rate	91%
Average time from call pick-up to dispatch confirmation	26 seconds
Average waiting time from dispatch	6 minutes
<b>Driver profile</b>	
Total number of drivers	24,292
Average age of drivers	50.7 years old
<b>Number of “bouquets” from customers for acts of good service by Comfort drivers</b>	
In 2002	737
In 2003	1,279
In 2004	3,114
In 2005	3,404

Comfort's vision is to be the *preferred land transport provider with best-in-class services that lead the market*. Its *mission* is to provide *24-hours-a-day, seven-days-a-week, point-to-point transportation to commuters, with helpful drivers, safe and reliable vehicles, and supported by friendly staff*. Comfort's vision and mission are achieved by training drivers and staff, harnessing the latest technologies, building operational excellence, and providing an environment where quality services and continuous improvement are encouraged and rewarded.<sup>17</sup>

<sup>17</sup> Comfort Transportation Website. Available at <http://www.comfort-transportation.com.sg/> (2005). Last visited on August 30, 2005.

## Comfort's Customer-Centric Enterprise System

In line with its vision and mission, Comfort aims to increase its competitiveness by positioning itself as a customer-centric organization. Management realized early that the company needed to focus not only on the commuters (its external customers) but also on the taxi drivers (its internal customers). Highlighting the importance of these internal customers, one of the senior executives at Comfort noted,

*“In the past, we focused only on the external customers. The main reason for beginning to focus on the internal customers also is the stiff competition in the taxi transportation business. A lot of new players have emerged, creating a necessity for Comfort to satisfy its drivers in a better way.”*

Therefore, Comfort has invested heavily in its customer-oriented technology infrastructure, which fulfills the needs of both internal and external customers, individually and collectively. Figure 4 lists some of the major customer-centric IT initiatives Comfort has undertaken in the past few years, along with a brief description of each system and its target customer group.

The information systems described in Figure 4 are closely linked, in essence, creating a single customer-centric enterprise system. This integration helps Comfort provide the desired service and information to customers. The system architecture, shown in Figure 5, enables Comfort to handle the system and information interdependencies and provide complete solutions to customers' needs, even when the information is initially captured in different systems.

**The CabLink System.** CabLink, launched in 1996, is Comfort's satellite taxi dispatch system. Of all the systems, it has the greatest impact on customers and required the largest investment (S\$32 million, equivalent to US\$20 million). It was the world's first and largest dispatch facility that integrated Interactive Voice Response (IVR) and a Global Positioning System (GPS). Using an advanced GPS and telematics<sup>18</sup> system, Comfort's dispatch center can locate an individual taxi instantaneously with reasonable accuracy.

<sup>18</sup> Telematics combines BPS technology with a cellular connection so that a vehicle's onboard systems can stay abreast of its location and, in turn, keep the driver connected to the outside world.

Figure 4: Customer-centric information systems at Comfort, Singapore		
System	Description	Customer Group(s)
Driver Online Enquiry System (DOES)	Drivers can view all records related to their payments, rental dues, CabLink commission dues, merit/demerit points, etc. The information is extracted from the integrated databases of the fleet management system, rental management system, and driver management system. Drivers can access DOES and the Interactive Voice Response (IVR) system through the Internet or through Short Messaging Service (SMS).	Internal
Fleet Management System	Maintains records of drivers' vehicles. Assists drivers with maintenance schedules, yearly road tax, insurance renewals, etc.	Internal
Rental Management System	Calculates and maintains drivers' rental.	Internal
Driver Management System	Maintains records of training provided, merit/demerit points, complaints.	Internal
Commuter Enquiry System	Commuters (external customers) can know the status of their taxi bookings, lost items, or complaints through either phone or IVR because this enquiry system is linked to the customer complaint system, lost and found system, and CabLink system. For complaints and feedback, e-mail can also be used.	External
Customer Complaint System	This system takes note of commuters' complaints and feedback via phone and tells them the action taken within a week	External
Lost and Found System	This system records the items left behind by commuters on taxis and tries to match the items with the description provided by commuters so that the rightful owners get their lost belongings back.	External
CabLink System	Commuters can call a taxi at any location 24/7. This system matches the customer requirement with the nearest available vacant taxi. The commuter gains in terms of time and convenience. The driver gains in terms of an extra taxi calling charge, which ranges from S\$2.50 to S\$5.20 (US\$1.56 to US\$3.25). Comfort charges a nominal commission for use of this system. The amount is calculated by a related system, based on the information provided by the CabLink system. The drivers are apprised of their dues in a timely manner through other related systems (SMS, IVR, DOES).	External Internal
Customer Relationship Management (CRM) System	CRM forms the core system through which all other systems are integrated. Drivers can call up the system at their convenience and indicate their complaints, repair of taxis, or any other concerns they may have. Through this system, these concerns are classified and routed to the appropriate authority for early resolution. The commuters are also provided information linked through this system regarding their complaints, lost and found items, and other issues. The information is recorded and retrieved from relevant databases depending on the need.	Internal External

