

A PROCESS FOR DETERMINING USER REQUIREMENTS IN eCRM DEVELOPMENT

A Strategic Aspect and Empirical Examination

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Abstract: Customer relationship management (CRM) has increasingly become important while business focus has shifted from product-centric to customer-centric. However, many organizations fail to achieve the objectives. One of the important determinants is the deployment of electronic CRM (eCRM) in organizations. In essence, CRM is complex in comprising product, channel, consumer, delivery, and service aspects. This requires different approaches in eCRM development. Determining user requirement is the most important phase and the key to the final success in system use. This research proposes a strategy-based process for system requirement analysis. Previous research has not discussed the important role of the CRM strategies in building eCRM. Moreover, the implementation process was only reported partially in literature. Basically, the framework contains three steps: (1) define CRM strategies, (2) identify consumer and marketing characteristics, and (3) determine system requirements. This framework is further examined by empirical data. The results indicate that CRM strategies have positive impact on system requirement analysis while developing eCRM.

1 INTRODUCTION

Business over the Internet presents unprecedented opportunities for building sales and increasing revenue streams by expanding geographical scope, enhancing channel coordination, and improving supply chain efficiency. To be successful at e-commerce, companies have to rethink their business focus. Their business model has to evolve from production-centric to customer-centric. As products have become more commoditized and pricing differences more slight, the great differentiator today is delivering customer value. Customer value is what leads to increased loyalty, sales, and retention rates. Customer relationship management (CRM) is a strategic and management concept in creating customer value (Kennedy and King; 2004; Karakostas, et al., 2005). Here, electronic CRM (eCRM) is a business and technology discipline that helps firms acquire and retain the most profitable customers while meeting their requirements. With this trend, too many organizations are rushing to implement a web site

and take a “build it and they will come” attitude. However, the results were less than what was expected. Estimates of CRM projects failing to achieve their objectives range from 60%-80% (Kale, 2004). One of the reasons for unsatisfactory outcomes are focusing solely on technological aspect rather than on customer and marketing aspects for successful use of this system by marketing personnel (Pavlou, 2003; Wu and Wu; 2005).

Basically, the idea of CRM is basically founded on relationship marketing. Relationship marketing is mainly to build a long term association, characterized by purposeful cooperation and mutual dependence on social, as well as structural, bonds (Mowen and Hinor, 1998). CRM context inherently involves a number of compound components on product design, customer, marketing characteristics and customer behavior for relatively complex processes. The development of eCRM therefore requires following different approaches from the traditional system development process (Albert, et al., 2004). Requirement analysis is the most

important phase in the development process and the key to the success of system use. Thus, a strategic view on requirement analysis can provide a clear picture to define the complex process and further, simplify the requirement analysis (Maguire, 2001; Rigby and Ledingham, 2004; Chan, 2005).

Therefore, this research proposes a strategy-based process for effectively determining system requirements in eCRM development. The first defines a well-planned, unique customer strategy, which conceptually considers customer needs and marketing objectives, to direct CRM activities. Next, the fundamentals to determining customer strategies require further understanding consumer behavior and marketing stimuli in order to build effective CRM (Brown, 2000). Accordingly, requirement analysis in eCRM development can be effectively determined based on the previous analyses. In summary, this planning process comprises three steps: define customer strategies, identify consumer and marketing characteristics, and determine system requirements. Little research has discussed the important role of customer strategies in e-CRM development. The literature on this implementation process has only reported partially rather than integratively. Moreover, the techniques used for analyzing these steps are also discussed. Finally, this framework is empirically examined to understand its practical validity.

