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Technology and its CRM implications in the shipping industry

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Abstract: This paper investigates the relative importance of service factors such as technology and facilities, how service providers are rated on those factors, and their relationship to customer satisfaction in a B2B environment. The results show that in the ocean freight shipping industry, customers placed more importance on factors such as efficiency in complaint handling, prompt availability of delivery information as compared to the use of latest equipment and technology. Most importantly, customers who had a more favourable evaluation of shipping companies on these factors also experienced a higher level of service satisfaction. Implications of these results for the use of technology in managing customer relationships are then presented.

Keywords: CRM; shipping industry; technology; service encounters; customer satisfaction.

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1 Introduction

Technology offers tremendous promise in transforming the processes related to ocean freight shipping services. Rust [1], for example, envisions a general transformation in services as the inevitable result of dramatic advances in technologies in computers and communication. Technology can provide faster response to customer needs which is a requirement for survival in the competitive container shipping sector. Laine and Vesalainen [2] provide evidence that technology can add tremendous value in harnessing the profit-making potential in port operation. Advanced cargo handling technologies, for example, can reap significant cost savings for shippers and shipping companies alike. Other shipping companies have used internet technology as a marketing tool to attract customers [3].

Yet, there is a deeper layer of considerations that must always be kept in mind. Namely, does the use of technology in delivering customer service always offer satisfaction to the customer who should be seen as king in the final analysis? A recent study, for example, found that B2B companies were failing in the use of technology in their online customer service relationships [4]. Also, in the shipping industry where relationships are established on the basis of long-term interactions among customers and service providers, superior technology is not a sufficient factor for customers to switch shipping carriers [5]. Even though some share the belief that technology related solutions to customer relationship management (CRM) efforts are the panacea for customer satisfaction and retention, studies have found that such efforts are not always successful [6]. Speier and Venkatesh [7] suggest that over 60% of sales force automation projects fail to show measurable results and may actually harm the firms. Ruquet [6] argued that CRM efforts to enhance customer satisfaction are bound to fail unless there is a change in the organisational culture and an appreciation of the need to share information and coordinate marketing efforts across the carriers' departments. Unfortunately, relatively little is known about the complexities in the CRM process since there is an absence of field-based empirical research.

The main goal of this paper then is to examine the role that technology and other factors play in customer satisfaction. Specifically, the objective is to assess the importance that customers place on various tangible factors (e.g., use of latest equipment and technology) and intangible factors (e.g., settling claims quickly, efficiency in problem handling) of service, how the service providers are rated on those factors, and their relationship to service satisfaction. These factors are clearly linked to the encounters that customers experience with the carrier's personnel, their technology and the

combination of these two. The study was done in a B2B environment with the Ocean Freight Shipping industry serving as the focal point. Since not much work has been done in this area in the shipping industry, our paper fills an important research gap.

The paper will begin by discussing CRM and its connections to technology and service encounters. Next, we examine the importance of quality and satisfaction in the service sector. Following that background discussion, we explore the role that service encounters and technology play in driving customer satisfaction. Subsequently, we present the research method and results. Lastly, the paper concludes with implications for managing customer relationships in the shipping industry.

2 CRM, technology and service encounters

CRM (Customer Relationship Management) has become a contemporary mantra in the way businesses recognise its importance. CRM has no clear paradigm as is evident by the many ways it is conceptualised [8]. Kleindl [9] views CRM systems as a combination of software and management practices to serve the customer from order placement through delivery and after-sales service. It must be noted that CRM involves a two-way flow of information and energy between the firm and its customers. As such, service encounters cannot be separated from CRM systems if such systems are designed properly. Zikmund, McLeod and Gilbert [10] define CRM as a 'process to compile information that increases understanding of how to manage an organisation's relationships with its customers' and as a 'business strategy that uses information technology to provide an enterprise with a comprehensive, reliable and integrated view of its customer base so that all processes and customer interactions help maintain and expand mutually beneficial relationships'. However, thinking about CRM in primarily technological terms is a mistake since CRM involves the integration of many resources in the firm. Since these relationships involve trust and commitment, personal contacts in the form of service encounters are also essential. Trust is an integral part of the shipping industry and CRM technology solutions alone are not likely to create the bonding between shipping lines and clients.