CabLink is based on Comfort's customer-centric thinking, as Comfort's CEO notes,<sup>19</sup>

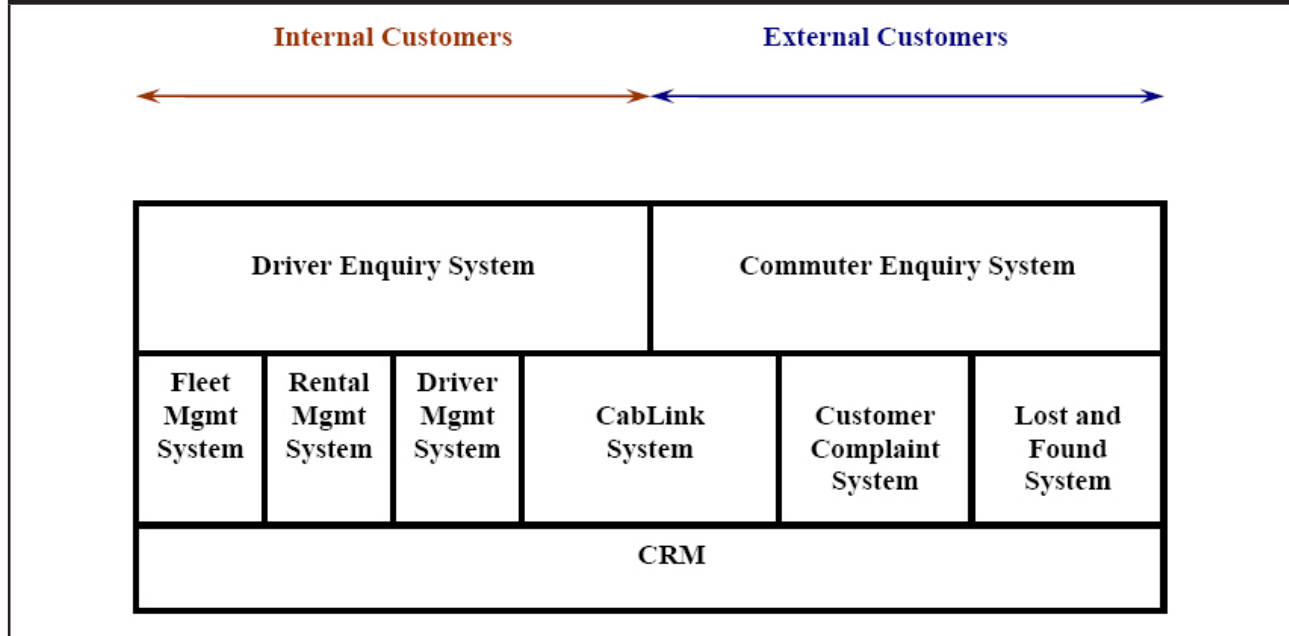
*"I put myself in the shoes of a customer and asked myself, 'What do I want?' ... I dreamed*

*up this system where a commuter can go to a telephone, press a few buttons, and get a taxi at his doorstep. Then, I went out and looked for people who could make this system."*

From the above quote, it is evident that top management was involved in conceptualizing and

19 Teik, L.C. "The Two Sams – From Headhunter to Headhunted," *The Straits Times*, (23 February, 1997) Singapore.

Figure 5: Schematic diagram of the customer-centric enterprise system at Comfort Transportation, Singapore



implementing this system. Its customer centricity led to its success.

CabLink is an end-to-end system that matches incoming orders for taxis with the available vehicle that can provide service quickest. The system can also locate vehicles in emergencies.

To book a cab, a customer dials a computer-operated or operator-assisted phone number, or sends a Short Message Service (SMS), or enters a request through a Taxi Order Terminal (TOT) in a major shopping center. The customer is almost instantly apprised of the taxi's license plate number and approximate pick-up time, either by the operator or the automated system; see Figure 6.

CabLink was initially created to improve customer service and meet the increasing demand for taxi bookings. Knowing the location of the drivers in real-time through the GPS helps Comfort more easily manage its taxi fleet. The traffic patterns recorded by the system will also guide future planning. Comfort is able to minimize the number of call operators because CabLink can handle large number of taxi bookings automatically. Thus, it reduces overhead costs. As one senior Comfort executive points out, "*CabLink is to Comfort what the nervous system is to the human body*"

Comfort has become known for its innovative use of IT, in particular, its use of GPS. The company's customer centricity is reflected in the number

of awards<sup>20</sup> it has received over the years for its innovative customer-centric IT solutions.

Its CCES has reduced operational costs as well. The firm now has one call center, down from two, and it has reduced call center operators from 200 to 80—a manpower savings of 60%. These operators now only handle 40% of the calls for taxis. The other 60% are handled electronically.

The system has also reduced administrative costs because there is no longer a need to send paper statements to drivers; business is conducted electronically.