2 LITERATURE REVIEW

2.1 IT Planning and User Requirements

Requirement determination is the process of gathering and modeling information about required functionality, data, and interface of a proposed system by a system analyst, and has been widely recognized as the most difficult phase in system development process (Larson and Naumann, 1992; Guinan, et al., 1998). Difficulties in requirements determination arise from four major reasons (Davis, 1982): (1) cognitive issues resulting from constraints on humans as information processors and problem solvers; (2) problem structuring issues resulting from the variety and complexity of information requirements; (3) communication issues resulting from the complex patterns of interaction among users and analysts in defining requirements; (4) political and behavioral issues resulting from unwillingness of some users to provide requirements.

Problem structuring issues are most apparent to system analysts for solving requirements determination problem (Sutcliffe, 1997). In particular, this study intended to alleviate the impact of unstructured problem associated with CRM domain on system requirements analysis.

A number of models have been proposed for developing the information system plan and information architecture. The main focus of these models is on discussing requirements analysis of system development. The three-stage model by Bowman et al. (1983) suggests that a strategic alignment effort as the first stage should precede organizational information requirements as the second stage and resource allocation as the third stage. The stimulus for systems development is typically an organizational problem. Problems may be usefully analyzed in terms of four levels in a pyramid structure with organizational strategies at the top, business processes at the second, tasks at the third, and information at the bottom (Leifer et al., 1994; Browne and Rogich, 2001). The review of these models would lay a foundation on developing the research framework in this study. A strategy-based process initiated with CRM strategies would define a new type of customer relationship and in turn, create a need for further understanding consumer behavior and marketing characteristics. Accordingly, information requirement analysis would be effectively followed.

2.2 CRM, eCRM and CRM Strategies

The new Internet Economy presents numerous challenges to marketers along with the significant opportunities it offers. Customers are smart, powerful, and highly informed. Customers are demanding that every interaction a company has with them leave them more than satisfied. In fact, customer satisfaction is considered as the most important new performance metric, soon to rival revenue and profit in importance. Today, any advantage based on product or service is short-lived. Instead, forging long-term relationships with customers is the key to stability in an increasingly dynamic market (Lee-Kelley et al., 2003; Payne and Frow, 2004). It indicates that traditional marketing approach no longer fulfills the needs of the Internet era. The premise is that existing customers are more profitable than new customers; that it is less expensive to sell an incremental product to existing customers; and that customer retention would be maximized by matching products and levels of services more closely to customer expectation. The

central objective of CRM is thus to maximize the lifetime value of a customer to the organization (Peppers et al., 1999; Brown, 2000; Turban et al., 2004). However, all have remained essentially theoretical concepts, aspirations rather than a practical or commercial reality. It has been difficult to develop eCRM due to the complexity in the CRM process. The great advancement in Internet and new information technologies recently has provided tremendous resources for supporting the development of eCRM. (Curry and Curry, 2000; van Nunen and Zuidwijk, 2004).

There are three similar models proposed to define CRM strategies in e-commerce. The first model includes three stages: acquisition, enhancement, and retention (Kalakota and Robinson, 2001). Each has a different impact on the customer relationship and each can more closely tie the company to the customer's life and value.

- (1). Acquiring new customer. You acquire new customers by promoting product and service leadership that pushes performance boundaries with respect to convenience and innovation. The value proposition to the customer is the offer of a superior product backed by excellent service.
- (2). Enhancing profitability of existing customers. You enhance the relationship by encouraging excellence in cross-selling and up-selling. This deepens the customer relationship. The value proposition to the customer is an offer of greater convenience at low cost (one-stop shopping).
- (3). Retaining profitable customers for life. Retention focuses on service adaptability—delivering not what the market wants, but what customers want. The value proposition to the customer is an offer of a proactive relationship that works in his or her best interest.

Next, Organizations all seemed to fall within one of three distinct stages for customer care: customer acquisition, customer retention, and strategic customer care (Brown, 2000). The descriptions of Stage I and Stage II are similar to Kalakota and Robinson's model. Stage III organizations recognize that customer relationships that are in essence strategic partnerships allow them to increase own benefits by focusing on enhancing the customer's profits. Finally, Gartner Group discusses a relationship marketing model. It comprises four categories, customer selection, customer acquisition, customer retention, and customer extension, as shown in Figure 1 (Turban et al., 2004).