CRM is based on the premise that developing a relationship with customers creates loyalty; loyal customers in turn provide more profits than those who are not loyal. Such a premise seems to have empirical and conceptual backing according to Reichheld and Teal [11] who argue that small improvements in customer retention rates can increase profits significantly. It is important to point out that according to Dowling [12], CRM has its origins in two places. In the USA, it was driven by advances in information technology and statistical algorithms which allowed for greater efficiencies and effectiveness in the use of call centres, websites, customer service and loyalty programs. In contrast, CRM emerged in Northern Europe and Scandinavia when marketing and sales departments tried to understand the nature and impact of long term relationships in B2B environments [12]. The goal in those countries was to understand the needs of business customers and how to give better value by providing superior benefits. For these B2B relationships, information technology was viewed as a support mechanism in CRM unlike the USA which viewed such technology as the driving force in developing customer relationships. Hence, service encounters were viewed as more critical in the European frame of mind. Perhaps, it is for this reason that the USA literature is rather sparse in its discussion on the use of technology in service encounters in B2B relationships such as those found in the shipping industry.

As a B2B sector, the shipping industry can use technology as an integral part of its CRM system. In particular, information technology in the form of the internet and business intelligence can enable shipping firms to focus on their customers more in depth and provide products and sales service at levels that are necessary to retain customers. The call centre can be another important element of CRM technology for shipping lines. Carriers can employ call centre technology to identify each incoming call and match it to the appropriate customer's record. An automated call distribution system can direct the calls to the proper department of the shipping line. One key in using CRM is to make sure that customisation and personalisation are integral to the carrier's marketing efforts [10]. Personalisation requires the firm to know the customer by name and to develop a more personal relationship. Customisation allows the shipping line to offer the customer a selection of service features that might be different from the ones offered to other customers. These service features are keyed to the shipper's specific needs. Johnson and Nilson [13] found that customisation is a definite driving force for customer satisfaction in the service sector.

In sum, implicit in the operation of CRM are three core aspects: market orientation, information technology and integration. Technology facilitates better interactions among customers and service personnel, makes call centres more efficient, helps sales staff close deals faster, discovers new customers, and simplifies marketing and sales processes. CRM, in turn, provides an integrated approach in managing important aspects of customer relationships and in adding value to the many dimensions involved in customer relationships [14].

3 Service quality and customer satisfaction

In today's competitive global environment, customer service is a crucial factor that determines a company's success. No wonder then that the services literature is dominated by papers which deal with customer service related concepts such as service quality and service satisfaction. Unfortunately, these papers do not explore how CRM methods are specifically connected to quality and satisfaction. The preponderance of evidence suggests that there is a clear link between service quality, service satisfaction, and customer loyalty, which is the key to business success [1,15–19]. Several papers in this area have also examined the causal links among the customer service constructs. Cronin, Brady, and Hult [20] synthesised the various research efforts and tested an empirical model involving the customer service constructs. According to this model, service quality is an antecedent of satisfaction, which, in turn, precedes behavioural intentions such as 'loyalty', 'saying positive things about the firm', 'recommending the firm to other consumers', and 'spending more with the firm'. Service quality is also found to have a direct link to behavioural intentions.

