SUCCESSFUL CUSTOMER RELATIONSHIP MANAGEMENT IN HOTEL INDUSTRY: A MULTILEVEL ANALYSIS

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Successful customer relationship management (CRM) depend on strategic skills and reflect the sharpness of long-term cooperation and organizational values. The purpose of the study will explore operational and analytical implementation of information system (IS) may lead to market strategy and CRM performances of a hotel. A CRM performance model was formulated by ISs success perspective in the study, and we collected international tourism hotel samples by mailing questionnaire survey in Taiwan. We mailed 232 questionnaires to hotels, of which 151 returned completed questionnaires and we test the model and hypotheses by structural equation modeling (SEM) and multilevel analysis for our research. As this result of the study, the role of IS will transfer from the transaction process system to a strategic supporting role, collecting information is important process to hoteliers, staffs prepare to personalize service for a guest in advance when they have more information about guest. And the capability of leveraging analytics in operations can be a critical differentiator for hotel to stay competitive. As a business discipline, this research could be directed toward helping managers and practitioners decide CRM implementation priority, and improve both business processes and competitiveness through the deployment of a CRM system.

Keywords: Customer relationship management; information systems; hotel.

2010 Mathematics Subject Classification: 62B10, 94A17, 94A05

1. Introduction

Information technology is the facilitation point for cross-functional technology solutions and a catalyst for business process improvements within a company. Business process improvement that ensures efficiency and excellence of enterprise operations is also considered in the conceptual framework of customer relationship management (CRM).1–7 CRM can achieve a competitive advantage in customer service and
ultimately increase profit levels for the hotel industry. Previous research has stated that CRM provides analytical, operational, and directional capabilities: the analytical capabilities enhance performance maximization from the customer relationship; however, it is not yet clearly understood why and how the CRM function becomes successful while others fail.

From a hotel’s operational perspective, customer information is collected through a whole range of touch points, such as contact centers, the contact management system, mail, fax, the sales force, the Web, etc. Such customer information is then stored and organized in a customer-centric database, which is made available to all employees who interact with the customers. Ideally, a typical operational CRM is the contact center, which provides information to serve the guests. The contact center provides complete and comprehensive tracking information relating to any contact with their customers. However, most hotels lack in identifying the most profitable ways to build and maintain a loyal customer relationship. The aim of this study is to explore how the functional integration of systems affects CRM performance.

Previous research has argued that operational capabilities cut across the customer value process and that direction capabilities depend on strategic skills and reflect the sharpness of long-term cooperation and organizational values that consist in specifying a suitable business. Analytical CRM refers to the firm-level processes involved in analyzing customers and the market. Some researchers have argued that small and large hotels significantly differ in some specific motives; significantly, the CRM in large hotels is greatly driven by a need to streamline and integrate what fragmented. Likewise, hoteliers reflect on new business processes to achieve more effective and closer interactions with customers. Thus, the aims of this study were to explain how ISs affect CRM performance through service process fit (SPF).

There are three levels of success for an information system (IS). Previous research has indicated that CRM can be implemented by employees within a firm on three levels: (1) firm or organization, (2) function or process, and (3) individual. The effective performance of the operational function has strong consequences for organizations. The technologies underpinning the analytical CRM system include CRM portals, data warehouses, and predictive and analytical engines; the analytical function may be fulfilled by separate systems, in which CRM involves the acquisition, analysis, and use of knowledge of customers to sell more goods or services and to do so more efficiently.

The research goals of this study were to investigate through multilevel analysis how a hotel uses ISs to affect CRM performance and to discuss how the operational and analytical implementation of an IS may enhance the CRM performance of a hotel. In this study, we formulate the CRM performance model by the IS’s success perspective. We collected international tourism hotel samples by a mailed questionnaire survey in Taiwan and tested the model and hypotheses by structural equation modeling (SEM) and multilevel analysis. This paper begins with the motivation for the study. Section 2 describes the theoretical background of the study,
followed by a review of previous research in Sec. 3. The research design is then presented in Sec. 4. Finally, the research findings and conclusions are reported in Secs. 5 and 6, respectively.

2. Theoretical Background and Literature Review

2.1. IS success

DeLone and McLean\textsuperscript{25–27} have taken six major categories of measures of IS success, which are seen to form an integrated whole. Their comprehensive review of IS success measures makes two important contributions to the understanding of IS success. First, it postulates a scheme for classifying a multitude of IS success measures into six aspects: system quality, information quality (IQ), system use, individual impact, organizational impact, and user satisfaction. Second, it suggests a model of “temporal and causal” interdependencies between these categories. This model can be used to relate and evaluate reported studies of IS success by focusing on the component measures.