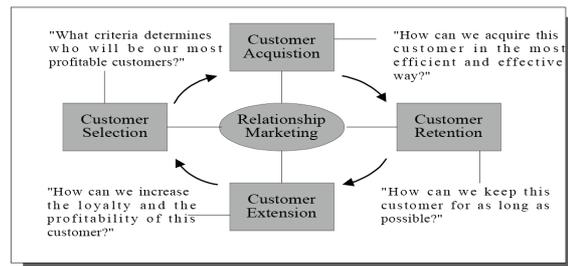


Figure 1: Relationship marketing model.

2.3 Consumer Behavior

Relationship marketing strategy describes high-level concept. Consumer behavior is the basis of the concept and has a profound impact on the way that online systems are developed. Market researchers have been trying for decades to understand consumer behavior. Schiffman and Kanuk (1994) briefly discusses six comprehensive models of consumer behavior: the Nicosia model (Arsham and Dianich, 1988), the Howard-Sheth model (Howard and Sheth, 1969), the Engel-Kollat-Blackwell model (Engel et al., 1990), the Sheth family decision-making model (Sheth, 1974), the Bettman information-processing model (Bettman, 1979), and the Sheth-Newman-Gross model (Sheth et al., 1991).

For example, the Nicosia model focuses on the relationship between the firm and its potential consumers. In the broadest terms, the firm communicates with consumers through its marketing messages (advertising), and consumers communicate with the firm by their purchase responses. This model involves a four-stage procedure. The first stage comprises two factors that affect consumer attitudes, i.e., (1) consumer characteristics, and (2) target market and competitive environment. The second stage deals with the search for the relevant information and evaluation of the firm's brand in comparison with alternative brands. The third stage is that the consumer's motivation toward the firm's brand results in purchase of the brand from a specific retailer (decision making). The final stage consists of two types of feedback from the purchase experience, i.e., one to the firm in the form of sales data, and the other to the consumer in the form of experience (Arsham and Dianich, 1988).

Moreover, a model for buyer behavior indicates a stimulus-response structure similar to the previous ones, as indicated in Figure 2 (Kotler, 1997). This model illustrates marketing and other stimuli entering the buyer's "black box" and producing the buyer's responses. An exception to this model is that buyer characteristics are classified as part of

buyer's black box, rather than as outside stimuli. Besides, a consumer behavior model in e-commerce includes outside stimuli, personal characteristics, external characteristics and vendors' controlled systems entering decision-making process and eventually producing buyers' decisions (Turban et al., 2004). Here, vendors' controlled systems is additional input component while compared to traditional behavior model.

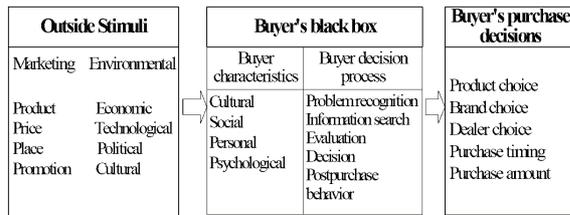


Figure 2: Buyer behavior model (Kotler, 1997).

3 THEORETICAL MODEL

Theoretically, the solution for this problem would be based on a strategic perspective to pre-define marketing orientation. Accordingly, system requirements would be effectively determined from a high-level perspective. Thus, this research proposes a strategy-based process for effectively defining system requirements in eCRM development, as indicated in Figure 3. The theoretical basis for building this model is mainly based on the analysis of a hierarchical structure with firm strategies at the top, business processes at the second, tasks at the third, and information at the bottom, as discussed in Section 2.1. This process basically contains three steps: (1) define customer strategies, (2) identify consumer and marketing characteristics, and (3) determine system requirements. Prior research has just literally discussed the importance of strategic role in determining system requirements. Furthermore, a well-defined process for requirement analysis has not reported integratively.