This evidence has been a driving force in the global business community's concern to take steps to improve service quality so as to gain a competitive edge and to improve the company's profitability. In the B2B industry in particular, this desire to improve service quality has become an obsession because, when compared to consumer markets, losing even a few customers could dramatically alter the company's profit picture. Some of the most common approaches that companies take to improve service quality include improving the attractiveness and décor of service provider's facilities, using latest

equipment and technology, meeting customer needs in a reasonable time, handling customer complaints promptly, providing correct information to the customer upon the first request itself, showing concern and attentiveness to customer needs, among others. Inherent in some of these approaches is the deployment of the latest technology to facilitate the process of delivering superior quality service and to help manage customer relationships [21–24]. For example, advances in database management systems are now making it possible for the various departments such as marketing, accounting, and manufacturing to share information on customers, orders, and inventory levels. Global positioning systems and cargo tracking technology are also making it possible to determine the precise location of customers and shipments. Joint portal technology, which tracks shipments from receipt at the shipper's loading dock through transport and delivery, is yet another technology that assists in logistics [25,26]. Pallatto [27] found that some shipping firms feel that shipping practices have not kept up with technological advances. Nonetheless, we neither know the level of importance that customers place on technology related factors and other factors nor their impact on service satisfaction.

Adding to our ambiguity of understanding is compelling literature suggesting that even though a firm may take a number of steps to improve service quality, not all customers want improved 'quality' in products and services given that some customers feel that there is no value in the so-called improvements [28,29]. It has also been discovered that about 70% of those customers, who switch service providers, cited indifferent attitudes of service provider's contact staff as the key reason, but not service delivery or price. Hannon [5] notes that some shippers indicate that technology from third parties cannot replace trusted shipper/carrier relationships. For example, the transportation operations manager for Fiskars Consumer Products stated that having an established relationship with a carrier may be considered first despite the advanced technologies offered by competing carriers [5].

4 The importance of service encounters and technology

Because services are intangible, personnel are required to perform various activities in the process of providing the service and technology is becoming integral in performing these services. Customers evaluate service quality and form satisfaction judgments - from the initial time the service is first provided to them to the final stages of delivery. Throughout the service delivery process, invariably the customer and one or more representatives of the service provider interact with each other. Personnel who interface with customers are the face of the firm for the customer. The interaction between these two parties is part of the service, which ultimately impacts customer satisfaction. This interaction is known as the 'service encounter'. It is during such encounters that technology may facilitate providing the service or even replace the human contact traditionally involved in providing the service. For instance, in the past a shipper may have called the carrier to inquire about the status of a bill of lading or the estimated time to reach the destination port. Now, shippers can consult the carrier's website and find a personalised record of their shipment including tracking and information on customs clearance.

Research has found that the perception of service encounters emerges as the most important determinant of customer satisfaction, and other patronage indicators [30]. A number of other research efforts have also confirmed that consumers' evaluation of the

service encounters has a strong impact on service satisfaction [31,32]. Therefore, technology must be seen in the context of these interactions and care must be exercised in substituting technology for the heretofore human attention given to the shipper by the carrier's personnel.

The salience of service encounters has been incorporated into the Service Marketing Triangle [33] and its extension known as the Pyramid Model [34–36] which places technology as a potential hub in marketing relationships. The Services Marketing Triangle Model conceptualises the interrelationship among three key constituents: customers, employees and the firm. The link involving 'customer-firm' represents 'external marketing' whereby the firm develops and executes a marketing mix to satisfy the customer. The customer-employee link is the one that is closely tied to service encounters since these are the moments of truth during which customers and employees interact. Customers derive satisfaction or dissatisfaction from these encounters. The link involving 'employees-firm' represents 'internal marketing' whereby employees are empowered to deliver satisfying services; this empowerment comes from training, incentives, and the proper treatment of personnel.

The Pyramid Model goes one step further in incorporating the role of technology among the three constituents since technology is viewed as a hub in the middle of this triangle that is connected to all the constituents [34]. With the inclusion of technology three new links arise (in addition to the three links cited above): company-technology-employees, company-technology-customers and customer-technology-employees. Technology can come in the form of advanced call centres, interactive voice response, automatic distribution system, websites for general information or specific information on a customer's orders, automated selling systems, among others.