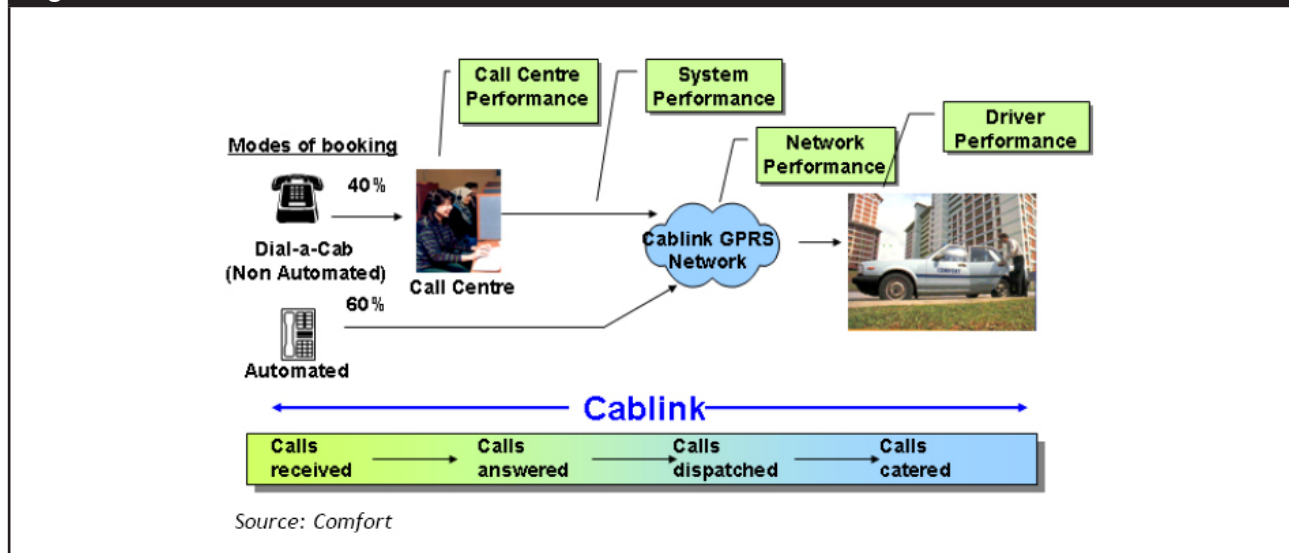
Now we discuss the three-perspectives framework as it applies to Comfort.

### **The Marketing Mix Perspective at Comfort**

The marketing mix perspective, called SIVA, is based on four customer-based premises, with a customer question for each:

<sup>20</sup> The Management Awards of Asia: IT category (1996) for its CabLink Global Positioning System, Innovative use of IT award from the National Computer Board, Singapore, for its CabLink System (1997), MIS Innovation Awards for the Customer Relationship Management and Storage categories (2003), Asia Intelligent 20 Award for SpeedCall system (an innovation that enables repeat customers to call for a taxi without going through a call center operator), COPC-2000® Standard Certification for its in-house corporate customer contact centre, CabLink.

Figure 6. CabLink's infrastructure



1. Customers want *solutions* to their problems rather than *products*. Their question is: “How can I solve my problem?”
2. Customers want more *information* about identified solutions rather than *promotions*. Their question is: “What information do I need?”
3. Customers view solutions in terms of their *value* rather than their *price*. Their question is: “What is the value of the solution relative to cost?”
4. Customers want convenient *access* to identified solutions. They are less concerned about *place*. Their question is: “Where can I access the service?”

Following are discussions of Comfort's views from these four components of the marketing mix perspective. This discussion can provide insights to CIOs seeking to build CCES.

**Addressing Customers' Solutions Question: “How Can I Solve My Problem?”** For high performance, firms are moving away from “selling products” to providing “customer solutions”<sup>21</sup> Customer centricity is especially important for gaining competitive advantage in service industries.

Comfort carefully analyzed the needs of its commuters (external customers) and realized that many of them needed a taxi at a designated place in the shortest

possible time. Comfort also realized that its drivers (internal customers) wanted to increase their earnings.

With these objectives in mind, it introduced CabLink—to provide efficient transportation to commuters and additional income to drivers. To get a taxi to a customer quickly, Comfort therefore turned to GPS technology to locate the nearest taxi. Use of GPS was an innovation over the Dial-A-Cab service, which used a radio call system to locate a taxi. Management continued to improve CabLink, as noted by a senior manager,<sup>22</sup>

*“Users of this service have a regular travel pattern which means that instead of calling for a cab each time they need one, these commuters issue standing orders for cab services to Comfort for a predetermined period. These standing orders are then keyed into the computer which issues cab bookings without human assistance.”*