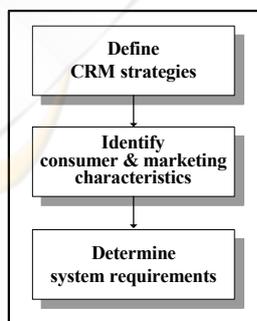


Figure 3: Theoretical model.

3.1 Define CRM Strategies

Comparatively, the Brown's model basically covers the primary features of the other models, as discussed previously, adopted to analyze the choice of CRM strategies in this step, i.e., customer acquisition, customer retention, and strategic customer care. The decision is important because it will dictate the infrastructure strategy of technology (Brown, 2000).

3.2 Identify Consumer and Marketing Characteristics

This step analyzes consumer and marketing characteristics based on the defined CRM strategies because the strategies are all attempting to discover and build highly personalized customer service. A summary of the literature indicates that the driving forces for making purchase decisions are primarily from the set of inputs and specifically, there were three key inputs, i.e., (1) personal characteristics, (2) external characteristics, and (3) stimuli. This set of inputs can be concluded with consumer characteristics and marketing stimuli.

3.3 Determine System Requirements

This step mainly bases the analyses of CRM strategies and consumer and marketing characteristics, on deriving a series of system requirements for eCRM. An example could be that if the customers tend to be more sensitive for the price toward certain products, the eCRM will consider such IT features as price-comparative analysis for these products to be included. Thus, the the major focus would be on discussing the performance of system requirements analysis.

Next, the three-step framework is primarily derived based on an extensive literature review and thus, further verification by empirical data is required for practical validity. This verification is primarily to explore the influence of the first step on the second step, the second step on the third step. However, there are two sets of variables discussed in the second step, consumer and marketing characteristics. Thus, two hypotheses for each relationship are presented for this.

Hypothesis 1: The choice of CRM strategies is positively related to consumer characteristics.

Hypothesis 2: The choice of CRM strategies is positively related to marketing stimuli.

Hypothesis 3: Consumer characteristics are positively related to the performance of requirements analysis.

Hypothesis 4: Marketing stimuli are positively related to the performance of requirements analysis.

4 RESEARCH DESIGN

4.1 Instrumentation

The instrument contains a four-part questionnaire as described subsequently. The first part uses nominal scales, while the rest use 7-point Likert scales.

4.1.1 Basic Information

This part collects organizational characteristics including industry, annual revenue, number of employees, and experience of eCRM and respondent's characteristics including education, age, experience, and position.

4.1.2 CRM Strategies

This part is adapted from a self-assessed instrument for defining CRM strategies (Brown, 2000), comprising 12 items in all. Example attributes include Internet applications, differentiated services, customer segmentation, and customers' profitability, in order to discriminate the adoption of CRM strategies.

4.1.3 Consumer and Marketing Characteristics

This part is adapted from two constructs in Turban et al., (2004). It includes 10 subconstructs for consumer characteristics such as age, gender, income, education, lifestyle, psychological state, occupation, values, personality, and marital as well as 4 subconstructs for marketing stimuli such as price, promotion, quality and product.

4.1.4 Performance of Requirement Analysis

This part is adapted from the instrument for assessing requirements analysis (Teng and Sethi, 1990). This measure includes five items, accuracy and free bias, completeness, decrease of user requirements determination time, usefulness of output information, and ease of use.