Rai et al.\textsuperscript{28} viewed perceived usefulness as being related to individual impact and tested the DeLone and McLean model.\textsuperscript{25} Sabherwal et al.\textsuperscript{29} explained the inter-relationships among four constructs representing the success of a specific IS and the relationships of these IS success constructs with four user-related constructs and two constructs representing the context-based meta-analysis. They pointed out the importance of user-related and contextual attributes in IS success.

CRM is an enterprise-wide and customer-centric business activity that must be built around the customer. It is a continuous effort that requires redesigning core business processes starting from the customer perspective and involving customer feedback.\textsuperscript{12} CRM can achieve a competitive advantage in customer management and ultimately increase profit levels for the hotel industry.\textsuperscript{11,30} Previous studies have focused on components of CRM strategy, such as the link between satisfaction and business performance, the link between customer loyalty and performance,\textsuperscript{30} customer performance heterogeneity\textsuperscript{31} and customer loyalty programs.

From an IS success perspective, business process improvement that assures efficiency and excellence of enterprise operations is also considered in the conceptual framework of CRM\textsuperscript{7,32}; that is, new business processes are required to achieve more effective and closer interactions with customers. Many organizations may expect a substantial payback, increased revenue, reduced cost, loyal customers, real-time customer information, and satisfied CRM system users.\textsuperscript{23,33–35} Because of the improvements, firms will consistently make efforts to maintain customer relationship, and service innovation will be developed through the CRM strategy.

2.2. IS application in the hotel industry

A property management system (PMS) helps manage all hotel activities and their interactions.\textsuperscript{8} Computerized guest-history systems for hotels are a technological
alternative to the cumbersome, hand-kept method of maintaining Rolodex files for personalized service.\textsuperscript{36-39} The systems are designed to store information such as the guest’s address, number of visits, preferred room type, and credit information. The guest’s preferences can be verified at the time the reservation is made, making the guest feel special and ensuring that the room with the desired amenities is reserved. The system can also be an excellent marketing tool because it can generate mailing lists, thank you notes, and promotional information.

In addition, a revenue system and a yield management system will help managers of hotels to segment their customers\textsuperscript{40,41} and develop a pricing strategy. Every interaction between the employee and the customer is an opportunity to refine the knowledge about her or him and to further build a relationship. Hotel managers claim that the major benefits of using a PMS are increased efficiency and accuracy of internal information transmission, savings on the costs of paperwork and information-processing labor, and increased effectiveness of management, especially in terms of cash, account, stock, and yield management.

A lot of the customer’s requests are received during the reservation period. Customer requests are the collective outcome of the customer’s perception and evaluation of and psychological reaction to the consumption experience of a product or service.\textsuperscript{38} The front stage includes all operational tasks and activities\textsuperscript{42} that involve direct customer interaction, such as the process of checking-in a guest in a hotel. Leveraging business intelligence to enhance business operations has become a top priority in business strategies.\textsuperscript{43} The hotel top management’s commitment to customer orientation (CO) and to building long-term, mutually satisfying customer relationships is at the core of the CRM process.

3. Research Model

Hotels need to take into consideration many elements when implementing the CRM strategy in their operational process. From the perspective of IS success, the CO climate will affect a hotel’s SPF. The CRM performance is based on the IQ of the system that supports it. Hotels that were considering the concept of the CRM function formed the basis of the research model of this study, as depicted in Fig. 1.

3.1. Customer orientation

CO refers to the commitment of an organization to identify and satisfy customer concerns about the quality and timeliness of their orders as well as to meet their demands for new products and services.\textsuperscript{33,35} CO will conspicuously influence the service industries’ service process. However, different target segmentations are relevant for the hotel industry, for example, in lodging, group travelers versus individual flight travelers, etc.

Each hotel emphasized its interaction with the guest and the opportunity provided by the customer to refine the knowledge about her or him and further build a
relationship. Some hotels focus on group travelers and on channel contribution. On the other hand, if the hotel focuses on individual flight travelers, they will focus on the service provided to each guest and on understanding each guest’s needs to increase their profit; that is, hotels will set service standards to understand guest needs.

3.2. Service process fit

The SPF has been defined as a configuration of technologies through which service providers sense and respond to the dynamic and complex needs of customers using information technology. In the customer-information-centric environment of CRM, companies should analyze customers’ experiences and problems and then respond and support their needs accordingly. CRM must conform to the ever-changing needs of the customer based on integrated and reliable customer information. Moreover, a customer-focused hotel will analyze and store customer requests and use these data to develop marketing and service strategies. For example, potential accommodation guests will select a hotel and make requests when booking, which are recorded by the hotel staff in an IS. The hotel can then provide personalized service to these customers when they return for future services. This leads to H1.