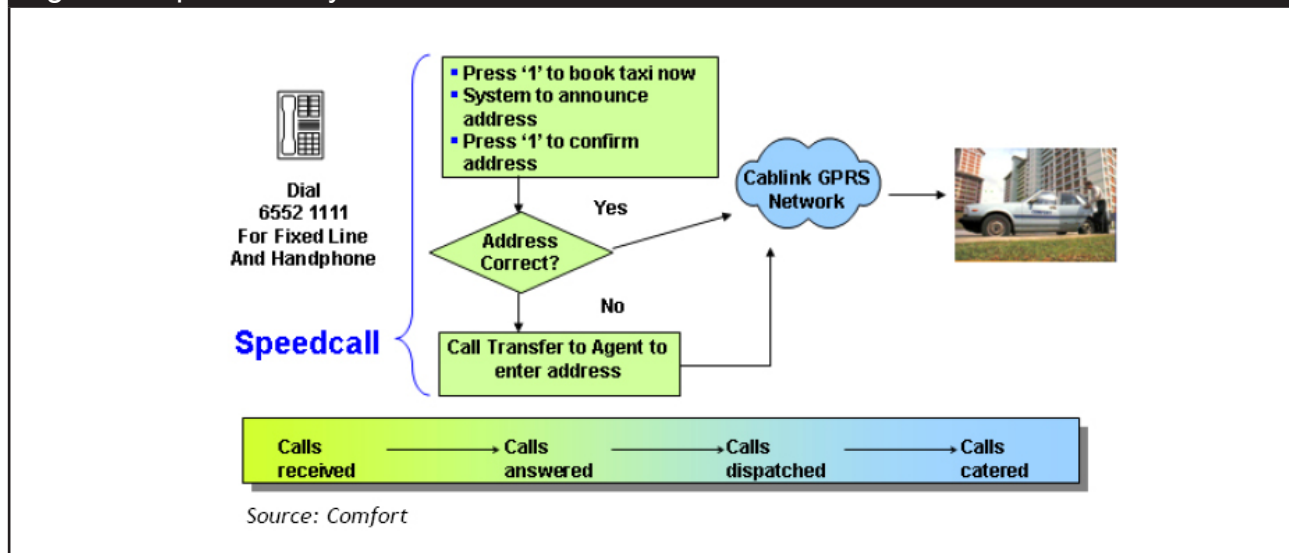
In 2003, Comfort introduced SpeedCall to improve on the original operator-based CabLink. SpeedCall adds a text-to-speech system (TTS), providing regular customers with an automated booking interface. As one company official noted,

*“The automated call, on average, takes 24 seconds, while the operator takes about 40 seconds ... also, for the drivers out of the 300 lines available, more are now available, leading to an enhanced number of bookings.”*

21 Gulati, R. and Kletter, D., “Shrinking Core, Expanding Periphery: The Relational Architecture of High-Performing Organizations,” *California Management Review* (47:3), 2005, pp. 77-104.

22 Liew, M., “Taking Comfort in IT,” *Computer Times*, 23 June, 1999, Singapore Press Holdings, Singapore.

Figure 7: SpeedCall system infrastructure



With SpeedCall, repeat customers bypass call center operators when booking a taxi. The system automatically identifies the call as a repeat customer, using the calling telephone number. SpeedCall then uses system intelligence to locate the caller's pick-up address, which it reads to the caller to confirm, using Interactive Voice Response (IVR) technology.

Figure 7 illustrates how the system works. When a repeat customer calls the Comfort hotline, the call is automatically diverted to SpeedCall and the caller is prompted to confirm the pick-up address. If the address is correct, a taxi is dispatched. If not, the caller is transferred to an operator.

This innovative service represents Comfort's solution-oriented philosophy. It is also in line with Comfort's strategy of leveraging technology to increase productivity and control operating costs by encouraging customers to participate in service delivery. Comfort continues to experiment with voice recognition, demand simulation, and other new technologies to further enhance its solutions to its external customers' needs.

In a similar vein, Comfort addresses its internal customers' primary need: to enhance earnings. Comfort's solution is to pay the taxi drivers a calling charge for every CabLink booking. Thus, the drivers are motivated to use CabLink, as one driver noted,

*"I get around five CabLink jobs every day and, when it rains heavily, I get more jobs through this system. I like the system, and for me, the day when it rains continuously is the best day."*

**Addressing Customers' Information Question: "What Information Do I Need?"** Information is the second element of the customer-centric marketing mix. Commuters want the information they need in a timely manner. CabLink provides such information, such as the taxi license number and the approximate time of arrival. At the same time, CabLink provides the taxi driver with information about the commuter and the pickup location.

During our visit to Comfort's call center, we observed a driver waiting at the "wrong" location because the commuter had not given his correct location when booking the taxi. The driver was nearby, but the dispatcher's challenge was to get the two together. The dispatcher found the driver's position on her computer screen and guided the commuter, who was using a mobile phone, to the nearby waiting taxi. Generally, when drivers go to a wrong location, the call center operator tracks the taxi via GPS and, then, guides the driver to the correct location. The Mobile Data Terminal (MDT) in the taxi shows the details of the customer, so that the driver can verify that he is picking up the correct customer.