This model recognises that the use of technology can cut across all encounters, either enhancing or detracting the customers' experiences and satisfaction with the service. Technology, therefore, can make employees more effective and efficient, yet there is likelihood that more distance will be created with the customer, ultimately affecting relationship building. It should be noted that the role that technology plays depends on the CRM system that is in place in the firm. If the CRM system is highly developed and integrated in the firm, technology will take on a more important role in service encounters. If the CRM system is not well developed, technology will play a lesser role. Moreover, if employees are not empowered with up-to-date technology, they will be unable to offer cutting-edge services that other firms may provide which can lead to dissatisfaction among both parties. Because shipping firms have varying levels of sophistication in their CRM systems, it is not possible to identify one model that describes the technology-personnel interfaces or boundaries. Ideally the firm should integrate all the triads; however, in practice this is often not the case. For this reason, we do not explore each triad of the Pyramidal Model in this research. [Our goal is to determine if technology is seen as superior to service encounter activities.]

In sum, services research supports a strong relationship among service encounters, service quality, and satisfaction. In turn, customers' service encounter experience may be positively impacted by the infusion of technology in the service delivery process. The key questions then are how important technology and other service related factors are to the customers and what is their relationship with service satisfaction? These questions are addressed in this paper.

5 Method

5.1 Sample and questionnaire administration

Two stages were used in this research for data collection. The first stage initially involved extensive personal interviews with shipping line executives of a major shipping line in Singapore which had agreed to assist in the development of this research. The executives of shipping line that participated in the interviews included top management, senior managers and department heads of various customer interfacing departments. A total of over a dozen individuals were involved. The outcomes of individual discussions were finally reviewed in a meeting with all these managers collectively. Similarly detailed individual discussions were held with a select number of five shipping managers from different customers' companies. From these discussions with a shipping line management and customers we identified important dimensions related to this study and items that best represented those items by content analysing the interviews. The measures used in this study thus were generated on the basis of this field work. These measures later became a part of the survey which was administered in the second phase.

In the second stage, data were collected from shipping managers of various organisations in Singapore who regularly use the services of ocean freight companies for their exporting requirements. A sample of 220 shipping managers participated in the study. Their names were randomly drawn from a list of all shippers, obtained from the same large shipping company which assisted in the first phase. While some of the shippers on the list represented customers of that shipping company, many were simply prospects and thus were customers of competing shipping lines. Skilled interviewers who had experience in conducting managerial interviews personally administered the survey. The companies that the shipping managers represented have the following profile: 41.2% of the organisations dealt with trading only, 17.5% dealt with manufacturing activities, and 26.3% had both trading and manufacturing activities. About 50% of the organisations were domestic, 18.4% foreign-owned and 31.6% joint ventures with a foreign partner. The annual turnover of the organisations varied from less than US\$10 million (for 49.1% of the companies) to over US\$25 million (for about 26%). The annual export freight expenses for these organisations ranged from less than US\$25,000 (for 25.7% of the companies) to over US\$100,000 (for 35.4%).

5.2 Measures

The questionnaire consisted of measures of service quality perceptions and satisfaction. First, a total of ten items were used to measure service quality perceptions. These include: 'informs promptly of any problems', 'has latest equipment and technology', 'efficient in complaint handling', 'continuously improves services', 'good on-time performance', 'effectiveness of tracking system', 'on-time pickups and deliveries', 'prompt availability of delivery status information', 'has quality certification', and 'settles claims quickly'. For each statement, subjects were asked to indicate the importance for shipping companies to possess that factor. This was measured on a 7-point scale, where a score of '1' represented least important and a score of '7' represented 'most important'. Next, subjects were asked to evaluate their most preferred shipping line on the same ten statements on a 7-point scale where a '1' represented 'excellent' and a score of '1'

represented 'very poor'. Finally, overall service satisfaction was also measured on a 7-point scale ('1' = very poor and '7' = excellent).

6 Results and discussion

We first examined the dimensionality and reliability of the ten-item evaluation scale and the ten-item importance rating scale. For each scale, a one-factor model explained about 50% of the total variance. Scale reliability values, as measured by coefficient alpha, were .89 for the evaluation scale and .87 for the importance scale. Reliability values above .7 are considered acceptable [37]. The ten-item evaluation scale also exhibited significant ($p < .05$) but not perfect correlations (i.e., $\text{corr.} < 1$) with other scales that measured perceptions of shipping lines' interfacing departments. This result establishes the evaluation scale's discriminant validity.