Hypothesis 1. CO is positively associated with the SPF.

3.3. CRM performance

Performance is a multidimensional construct, and previous research has argued that this multidimensional construct consists of two broad measures: customer-satisfied performance (e.g., customer service loyalty) and finance-oriented performance (e.g., ROI). Based on the conceptualization of the CRM function, this study focused on
ISs applied to CRM activities in the travel industry, with the construct adapted from Roh et al.\textsuperscript{33} to suit the process fit after system implementation.

Piccoli et al.\textsuperscript{51} pointed out that the customer-established need for a product is the first stage of the customer service life cycle. O’Connor\textsuperscript{38} indicated that the majority of hotel websites collect extensive personal, demographic, and performance information from their online users and encourage them to surrender this information. Piccoli et al.\textsuperscript{51} validated a descriptive taxonomy of customer needs amenable to online fulfillment. As previously mentioned, a lot of the customer’s requests are made during the reservation period. Customer requests refer to the collective outcome of the customer’s perception and evaluation of and psychological reaction to their consumption experience of a product or service.

Every interaction between the customer and the hotel is an opportunity to refine the knowledge about the former to further the relationship.\textsuperscript{2} We argue that the SPF after ISs implementation helps firms to manage all activity interactions and increase CRM performance. This leads to H2.

**Hypothesis 2.** The process fit after system implementation in a hotel is positively associated with CRM performance.

3.4. **System support**

From an IS success perspective, CRM systems support all stages of the interaction with the customer from the order, through the delivery, to the after-sales service and use the rich database of customer information to manage the relationship with customers. A measure of the CRM system was measured by the performance of system, and the performance of system has been implemented by the firm.\textsuperscript{52,53} If the system has been implemented and adopted successfully, the firm is able to reap its benefits. CRM should be placed at the heart of the organization, and a holistic approach should be adopted because CRM reaches into many parts of the firm.\textsuperscript{32,54}

The service industry organizes its service process to set the standard of their service. The service process will lead employees to use ISs. In a customer-oriented hotel, the service process is conducted through employee worksheets; for example, before a guest checks in, the employee uses the guest history information to understand guest behavior, and after the guest checks out, the employee records the guest’s requests. The service process helps the employee prepare a worksheet for the guest in advance.

The service process interaction between the customer and the employee will remind the latter to use the IS. With the service process, guests will be able to provide feedback regarding their needs to the hotel. Thus, we develop H3, which is stated as follows.

**Hypothesis 3.** The process fit after system implementation in a hotel is positively associated with system support (SS).
3.5. **Customer IQ**

Customer information can be measured on different levels, including the semantic, technical, and efficiency levels. With customer information analytics, firms can begin to realize the value of their CRM implementation. Customer information analytics involves more than just factual information. It builds insight into customer behaviors, enabling businesses to take the correct action necessary in the ever-changing market environment.

The rapid advances in information and communication technology provide greater opportunities for today’s firms to establish, nurture, and sustain long-term relationships with their customers than ever before, and CRM requires perfect alignment with the ever-changing needs of customers based on integrated and reliable customer information. In the hotel industry, the staff use the IS to decrease their workload and the service cost. From DeLone and McLean’s perspective, linking by suggesting high quality of customer information will result in IS success; they also suggested that, to a large extent, this relationship is intuitive. Thus, H4 is stated as follows.

**Hypothesis 4.** Customer IQ is positively associated with SS.

ISs support a wide range of functionality for core business processes across the value chain. When the purpose of IT investments is to improve operational efficiency, many traditional appraisal techniques may be considered appropriate. Systems efficiency is an important and useful measure of CRM performance. Nielsen pointed out that SS has a positive significant path coefficient to customer relationship performance. When the purpose of IT investments is to improve operational efficiency, many traditional appraisal techniques may be considered appropriate. Thus, we develop H5, which is stated as follows.

**Hypothesis 5.** Systems support is positively associated with CRM performance.

3.6. **Functional implementation of systems**

CRM provides analytical, operational, and directional capabilities: the analytical capabilities aid performance maximization from the customer relationship, the operational capabilities influence the customer value process and the directional capabilities depend on strategic skills and reflect the efficacy of long-term cooperation and organizational values. Operational CRM consists in specifying a suitable and replicable business, and analytical CRM refers to the firm-level processes involved in analyzing customers and the market.