In addition, the lost-and-found system can provide immediate status of goods left in a taxi because the commuter inquiry system is linked, through the CRM system, to the lost-and-found system and the driver management system. Once a driver reports a found item, that information is almost immediately available to the other systems. A Comfort official noted,

*"The lost-and-found system matches the articles lost by customers to those deposited by the driver. There are about 100-200 cases*

*of lost and found every day. The IVR can be used by external customers also, to know if the lost item reported by them has been found.”*

Comfort is also committed to providing information to its internal customers, the drivers. The Driver Online Enquiry System (DOES), Interactive Voice Response (IVR) system, and Short Messaging Service (SMS) system provide them with timely information about pending accounts, merit/demerit points, etc. As a senior Comfort executive noted,

*“Through Internet login, drivers can view all their records related to their payments, demerit points, their outstanding payments, etc. Every day, around 400 drivers login to see their accounts on the DOES.”*

**Addressing Customers’ Value Question: “What is the Value of the Solution Relative to Cost?”** The third component of the marketing mix perspective is value. Customers who have bought a solution to their need view it in terms of sacrifice made, rather than price. As Dev and Schultz<sup>23</sup> note,

*“As long as we think of price alone, we’ll miss the non-price elements of value that are becoming so, well, valuable. Value then, is what customers want. Price is only one element in the mix.”*

Comfort aims to give commuters greater value in terms of faster and more reliable taxi service, and give drivers greater value, as noted by a senior executive,

*“This system benefits internal, as well as external, customers as the processing time is reduced and also, for the drivers, more calls are handled leading to an enhanced number of bookings. Hence, the internal customers (drivers) get more jobs, while the external customers get their taxis faster.”*

Comfort’s commitment to value over price is reflected in one executive’s view of GPRS<sup>24</sup> soon after it was implemented,

*“GPRS was implemented a year ago and is faster compared to the Mobitex system.”*

23 Op. cit. Dev and Schultz 2005b.

24 GPRS (General Packet Radio Service) is a mobile data service available to users of GSM mobile phones. It can be described as “2.5G”, i.e., between the second (2G) and third (3G) generations of mobile telephony. Mobitex is a packet-switched, narrowband, data-only technology mainly for short burst data and is an older technology than GPRS.

*Hence, more jobs are dispatched in a faster way, resulting in more jobs. This helps to improve the drivers’ income.”*

In addition to price, time, and convenience, commuters also value reliability, as noted in this commuter’s comment,

*“Whenever I try and call a taxi from an operator other than Comfort, either I am put on hold for a very long time or, even when I get through to the operator, the taxi takes a long time to arrive. Comfort is able to send a taxi within 5-10 minutes, without even going through the operator.”*

Most of the taxi companies in Singapore still use the radio call system. It’s a minimum requirement of the Land Transport Authority, Singapore. Using radio call, dispatchers verbally tell drivers the pick-up information. But without a GPS system, a dispatcher cannot assure that the chosen driver is nearest the commuter. Also, voice quality (and pronunciation) can cause drivers’ confusion—reducing taxi response time. At Comfort, on the other hand, the drivers see a printed dispatch on their MDT (Mobile Data Terminal). So, they work from more reliable information, and the dispatcher knows they are the nearest taxi. Comfort’s value proposition, therefore, includes reliability.

Singapore’s taxi services have been deregulated since 1998, so the taxi companies can set their own fares. At the time of this research, Comfort charged S\$3.20 (US\$2) per taxi call via phone, which is slightly higher than what its top two competitors charged during off peak hours (Citicab charged S\$3.00 (US\$1.88) and SMRT charged S\$2.00 (US\$1.25)). This higher price attests to Comfort’s confidence in its value proposition to customers.

**Addressing Customers’ Access Question: “Where can I access the service?”** Access is the fourth component of the marketing mix perspective. Comfort wanted commuters to be able to access CabLink in the most convenient and preferred ways. Thus, it currently offers eight options for calling a taxi—Dial-A-Cab, AutoCall, FastCall, Send-A-Taxi, Taxi Order Terminal, e-Comfort Taxi Booking, SpeedCall/SpeedCall Mobile, and PDA Taxi Booking Service. Comfort has taken advantage of the proliferation of mobile telephones in its options, as the Chief Operating Officer noted,<sup>25</sup>

25 Ho, B., “10pm Call Bookings for Comfort Cabs” *The Straits Times*, 3 February, 2005, Singapore.

*“Most people have mobile phones these days and, thus, have greater access to making a booking. In the past, it was inconvenient ... as they had to look for a telephone”*

Comfort learned that many customers did not want to book a taxi through an operator. A senior executive explained,

*“Customers sometimes complain about the rude behavior of the call center operators. Though we constantly teach the operators to be courteous and polite, there may be some instances where it cannot be controlled fully. SpeedCall offers an access channel with no human interface and . . . machines cannot be rude. But we do not close the human interaction option, the customers can still talk to an operator if they so prefer.”*

The taxi drivers want access to specific services at times convenient to them. To provide this personalized, time-independent service to drivers, Comfort’s DOES, SMS, and IVR systems provide any-time access to their personal account. These systems are also integrated with the fleet management system and driver management system, giving drivers a full spectrum of information, as one company executive noted,

*“To retain them (drivers) in the company, we have to devise ways in which we can understand them in a better way. Our system addresses the needs of this segment and has options for driver waiting list allocation, GIRO financial management applications, monitoring drivers’ behavior, insurance, traffic accidents, no claim bonus for an accident-free record, and maintaining merit and demerit point allocations to drivers.”*

Drivers can access all this information via their cab display or as SMS messages on their mobile phone.