Considering our study purpose, we then performed item-level analysis. Table 1 and Figure 1 show the importance and evaluation mean scores for the ten service quality perception statements. It is clear that shipping lines are rated highly on 'having latest equipment and technology' (HLE) (mean = 5.57), 'prompt delivery of service' (PDS) (mean = 5.57), and 'continually improves service' (CIM) (mean = 5.47). But, 'having latest equipment and technology' is not that important (mean = 6.08) as compared to 'on-time performance' (OTP) (mean = 6.27) and 'efficiency in complaint handling' (ECH) (mean = 6.23). Based on the importance and evaluation mean scores as shown in Figure 1, it is clear that large differences in service quality perceptions exist for 'efficiency in complaint handling' (mean diff. = .97), 'continuously improves services' (mean diff. = .85), 'good on-time performance' (mean diff. = .86), and 'settles complaints quickly' (SCQ) (mean diff. = 1.33). While customers considered these factors to be highly important, they rated shipping lines' performance on those factors as relatively weak. On the other hand, the difference is much smaller for factors such as 'having latest equipment and technology' (mean diff. = .51) and 'having latest quality certification' (ISO) (mean diff. = .56).

Next, for each service quality statement, those customers whose evaluation scores are above the statement mean (as shown in Table 1) are categorised into the 'favourable perceptions' group where as customers whose evaluation scores are below the statement mean are categorised into the 'unfavourable perceptions' group. For example, for the statement 'having latest equipment and technology', customers whose evaluation of the shipping line is above 6.08 are considered to have a favourable perception of the shipping line on that statement. In contrast, customers whose evaluation is below 6.08 are considered to have an unfavourable perception of the shipping line on that statement ('having latest equipment and technology'). For the favourable and unfavourable perception groups, the overall service satisfaction scores were then computed. Table 2 and Figure 2 show the results. Clearly, overall service satisfaction mean is the highest for those customers who had a favourable perception of shipping lines on 'on-time performance' (mean=6.30), 'effectiveness of tracking system' (ETS) (mean = 6.29), 'on-time pickups and deliveries' (OPD) (mean = 6.30), and 'efficient in complaint handling' (mean = 6.26). For 'having latest equipment and technology' and 'has quality certification', the mean service satisfaction scores are relatively lower for the favourable perception groups. Further, for these two statements, the difference in mean service satisfaction scores for the favourable perception group and unfavourable perception group is statistically insignificant ($p > .05$).

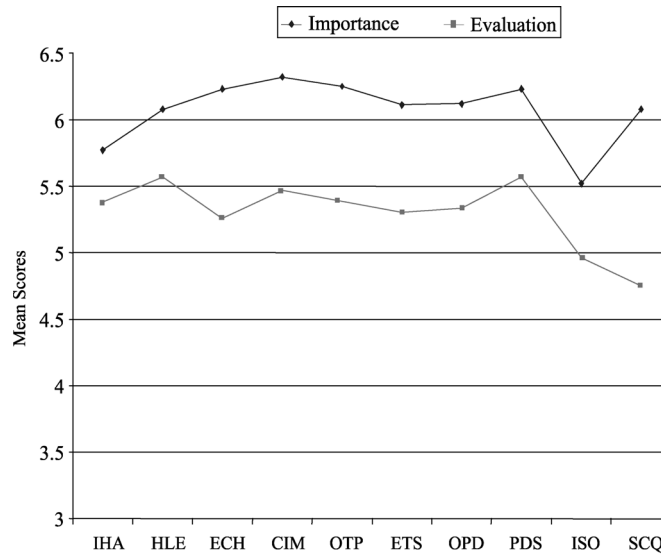
Table 1 Service quality ratings of ocean freight shipping lines