A process fit in corporate operations is necessary to make CRM activities consistent with the customer-oriented work process. From an operational view, information on customer problems indicates whether, and to what extent, fixed quality standards are met. It reflects the adequacy of these standards and can be used as a basis for altering the services offered or developing new service elements.
an important tool for creating climate for service by facilitating internal coordination and performance support for achieving organizational goals. It is thus essential for service providers to observe closely the nature and frequency of customer problems, thus, combining the functional knowledge into a conclusive customer service information process which enables management to use this information for quality improvement and control.

The customer information is transferred to the service ports, and unique strategic services will be provided by the hotel. For example, a receptionist can arrange a suitable and special room based on the reservation information, and a VIP guest can be upgraded according to his or her history information. Likewise, technological advances that produce information to support the decision-making process and those that help to improve operational performance are regarded as management-oriented technologies. Thus, we develop H6a, which is stated as follows.

**Hypothesis 6a.** Functional implementation moderates the effect of SPF on CRM performance.

Likewise, CRM technology applications link front office (e.g., front office) and back office (e.g., financial and human resources) functions with the hotel's customer touch points; ISs support automatic or semi-automatic execution of process instances, coordination between process activities and the communication between process actors systems can be evaluated automatically and may provide useful information regarding activity-related costs, queuing time of process.

Previous research has argued that SS will increase operational efficiency. PMS information is used to facilitate and support managerial decisions. Accordingly, ISs that tracks and analyzes customer behavior allows companies to easily identify the best customers and focus marketing efforts and reward those who are likely to buy often. Acquiring a better understanding of existing customers allows companies to interact, respond, and communicate more effectively to significantly improve retention rates. From an analytical perspective, hotels have begun to use their database to collect immense amounts of information on their customers’ needs and preferences; undoubtedly, customer profiles can be retrieved by employees from the sales and marketing departments via the IS support.

IS implementation success is stated in terms of the achievement of predetermined goals, which normally include multiple efficiency parameters, such as time, cost, and function, and it has a positive influence on SS. We argue that ISs could assist with the distribution of information across various departments of a hotel and between different levels of staff. The collection, analysis, and storage of readily accessible information have become a powerful tool that presents junior staff in a hotel with an opportunity to assume responsibility for making on-the-spot decisions. Thus, H6b is tested based on the following hypotheses.

**Hypothesis 6b.** Functional implementation moderates the effect of SS on CRM performance.
4. Research Methodology

4.1. Data collection and sample characteristics

CRM should be at the core of the organization, and a holistic approach should be adopted because CRM reaches into many aspects of the business. We consider the firm’s use of a centralized customer database as one of the success factors for CRM; that is, each division of the firm can share and use the information in the database to serve their guest, and this service procedure will influence CRM performance.

A total of 2629 hotels were identified from the Tourism Bureau of Transportation and Communication,\(^7^0\) including hotels (97.2%) and international tourist hotels (2.8%). However, according to the purpose of this study, we identified those hotels that have implemented and are operating PMSs, reservation systems, or guest history systems. These systems include the functions of e-mail response, reservation center management, guest history systems, business intelligence, personalization, sales force automation, and customer profiling/segmentation, among others. A total of 287 hotels were found to have introduced ISs for customer service. Additionally, each of these hotels has been using the system for more than three years.\(^7^0\) Thus, we randomly selected 58 of the hotels for our sample as they use ISs as CRM systems. We mailed four survey questionnaires to each hotel, addressed to their reservation, front office, sales and marketing, and housekeeping departments.

Further, we mailed the research questionnaire to the hotel managers in cases where they could be identified. In other cases, where “manager” did not appear as a professional title, we followed the tailored design method,\(^7^1\) confirming the key person responsible for the CRM activities of the hotel and inviting them in advance to be participants in the survey. In total, we mailed 232 (58*4) questionnaires to hotels, of which 151 were returned as completed questionnaires (return rate of 65.1%). The sample is described in Table 1.