The SIVA framework can help executives ask the “right” questions to become more customer-centric. Figure 8 illustrates the SIVA framework with respect to Comfort.

CIOs, specifically, can use SIVA to identify requirements of important customer groups because technical solutions can enhance the value of business solutions already in place. CIOs’ important role is to spot opportunities where IT can enhance the value solutions to customers as well as to the company.

## **The Organizational Learning Perspective at Comfort**

At Comfort, all system enhancements stem from its organizational learning perspective. Comfort uses feedback from both its internal and external customers to offer new services and upgrade “SIVA” to its customers. It investigates new technologies, but only implements those that create customer value.

Comfort uses its everyday interactions with its internal and external customers through the CCES to understand their needs more accurately. For internal customers, CRM indicates the taxi drivers’ most common problems. If, for example, the data in the CRM system indicates that the drivers’ problems are related to accounts, the system alerts management to this fact.

Comfort also frequently conducts customer satisfaction surveys and uses an analytical approach to improve systems.

Every new use of IT is seen as a customer solution rather than a technical solution—and as a means to learn more about customers. For example, the Chief Operating Officer commented on the learning opportunities of the text-to-speech technology used in SpeedCall, saying,<sup>26</sup>

*“Comfort is constantly exploring new ways to make taxi bookings easier and faster for customers. Harnessing the text-to-speech technology, as another form of automating our call processes, has made it more convenient for our customers and brings us another step closer to meeting our customers’ needs of getting a taxi in the shortest time.”*

In its spirit of continuous learning and customer-centric innovation, Comfort realized that some customers have more than one frequently used address. Through customer feedback, Comfort learned that customers preferred that the system announce more than one address and let the customer choose one. Based on this customer-centric objective, SpeedCall recently began announcing two addresses. A Comfort executive commented on this upgrade,

*“Customers always ask us—why do you want us to repeat the addresses when you already have them in your database? So in*

<sup>26</sup> Comfort Press Release, “Comfort Launches Asia’s First Text-to-Speech Taxi Booking Service,” *Media Corner*, 2003. Available at <http://www.comfort-transportation.com.sg>. Last visited on August 30, 2005.

**Figure 8: Application of SIVA framework**

SIVA	Customer Question	Organizational Goal	External Customer	Internal Customer
Solutions	How can I solve my problem?	Understanding and solving customer problems instead of developing products/ services and trying to fit them to customer needs.	CabLink solves the following problems:  Unable to get through to call center and being put on hold for a long time  Long waiting time for taxis, especially during peak hours and on rainy days	CabLink solves the following problems:  Cruising empty along the road  Unable to hear radio calls clearly
Information	What information do I need?	Provide information customers want and need when they want and need it.	CabLink gives:  Taxi license plate number  Waiting time for taxi to arrive	CabLink gives:  Location of pickup and destination
Value	What is the value of the solution relative to cost?	Emphasize non-price elements of value (e.g., time, delivery) rather than cost.	CabLink provides:  Time savings due to faster pickup  Assurance of getting a taxi  Convenience	CabLink provides:  More pickups to increase revenue from calling charges  Clearer information on pickup
Access	Where can I access the service?	Ease of access to service using various contact channels.	CabLink allows:  Eight modes of access: Dial-A-Cab, AutoCall, FastCall, Send-A-Taxi, Taxi Order Terminal, e-Comfort Taxi Booking, SpeedCall/ SpeedCall Mobile, and PDA Taxi Booking Service	CabLink allows:  Access through the LCD display on the Mobile Data Terminal (MDT) in the taxi

*the last two months, we decided to announce two addresses based on passenger history, instead of only one and ... we found that by doing this, an additional 4% of the calls are covered."*

In another case, Comfort toyed with the idea of implementing a voice recognition system to record customers' verbal requests for a taxi. However, while technically advanced, the system could irritate customers if it did not properly understand them. So, management decided not to implement this system, as one noted,

*"We wanted to implement a voice recognition system. But apart from the cost being high, Singapore has different races that have different ways of speaking English. So, we thought that ... such a system might cause more*

*frustration and confusion among customers, so, we shelved it."*

As the above quotes attest, new technologies are introduced, or not introduced, based on Comfort's learning and feedback from customers rather than the sophistication of the solution.