<i>Item Description</i>	<i>Importance Mean</i>	<i>Evaluation Mean</i>	<i>Difference Score</i>
1 Informs promptly of any problems (IHA)	5.77	5.38	0.39
2 Has latest equipment / technology / facilities (HLE)	6.08	5.57	0.51
3 Efficient in complaint handling (ECH)	6.23	5.26	0.97
4 Continually improves services (CIM)	6.32	5.47	0.85
5 Good on-time performance (OTP)	6.25	5.39	0.86
6 Effectiveness of tracking system (ETS)	6.11	5.30	0.81
7 On-time pickups and deliveries (OPD)	6.12	5.33	0.79
8 Prompt availability of delivery status information (PDS)	6.23	5.57	0.66
9 Has quality certification (ISO 9K) (ISO)	5.52	4.96	0.56
10 Settles claims quickly (SCQ)	6.08	4.75	1.33

Notes:

- 1 Importance ratings are obtained using 7-point scales (1 = least important and 7 = most important)
- 2 Evaluation ratings are obtained using 7-point scales (1 = very poor and 7 = excellent)
- 3 The difference mean scores are obtained by subtracting evaluation mean from importance mean. These mean scores must be interpreted with caution, as they are different from the traditional gap scores that compare evaluation means with expectation mean scores

Figure 1 Ratings of ocean freight shipping lines



Notes:

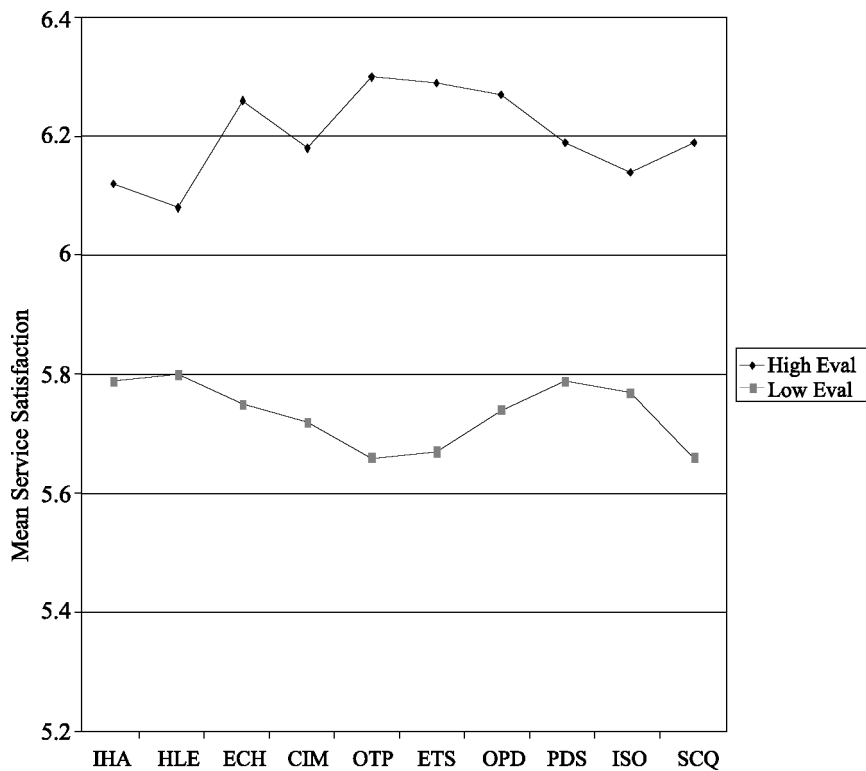
- 1 Importance ratings are obtained using 7-point scales (1 = least important and 7 = most important)
- 2 Evaluation ratings are obtained using 7-point scales (1 = excellent and 7 = very poor)