<table>
<thead>
<tr>
<th>Item</th>
<th>Total</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Department (Functional)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reservation (Operational)</td>
<td>35</td>
<td>23.2</td>
</tr>
<tr>
<td>Front office (Operational)</td>
<td>37</td>
<td>25.5</td>
</tr>
<tr>
<td>Sales/Marketing (Analytic)</td>
<td>37</td>
<td>25.5</td>
</tr>
<tr>
<td>Housekeeping (Collaborative)</td>
<td>42</td>
<td>25.8</td>
</tr>
<tr>
<td>Rooms of Hotel</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 200</td>
<td>48</td>
<td>31.8</td>
</tr>
<tr>
<td>200–400</td>
<td>67</td>
<td>44.4</td>
</tr>
<tr>
<td>Over 400</td>
<td>36</td>
<td>23.8</td>
</tr>
<tr>
<td>Job title</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Supervisor</td>
<td>19</td>
<td>18.9</td>
</tr>
<tr>
<td>Asst. Manager</td>
<td>62</td>
<td>41.1</td>
</tr>
<tr>
<td>Management</td>
<td>70</td>
<td>40.0</td>
</tr>
</tbody>
</table>
4.2. Measures

We first conducted literature reviews on related topics to examine the external validity of our research model. We then developed the questionnaire items based on the literature. The measures used to operationalize the constructs in the research model were mainly adopted from some of the related studies conducted in the past, with minor wording changes tailored to the interviewees. All the items were translated into Chinese with modification by the authors, a MIS professor, and a Tourism professor who had an average of five years of actual experience in related field. This resulted in the identification of 18 potential research items. These scales are summarized in Table 2 with their related literature. The different opinions are indicated by the numbers. 1: Strongly disagree, 2: disagree to some extent, 3: uncertain, 4: agree to some extent, 5: strongly agree.

<table>
<thead>
<tr>
<th>Table 2. Scale development.</th>
</tr>
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<tbody>
<tr>
<td><strong>Factor</strong></td>
</tr>
<tr>
<td>Customer</td>
</tr>
<tr>
<td>Orientation</td>
</tr>
<tr>
<td>(CO)</td>
</tr>
<tr>
<td>Service Process Fit</td>
</tr>
<tr>
<td>(SPF)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Information</td>
</tr>
<tr>
<td>Quality</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>System Support</td>
</tr>
<tr>
<td>(SS)</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Customer Relationship</td>
</tr>
<tr>
<td>Management</td>
</tr>
<tr>
<td>Performance</td>
</tr>
<tr>
<td>(RMP)</td>
</tr>
</tbody>
</table>
5. Results

5.1. Tests of the measuring scales

Internal consistency reliability is the accuracy or precision of a measuring instrument, which is the extent of unidimensionality, i.e., the detailed items (questions) measure the same thing. The internal consistency reliability was assessed by calculating Cronbach’s alpha values.

In the study, the internal consistency (Cronbach’s alpha) of the construct over 0.9, which were above the acceptable threshold. These estimates of composite reliability of latent factors range from 0.70 to 0.87, which are all well above the threshold of 0.70 and thus acceptable construct reliability is implied (as shown in Table 3). And, result also shows that square roots of all AVE estimates for each construct are greater than interconstruct correlations, thus discriminant validity is supported.

Because multi-item constructs measure each variable, factor analysis with varimax was employed to check unidimensionality among the items. We used confirmatory factor analysis shown in Table 4 with LISREL to examine the convergent validity of each construct; the range for factor loadings was 0.681–0.866.

5.2. Test of the structural model

SEM was performed to test the hypothesized model presented in Fig. 1. We used the LISREL 8.50 software for this analysis. The overall goodness-of-fit was assessed in terms of the following six common model fit measures: Our finding that GFI is 0.90, AGFI is 0.87, RMR is 0.05, RMSEA is 0.049, PNFI is 0.76, and PGFI is 0.68. The direct model shows an acceptable fit except Chi-square and CFI, but the full model appeared to be superior to the direct model in explaining CRM. As presented in Fig. 2, the results of this hypothesized full CRM performance model indicate a good fit of the model, and the findings provide meaningful support for research hypotheses. Results for hypotheses testing through structural model estimation are summarized in Table 5. Among these hypotheses, five are fully supported.