Similarly, Comfort's decision to move from radio-based voice dispatching (Dial-A-Cab) to Mobitex (now GPRS) data dispatching (CabLink) was based on learning from taxi drivers. Using CabLink, jobs are either allocated by the system automatically, or drivers can bid for a job. The radio-based system permits only one option: allocation by the call center operator. One taxi driver expressed his satisfaction with the change,

*"The system is fairer compared to the radio system, where the jobs were allocated directly*

Figure 9: Comfort's call center technology evolution

Year	Call Center	Booking Mode	Payment Mode
1993-1995	Call Center, Radio-based Voice Dispatch	Telephone	Cash
1996-1999	Call Center, Mobitex Data Dispatch	Telephone	Cash
2000-2002	Call Center, Mobitex Data Dispatch	IVR, Location-based Services, WAP, SMS	Credit/Corporate Card, Voucher, Cash Card
2003-2004	Virtual Call Center, GPRS, VoIP	GPRS, Location ID	Mobile Phone Payment

Figure 10: Comparison between CabLink and Dial-A-Cab Systems

Application System	Call Center Technologies	Avg. number of jobs handled per hour	Successful jobs per day	Taxi arrival time
Dial-A-Cab (till 1996)	Radio-Based Voice Dispatch	120	3,000	15-20 minutes
CabLink (post 1996)	Mobitex/GPRS Data Dispatch	5,000	30,000	1-5 minutes

*to the taxi drivers by the call center operators ... mostly to their friends ...*

Comfort's continual introduction of new technologies follows an iterative process between technology and customer focus. Figure 9 shows how Comfort's call center evolution reflects the company's learning and continuous improvement perspective.

Figure 10 shows the manifold efficiency increases Comfort experienced in moving from the voice-based Dial-A-Cab system to the text-based CabLink system.

Customers' needs change. With close attention to regular customer feedback, organizations can iteratively improve their systems to keep step. Systems should follow a win-win-win approach, meeting the needs of external customers, internal customers, and the organization itself—reducing costs and improving efficiency. The evolution of Comfort's CCES closely aligns with its customers' emerging needs, which the company tracks through its feedback from them.

Organizational learning also comes from obstacles faced when implementing new technologies. Implementation of CabLink is an example. For its first two years, neither the drivers nor the commuters were comfortable using the system. Comfort followed

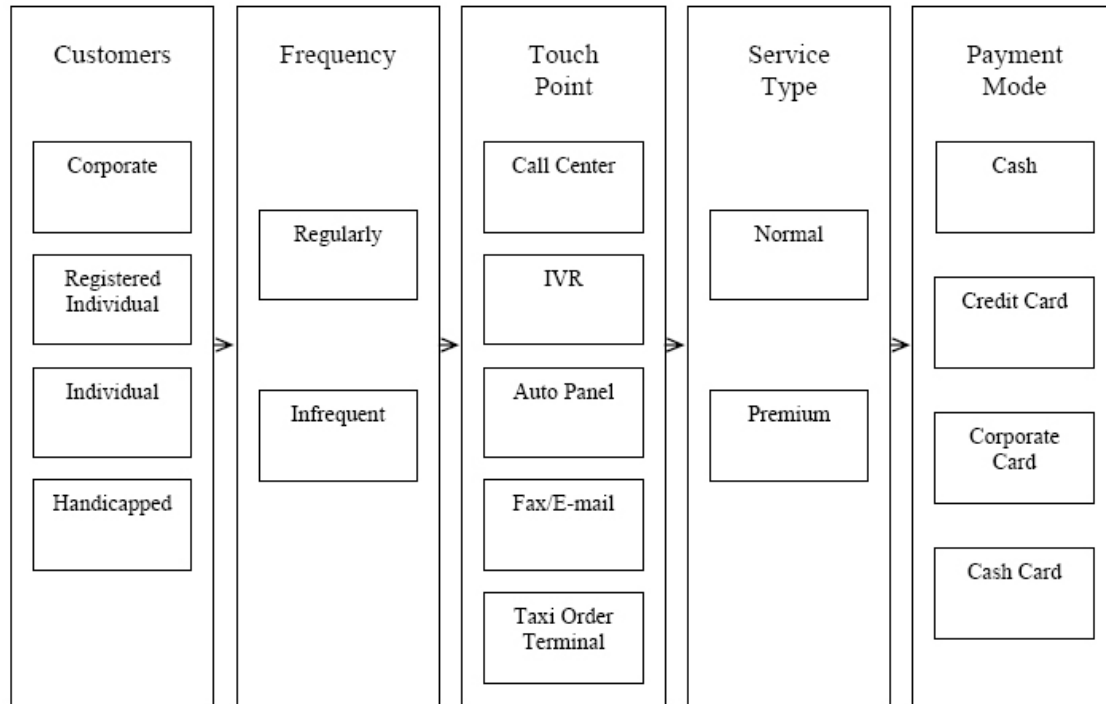
an iterative learning loop approach to increase the system's value to the drivers and commuters. The company trained its drivers and emphasized how the system could increase their earnings. The company also held various promotions to encourage commuters to use CabLink.