Table 2 Mean service satisfaction for high and low evaluation groups

Item Description	Mean Service Satisfaction		
	High Evaluation Group	Low Evaluation Group	p-value
1 Informs promptly of any problems (IHA)	6.12	5.79	.02
2 Has latest equipment / technology / facilities (HLE)	6.08	5.80	.07
3 Efficient in complaint handling (ECH)	6.26	5.75	.00
4 Continually improves services (CIM)	6.18	5.72	.00
5 Good on-time performance (OTP)	6.30	5.66	.00
6 Effectiveness of tracking system (ETS)	6.29	5.67	.00
7 On-time pickups and deliveries (OPD)	6.27	5.74	.00
8 Prompt availability of delivery status information (PDS)	6.19	5.79	.01
9 Has quality certification (ISO 9K) (ISO)	6.14	5.77	.07
10 Settles claims quickly (SCQ)	6.19	5.66	.00

Note: Service satisfaction ratings are obtained using 7-point scales (1 = very poor and 7 = excellent).

Figure 2 Mean service satisfaction for high and low evaluation groups



In sum, while the factor 'has latest equipment and technology' received the most favourable evaluation (mean = 5.57), customers of shipping lines do not consider it to be as important as 'efficient in complaint handling', 'continuously improves services', 'good on-time performance', and 'prompt availability of delivery status information'. For 'settles claims quickly', even though the importance mean is not as high as that of the other factors, the gap in service quality (i.e., difference in importance and evaluation means) is the largest because customers had a relatively low evaluation of shipping companies on this factor. For tangible factors such as 'has latest equipment and technology' and 'has quality certification', whether consumers have either favourable or unfavourable evaluations appears to have no impact on service satisfaction. So, the perception of having latest technology is not sufficient by itself. It looks as if shipping companies have not been able to use technology effectively in settling claims, be efficient in complaint handling, or have the ability to provide on-time pickup and delivery of shipments.

Even for the most preferred shipping lines for which customers provided the data, the service gap (i.e., difference in importance and evaluation means) in these areas is quite glaring. Evidently, customers want to see how the use of technology translates into an offering of superior service where it matters the most, e.g., in enhancing on-time performance, making delivery status information promptly, settling claims quickly, etc. After all, shippers are more interested in seeing how quickly and efficiently their merchandise is shipped, how well they can track shipments, and the speed with which complaints are handled.

7 Implications and conclusions

The results show that while technology is clearly an essential and productive tool in satisfying customers, there are also other important issues that lie beneath the surface. Even though shippers today are demanding new technologies to give them more detailed information about their shipments [5,21], the relationship with the carrier continues to be important. In particular the interactions that customers have with personnel at the shipping companies such as complaint handling and settling claims may be as important if not more so than the technology, which is used for other aspects of the service. These service encounters, often on a person-to-person basis, are essential in creating and maintaining satisfaction for customers in ocean freight shipping. In fact, one study using decision tree analysis by Durvasula, Lysonski and Mehta [23] on the interfaces in ocean freight shipping lines found that sales representatives and problem handling were the most important linkages to satisfaction.

The absence of a significant difference between the high and low satisfaction groups regarding the presence of latest technology and facilities was not a-priori expected. While some literature [1,15–19] indicates that technology did not improve satisfaction, other literature suggests the opposite [5,28,29]. It is likely that the lack of a relationship in the present study was due to the variation in the level and complexity of the technology used by shipping firms. Shippers are more likely to be dissatisfied with technology if it is difficult to use and especially if it supplants human contact that had always been effective in the past. An example from the credit card industry may illuminate this understanding. Some consumers have complained about the automated telephone technology implemented by some firms which has replaced direct contact with call centre personnel.

These customers experienced the automated telephone technology as less expedient in the resolution of a problem while other customers found the technology to be helpful with routine issues. In sum, there was not a clear cut relationship between the installation of technology and customer satisfaction. In the case of ocean freight shipping, unless the service technology is implemented carefully and attuned to the needs of the customer, some customers will not be satisfied. It is likely that customer satisfaction/dissatisfaction is driven by much more than just technology. The results of this study seem to give this idea credence.