Table 3. Reliability, correlation coefficients, and AVE results.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>S.D.</th>
<th>Cronbach’s alpha</th>
<th>Composite reliability</th>
<th>AVE</th>
<th>IQ</th>
<th>SS</th>
<th>CRMP</th>
<th>CO</th>
<th>SPF</th>
</tr>
</thead>
<tbody>
<tr>
<td>IQ</td>
<td>4.3064</td>
<td>0.6729</td>
<td>0.9390</td>
<td>0.939</td>
<td>0.65</td>
<td>0.81</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SS</td>
<td>3.9660</td>
<td>0.7999</td>
<td>0.9403</td>
<td>0.940</td>
<td>0.67</td>
<td>0.74</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CRMP</td>
<td>4.0702</td>
<td>0.7646</td>
<td>0.9386</td>
<td>0.938</td>
<td>0.67</td>
<td>0.52</td>
<td>0.53</td>
<td>0.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CO</td>
<td>4.1219</td>
<td>0.7561</td>
<td>0.9364</td>
<td>0.936</td>
<td>0.52</td>
<td>0.39</td>
<td>0.39</td>
<td>0.22</td>
<td>0.72</td>
<td></td>
</tr>
<tr>
<td>SPF</td>
<td>4.2383</td>
<td>0.8182</td>
<td>0.9197</td>
<td>0.919</td>
<td>0.68</td>
<td>0.38</td>
<td>0.38</td>
<td>0.20</td>
<td>0.55</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Notes:
- a. The main diagonal shows the square root of the AVE (averaged variance extracted).
- b. Significance at $p < 0.05$ level is shown in bold.
- c. IQ stands for information quality, SS for system support, CRMP for customer relationship management performance, CO for customer orientation, SPF for service process fit.
Table 4. Confirmatory factor analysis.

<table>
<thead>
<tr>
<th>Constructs variables</th>
<th>CRMP</th>
<th>SPF</th>
<th>SS</th>
<th>CO</th>
<th>IQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRMP1</td>
<td>0.785</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>CRMP2</td>
<td>0.712</td>
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<td></td>
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<tr>
<td>CRMP3</td>
<td>0.866</td>
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<tr>
<td>CRMP4</td>
<td>0.845</td>
<td></td>
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</tr>
<tr>
<td>SPF1</td>
<td>0.785</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SPF2</td>
<td>0.845</td>
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<tr>
<td>SPF3</td>
<td>0.788</td>
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<td></td>
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</tr>
<tr>
<td>SS1</td>
<td>0.744</td>
<td></td>
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<tr>
<td>SS2</td>
<td>0.691</td>
<td></td>
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<tr>
<td>SS3</td>
<td>0.754</td>
<td></td>
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<tr>
<td>SS4</td>
<td>0.773</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>CO1</td>
<td>0.717</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>CO2</td>
<td>0.835</td>
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</tr>
<tr>
<td>CO3</td>
<td>0.790</td>
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<td></td>
</tr>
<tr>
<td>IQ1</td>
<td>0.822</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>IQ2</td>
<td>0.705</td>
<td></td>
<td></td>
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<td>IQ3</td>
<td>0.683</td>
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<td>IQ4</td>
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12.23* 2.25**

GFI= 0.90, AGFI= 0.87, RMR= 0.05, RMSEA= 0.049, PNFI= 0.76, PGFI= 0.68.

Fig. 2. Structural equation model with path estimates.
As our analysis, CO is positively associated with the SPF. Compared with Ref. 46, SPF is an important mediating role related to CRM performance. That is, a customer-oriented hotel will analyze and store their customer requests, and integrate them to service process by using these data to develop marketing and service strategies. The hotel can then provide a personalized service to their customers when they return for future services. Service process interactions between customers and hotels employees will prompt the latter to use the available IS. Customer-focused employees are those who consider valuing the customer to be their primary work goal.

In Hypothesis 2, the process fit after system implementation of a travel agent is positively associated with CRM performance. Information technology changes very quickly and hotels make use of information and tools in order to provide a competitive advantage. Hotels should organize their service delivery using ISs in order to improve their service standard. Compared with Ref. 33, this study has the same result. The SPF will affect the performance of CRM. That is, customers can inform the hotel of their needs, and employees of hotels can analyze their request and develop the appropriate CRM strategies.

Moreover, the process fit after system implementation of a firm is positively associated with SS in this study. Compared with previous research, the SPF after system implementation of a firm will affect customer relationship through purchasing, payment, and service. In the study, the SPF also significantly influence the SS.

In Hypothesis 4, IQ is positively associated with systems efficiency. The hotels are information-oriented business, and the Internet can provide companies with an arena to construct a rich and dynamic platform for information supply and exchange.

In Hypothesis 5, SS of CRM is positively associated with CRM performance. Roh et al. has discussed that the customer satisfaction will be a mediator between the systems efficiency and performance of CRM in their study. But in this study, a customer oriented industry, SS makes the staff to get guest information easily, and it is easier to serve customer, and lead to performance of CRM.

### 5.3. Multilevel analysis: Functional implementation

Functional implementation is regarded as group-level variables in this study, functional implementation should be aggregated from individual perceptions and treated
as a higher-level construct. The aggregation of individual perceptions can also imply significant differences in functional between units and significant agreement in perceptions within units. In this study, the construct was adopted three functions for each hotel in a qualified group is then averaged into a single score to represent the functional implementation. This study also justifies the aggregation of these both two group-level variable in section of data analyses.