Likewise, SpeedCall was not initially accepted, as a senior executive noted,

*"Most of the commuters were used to interacting with operators. For them, talking to a machine was not something they enjoyed. It took about three months for them to realize that the system actually saves time and money for them."*

CIOs need to acknowledge the risks that new technologies bring and manage those risks from a business requirements standpoint. Comfort management acknowledges that the company could have better anticipated drivers' slow, two-year-long uptake of CabLink and started a training and communication program earlier to shorten this long learning period. Similarly, Comfort could have shortened commuters' three-month-long uptake of SpeedCall by better communicating its benefits to them.

Figure 11. Comfort's external customer groups



**Key:**

- **Corporate customers:** Companies who use the taxis on a regular basis
- **Registered individuals:** Individuals who have registered their personal information for frequent personalized use of taxis
- **Individuals:** Individuals who use taxis when required
- **Handicapped:** Physically challenged customers who require special assistance
- **IVR:** Interactive Voice Response system used for automated booking without operator interface
- **Auto Panel:** A special display in shopping centers and other locations for booking a taxi without going through an operator
- **Taxi Order Terminal:** Designated terminals for booking taxis
- **Premium:** A service that provides Sovereign taxis, which are luxury taxis, for a premium price

CIOs also need to continually communicate the value of a technical solution to top management to maintain their support. One approach is to use statistics and simulations to project possible cost savings and improved customer service levels.

CIOs can also minimize risk by enhancing existing systems in “manageable chunks”. Comfort took this approach to SpeedCall. It first tested the system during off-peak hours to minimize disruption should the system not perform as expected. As the vice president of IT noted,

*“The best way to go about implementing a technology is to ‘think big but do it in small steps.’ We followed this philosophy in our CabLink system also. We normally move to the next technologically enhanced module*

*only after implementing the current one successfully.”*

**The Customer Groups Perspective at Comfort**

Comfort realized early on that competitive advantage required knowing both its drivers and commuters well. Figure 8 summarizes the solutions, information, value and access (SIVA) Comfort believes it delivers to both customer groups. In fact, management has made sure that all the information systems for both groups link to one another via CRM. This integration helps Comfort efficiently provide customized and personalized service to both, and permits true customer centricity because the systems work in concert, not in silos.

But Comfort goes further in identifying customer groups. It segments drivers by performance (based on merit/demerit points, use of CabLink, etc.) and has identified certain drivers as “star” drivers. One executive described the means of segmentation,

*“The merit and demerit points allocated by the company serve as a guide to the drivers’ performance and are linked to their performance. Rewards like diesel rebate, rebates on rental, etc. are linked to this. Star drivers (about 1,000 out of 11,000 drivers) receive other benefits, like free medical checkups, overseas trips. Merit points serve as a fair way of giving benefits. Traffic offenses and customer complaints may point to demerit points. Drivers who take part in dialog, functions, training, etc. are given merit points.”*

Comfort also segments its external customers, and its CCES has been designed to address the needs of each segment. Figure 11 shows five external customer groups and various options for using CabLink.

A senior executive commented on the benefits of categorizing customer groups,

*“Comfort segments its external customers to understand them in a better way. Categorizing them according to their preferences of booking methods and types of services helps Comfort in understanding the preferences of individual customers. Efficiency of services can be immediately improved upon by rationalizing, or even reducing, the overall marketing cost in the process.”*

Ease of learning and use are particularly important criteria for CCES—for internal, as well as external, customers. One driver commented on using the mobile data terminal in his taxi to access CabLink,

*“It is a very easy system, and it takes only a half-day course to learn to use it efficiently.”*

## CONCLUSION

The new customer-centric marketing mix framework SIVA (solutions, information, value, and access) is new to IS literature, replacing the traditional company-centric 4Ps framework. As shown in this article, the SIVA perspective is helpful in understanding CCES.

SIVA also helps organizations see and resolve competing customer objectives. For example, Comfort’s taxi drivers want to maximize their income, whereas commuters want effective transportation at a reasonable price. Comfort struck a balance by focusing on service “value” rather than “price.” Likewise, the SIVA framework helps firms make technology decisions from the customers’ four perspectives: solutions, information, value, and access.

The Trident model, which combines SIVA with the organizational learning and customer groups perspectives, is even more useful because the integration provides a more holistic understanding of customer-centric enterprise systems.

Furthermore, the three integrated perspectives are most helpful when customer groups include internal, as well as external, customers because CCES need to accommodate all types of customers.

In short, this three-part Trident model can be used in future research to analyze customer-centric firms, just as this article has illustrated CCES from an Asian perspective at Comfort Transportation, Singapore.

## APPENDIX: RESEARCH METHOD

Data was gathered through semi-structured interviews with the Vice President (Information Technology), who was the key person responsible for leveraging information systems at Comfort; the Head of CabLink System; and three Comfort taxi drivers. We also drew on in-house materials about the CCES and various secondary sources, such as newspaper articles and the company Web site, to understand the organization and its systems. We also conducted five focus group interviews with commuters (10 commuters per focus group) to assess their experiences with Comfort.

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