4.2 Sample Organizations and Respondents

Service industries would have more experience on CRM activities. Moreover, the activities usually need massive IT investment and also involve strategic planning. It is assumed that larger firms would be more likely to have this experience. A study sample including 645 service firms and 200 finance and banking firms was thus selected from the year 2004 listing of commonwealth 1155 manufacturing firms, 645 service firms, and 200 finance and banking firms. Based on this sample, CIOs or IS top managers were selected as the respondents. This is because this study focuses on the understanding of IT applications development and also involves the analysis of CRM strategies, and therefore CIOs are likely to be the managerial personnel most familiar with this topic. 159 replied, with 4 incomplete responses deleted, resulting in a total sample of 155 respondents for an 18% response rate. The seemingly low response rate raises the concern about non-response bias. A test for non-response bias was conducted using two responding subsamples: early and late respondents. They were correlated on their annual revenue and working experience. There is no significant systematic non-response bias in the responding sample.

4.3 Scale Validation

Confirmatory factor analysis (CFA) is used to analyze scale validation. There are three measurement models for the instrument. The results are reported in Table 1. All indices are above the criteria.

Table 1: Scale reliability and validity.

Scale	Item loading	Construct reliability	AVE
Define CRM strategies	0.85-0.88	0.92	0.82
Identify consumer and marketing characteristics	0.76-0.83/0.82-0.84	0.83/0.87	0.69/0.75
Performance of Requirement analysis	0.88-0.96	0.95	0.85

5 ANALYSIS AND FINDINGS

5.1 Define CRM Strategies

Cluster analysis is used to analyze the strategic types. The results finally suggests that three-cluster

solution is the appropriate choice, with cluster sizes of 20, 70, 65 firms for clusters 1, 2, and 3 respectively. Scheffe's multiple comparisons is used to define the three clusters. Corresponding to the Brown's model, clusters 2, 3, and 1 can be reasonably defined as the strategies of customer acquisition (45.2%), customer retention (41.9%), and strategic customer care (12.9%), respectively. From the percentage distribution, some facts can be discussed for practice. There are almost half of the responding firms considering customer acquisition as the major CRM strategy. Obviously, traditional marketing approach is still playing the important role while CRM approach is currently in the early stage for most firms in Taiwan.

Nevertheless, the adoption of the other two CRM strategies adds up to occupy a high percentage (54.8%). This implies that a trend of moving toward CRM-based marketing strategies is developing as Internet-based technology plays an important role in supporting the features of customer retention and strategic customer care. Finally, only 12.9 % of the responding firms are in the stage of strategic customer care. They have built the relationship of strategic partnership with customers. However, customers, in essence, are associated with uncertainty and complexity in many aspects and require extended time and effort to achieve.

5.2 Identify Consumer and Marketing Attributes

MANOVA is used to examine the relationship of CRM strategies with metric attributes and consumer characteristics with non-metric attributes. The test is significant at 0.01 level. Therefore, Hypothesis 1 is accepted. In particular, univariate F statistics are further examined to understand the ten consumer characteristics varying across the three CRM strategies. The results are reported in Table 2. Eight of them report significant differences across the three CRM strategies. This explains some facts. The range of user requirement may be approximately defined based on these aspects and the determination process should proceed with priorities on these aspects.

Specifically, while examining group mean differences of the consumer characteristics, it indicates a pattern that acquisition strategy indicates the least significant role in identifying the consumer characteristics for building customer relationship. This may be because this strategy mainly focuses on expanding new customers rather than exploring existing customers. As the firms move to customer retention, the focus shifts to customer-centered and customers are initially considered as the important asset of the firms. Differentiated services for

customers are critical to sustaining their profits. For the firms evolving to strategic customer care, the focus is on determining the most profitable customers and further developing differentiated services for the customers. The specific findings, while different consumer strategies place different focuses on consumer characteristics, would provide insight for clearly defining the particular scope of user requirement. For instance, one, six, and eight consumer characteristics, as indicated in Table 2, are the focus on requirement analysis for the adoption of acquisition, retention, and strategic customer care respectively.

Table 2: Univariate tests for consumer attributes across CRM strategies.