The cross-level effects of on-line pricing were tested by HLM analyses, which allow both within- and between-group effects on an individual-level-dependent variable to be investigated through an iterative estimation process using individual- and group-level models. A within-group analysis (called a Level-1 analysis in HLM) was first employed to estimate intercept and slope parameters describing the relationship between individual-level predictors and focal individual-level-dependent variables within each group. The intercept and slope estimates obtained from within-group analysis were then specified as the dependent variables in between-group analysis (called a Level-2 analysis in HLM). The effect of group-level variables on focal individual-level-dependent variables can be examined by assigning them as predictors of the Level-1 intercept parameter, while the moderating effect of group-level variables on the relationship between individual-level predictors and focal individual-level dependent variables can be examined by assigning them as predictors of the Level-1 slope parameter.

We also calculated the intraclass correlation coefficient (ICC), which represents the decomposition of the total variance. The ICC is described as the proportion of between-group variance in a variable relative to its total variance; we followed an analytical strategy similar to that used in management research, with the CRM performance effects being explored at multiple levels, such as the functional implementation level and individual hotel district level, using a hierarchical linear model (HLM).

Three types of estimation difficulties are encountered when analyzing multilevel data: (1) aggregation bias, (2) estimation errors, and (2) heterogeneity of regression. Aggregation bias occurs when a variable has different meanings at different levels of analysis. Our concept of functional implementation effect latent variables by aggregating variables within three functions. HLM addresses the potential confounding of variable interpretation by decomposing the effects of variables at separate levels of analysis.

In the HLM analysis we modeled the randomly varying intercepts and slope coefficients, and estimated the following equations based on advertised website prices. The within-functional CRM performance (Level 1) model was as follows:

\[
(\text{CRM performance})_n = \beta_0 + \beta_1(\text{Service Process Fit})_{n-1} + \beta_2(\text{System Support})_{n-1} + \varepsilon_{ij},
\]

where \textit{CRM performance} represents the hotel referral (as an outcome variable), \(n\) is the functional implication.
The between-function (Level 2) models are as follows:

\[ \beta_{0j} = \gamma_{00} + \gamma_{01} Z_i + \mu_{0j}, \]

\[ \beta_{(\text{Service Process Fit})} = \gamma_{10} = r_{11} Z_i + \mu_{1j}, \]

\[ \beta_{(\text{System Support})} = \gamma_{20} + \gamma_{21} Z_i + \mu_{2j} \]

and

\[ \varepsilon_{ij} = i_i \sim N(0, \sigma^2), \]

\[ \begin{pmatrix} \mu_{0j} \\ \mu_{1j} \end{pmatrix} \sim N \left( \begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} \tau_{00} & \tau_{10} \\ \tau_{10} & \tau_{11} \end{pmatrix} \right). \]

HLM analysis provides three types of parameter estimates: (1) empirical Bayes’ or shrunken estimates of randomly varying Level-1 coefficients, (2) generalized least-squares estimates of the Level-2 coefficients, and (3) maximum likelihood estimates of the variance and covariance components. We hypothesized that CRM performance are influenced by a SPF and SS.

5.4. ICC

The ICC is described as the proportion of between-group variance in a variable relative to its total variance, Tables 6 and 7 present detailed results from the estimations of the HLM models. Our fully unconditional model indicates that the ICC was 31.4% to 38.8% for the CRM performance model. In other words, more than 31% of the variance in referral likelihood lay across functional implementation, and it is necessary to model this variation using an HLM approach when attempting to draw valid conclusions.

5.5. Intercept- and slopes-as-outcomes model

We now consider the variance within hotels through the functional-level variables of SPF and SS. Our intercept- and slopes-as-outcomes model (within-functional model) explained a substantial 64.35% of the variance in referral likelihood. We also found that both intercept and slopes still varied significantly across functional implementation. Results of the intercept-as-outcomes models estimation using HLM analysis are shown in Table 7. The residual variances in intercepts for a Level-2 model were statistically significant, which implies that other group-level variables not included in this study also affect CRM performance.

As predicted by H6a and H6b, Table 7 indicates that functional implementation moderates the SPF (\( \gamma_{01} = 1.431, p < 0.05 \)) had a significant and positive influence
on CRM performance. With the HLM analyses indicating that both the intercepts and slopes varied significantly across functional implementation. But, it is not significant that functional implementation moderates the effect of SS on the CRMP. As the result, the operational capabilities influence CRM performance by moderating the customer service process, and the analytic capabilities will reflect the efficacy of long-term investment for the future.