The results of this study enable us to better understand the role of technology vis-a-vis SERVQUAL [38], the often used service quality scale. SERVQUAL works well in measuring broad components of service yet it does not focus specifically on technology. Of the five dimensions used to measure quality in SERVQUAL, three dimensions deal directly with the role of personnel in delivering the service. These three dimensions are: responsiveness (i.e., willingness to help customers and provide prompt service), assurance (i.e., knowledge and courtesy of employees and their ability to convey trust and confidence) and empathy (i.e., caring, individualised attention provided to the customer). The remaining two dimensions (i.e., reliability and tangibles) focus more on objective qualities of the service in which technology can play a pivotal role in perceptions of quality. In contrast, the other three dimensions involve direct contact with service personnel in the form of various encounters. Such encounters may allow for the use of technology, but technology becomes only an assistant here and cannot replace the integral role of the employee. It is also crucial to point out that internal marketing gives incentives to the personnel to provide quality service either by the use of technology or human interactions.

As technology continues to make inroads into the ocean freight shipping industry, more and more aspects of the service are likely to be delivered by technology rather than people. As such, firms must be vigilant against separating themselves too much from the customers they serve. As more advanced and sophisticated CRM systems are implemented, firms must always remember the bromide 'without the customer, we would not be in business'. CRM systems must be highly responsive to customer needs or they risk alienating customers. Relationship marketing dictates that firms strive to develop long term relationships with customers since these relationships enhance profitability. There is emotional value in service encounters that cannot be replaced with advanced technology [39]. The contact between the personnel representing the carrier and the customer represents a service encounter that is likely to influence these long term relationships. A customer contact audit can be used to determine where technology can be integrated into the multiple contacts that firms have with customers. A customer contact audit is a flowchart of the points of interaction between customer and service provider [40]. Human involvement may be essential in some of the contacts so as to establish strong relationships with the customer.

One possible application of technology in the shipping industry is the creation of an effective information system that becomes part of the CRM system. Shipping companies could implement an enterprise-wide resource planning (ERP) system or even an information system that monitors all transactions and inquiries and retrieves the information fast. Such an information system facilitates sharing of information across the various interfacing departments. For example, information on customers, shipments, complaints, complaint resolution, and potential responses to FAQs can be made

accessible to various departments (e.g., Claims, Documentation, Marketing) of the shipping companies for a more organised way of managing customer relationships. In turn, these departments can provide prompt service, without having to give the shippers the run-around. Another potential application of latest technology lies in creating a state of the art call centre for responding to inquiries, handling of complaints, etc. In fact, customers consider efficiency in complaint handling and prompt availability of delivery status information as crucial factors for improving service quality. Creation of a geographical information system and implementation of global positioning system tools can also make tracking of shipments more effective.

A major consequence of technology's transforming role in the services sector is a growth in self-service technologies that require customers to interact with technology-based system rather than company personnel [35,41–43]. Yet at the same time Parasuraman [42] cites evidence of increasing customer frustration in dealing with technology-based systems. Bitner, Brown and Meuter [34] note the absence of research investigating the role of technology in service encounters. Clearly, more investigation is needed on how the deployment of technology is being perceived and its impact on relationship building with customers in the ocean freight shipping industry.

As the logistics system in ocean freight shipping continues to be transformed by technology, shippers are looking for one-stop shopping for their shipping needs [5]. Moreover, Hastings [44] envisions consolidation in the shipping industry with the merging of different shipping functions into a single integrated process. Although technology will be at the core of these changes, the human dimension will continue to be an integral aspect of this process. Future research needs to examine changing customer needs and how these can be satisfied with technology without losing sight of the customer.

In the end, what matters more is not the display of technology, but how technology is put to practical use for delivering superior quality service. Technology therefore, must be seen in its proper context as an assistant in creating satisfaction for the shipper but not the sole source of satisfaction. In the increasingly competitive global environment for the shipping industry, the extra edge that technology provides in giving superior quality service goes a long way in enhancing customer satisfaction and improving the corporate bottom line.

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