6. Conclusion and Implications

The results of the study provide reliable instruments for operationalizing the key constructs in the analysis of CRM performance and have some important implications for implementing CRM systems.

6.1. Implications for research

Overall, the findings of the study provide reliable instruments for operationalizing the key effect constructs in CRM performance analysis. From a theoretical perspective, as the result of this study implies, when fully and successfully implemented, a customer-driven and technology integrated service process management maximizes relationships and encompasses the hotel industry as a whole.

Our findings suggest that facets of IS success are helpful in explaining CRM performance in the hotel industry. Compared to prior research, our study argues that CRM performance is a widely deployed system mechanism in a variety of IS contexts. Our findings explore the SPF and the functional implementation factors that influence the CRM performance setting. Thus, another direction for future research is to examine how an operational or analytic function is useful in motivating a hotel to implement successful CRM.

6.2. Managerial implications

Our use of a structural equation model to test a theoretical model of CRM performance could lead to a greater understanding of the nature and determinants of ISs
across different functions related to CRM performance analysis. By methodically collecting, consolidating, and analyzing both guest preferences and transactional data, hotel chains have the potential to develop a deep understanding of each customer’s behavior and preferences, provide substantially improved service levels, individually tailor the customer experience, and generally offer more personalized service.

First, the capability of leveraging analytics in operations can be a critical differentiator for hotels to stay competitive. The results of the study explore the operational and analytical implementation of IS that leads to the marketing strategy and CRM performance of a hotel. That is, disconnects between analytics and operations may result in negative customer experience and the loss of opportunities for the hotel. For example, many upscale hotel chains record guest preferences gleaned from conversations with customers during their stay and then use them to tailor the services that they provide the customers on their next visit to any member of the hotel chain in any part of the world. Requests for items such as hypoallergenic pillows and additional towels are recorded for future use so that personalized goods and services can be offered to repeat customers.

Second, in the construct of SPF, a customer-oriented hotel will analyze customers’ experiences and questions and then respond and support their needs accordingly. Our findings also indicate that SPF will positively influence CRM performance. That is, personalized service strategies for the hotel will be implemented from their system. For example, hotels will set their private service process to understand a guest’s need and record the information during the reservation process. From the conceptual perspective, hotels will focus on the service provided to each guest and understand each guest’s need, and this will increase their profit from the guests; thus, the service process will lead employees to use ISs.

Third, as our results show, guest IQ will influence CRM performance through the use of ISs. The more information is collected, the better the service that will be provided by the hotels. Thus, the study also suggests that hotels will understand their limitations in market segmentation and improve their service procedure. For example, in a resort hotel that targets group travelers, employees simply collect group information but not individual-level information. To improve their service process, they should collect individual information.

Fourth, connecting the operational and analytical functions of ISs can increase CRM performance. According to the findings of the study, functional implementation plays an important moderating role from the perspective of the operation process. Hotel managers will train their staff to collect, analyze, and use customer data, including personal behavior, sales records, and guest history, rather than just entering information into ISs. By using ISs, a customer-oriented company will be able to provide more efficiency in CRM.

Finally, the management of the hotel industry will reposition the CO of the company by integrating standard operating procedures using ISs. In particular, the hotel industry’s analytics and operations nourish each other in a symbiotic
relationship. Analytics generate the hotel industry’s intelligence for better operations, and conversely, the data captured in the operations provide the inputs for analytical processing.

Further, a wide variety of information technology resources and capabilities are relevant to the provision of customer service: generic technologies including scanning and imaging technology, computer networks with agents and brokers, Web-enabled customer interfaces, call tracking and CRM software, computer and telephony integration, and customer-service expert systems. While much of this technology must ultimately be integrated into a hotel’s customer service process, the applications are available to all hotels.

As a business discipline, this research could be directed toward helping managers and practitioners decide on the priority of CRM implementation and improve both business processes and competitiveness through its deployment. Managerial and technological implications can be drawn from this study.

6.3. Study limitations

The first limitation of this study is that the hotels’ styles of operation were not compared. We examined the possibly differential impacts of IS on enhancing CRM performance in this study. Future research can clarify such differential style of hotels and other facilitating and market factors affecting CRM performance. Second, this study focuses on SPF and SS within CRM activity of hotel industry; the employees included in the study were not compared according to their work experience, which might classify them into different categories. Third, while much of new technology will be integrated into a hotel’s customer service process, these applications can be addressed in future research.

References


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