Consumer characteristics	F	P-value	Customer strategies			Group mean differences
			1	2	3	
Age	7.83	0.012*	3.58	5.01	5.93	3>1*, 2>1*
Gender	6.43	0.031*	2.84	5.16	5.26	3>1*, 2>1*
Income	13.2	0.000*	4.98	5.69	6.43	3>1*
Education	10.1	0.001*	3.21	4.82	6.25	3>1,2*, 2>1*
Lifestyle	5.12	0.041*	2.31	3.84	4.51	3>1*
Psychological	7.34	0.071	3.03	3.31	4.01	-
Occupation	6.64	0.029*	2.96	5.39	6.23	3>1*, 2>1*
Values	6.38	0.033*	3.01	3.68	5.23	3>1,2*
Personality	9.23	0.009*	3.18	5.23	5.41	3>1*, 2>1*
Marital	5.89	0.064	3.11	3.70	4.01	-

*:P<0.05; 1:Customer acquisition, 2:Customer retention, 3:Strategic customer care

The second part discusses the effect of CRM strategies on marketing stimuli. The same procedure is used. The test is significant at 0.01 level. Therefore, Hypothesis 2 is accepted. The same univariate F statistics are further examined across the three CRM strategies. The results are reported in Table 3 and all the four marketing stimuli are significant differences across the three CRM strategies. Specifically, while examining group mean differences of the marketing stimuli, acquisition strategy influences the four marketing stimuli. This is because this strategy aims mainly at expanding new customers and thus, focuses on product attributes rather than consumer attributes for attracting new customers. While customer strategies evolving to latter stages, the correlation with the four product attributes becomes weaker and weaker. For example, four, two, and one marketing attributes as indicated in Table 3, are the focus on requirement analysis for the adoption of acquisition, retention, and strategic customer care respectively.

5.3 Determine System Requirements

This step discusses the performance of requirement analysis after the analysis of the previous steps. First, multiple regression analysis is used to examine Hypotheses 3 and 4. Hypothesis 3 and Hypothesis 4

Table 3: Univariate tests for marketing stimuli across CRM Strategies.

Marketing attributes	F	P-value	Customer strategies			Group mean difference
			1	2	3	
Price	5.33	0.028*	6.31	5.25	4.83	1>3*
Promotion	4.43	0.031*	6.01	3.31	3.16	1>2,3*
Quality	4.23	0.039*	5.75	4.29	4.23	1>2,3*
Product	4.12	0.041*	5.83	4.82	4.16	1>3*

*:P<0.05; 1:Customer acquisition, 2:Customer retention, 3:Strategic customer care

are accepted. Next, the performance of requirement analysis is assessed using the five items in the questionnaire for the three groups of responding firms with different strategies. Their average performances are 5.71, 6.16, and 6.42 respectively, with 7-point Likert scale, as indicated in Table 4. This indicates that the performance of requirement analysis is good while following the strategy-based determining process. In particular, different strategies has different impacts on consumer behavior and marketing attributes and further, provides insight to requirement analysis in eCRM development.

Table 4: Impact of CRM strategies on requirement analysis.

CRM strategy	Emphases on consumer/marketing characteristics	Performance
Customer acquisition	Income Price, Promotion, Quality, Product	5.71
Customer retention	Age, Gender, Income, Education*, Occupation, Personality Price, Quality, Product	6.16
Strategic customer care	Age, Gender, Income, Education, Occupation, Values , Lifestyle, Personality Price, Quality*, Product*	6.42

: P<0.05, The others: P<0.01

6 CONCLUSIONS AND SUGGESTIONS

As the growth of customer base has become more saturated and the price premium of products less differentiated, this justifies the need for better CRM. While the Internet offers a tremendous amount of communication resources to support eCRM implementation, most organizations are rushing to move to web-based CRM systems. However, a high percentage of firms fail to achieve their CRM goals. While CRM domain involves a number of compound components on product design, market characteristics, and consumer behavior, a strategy-based process for requirement analysis can initially provide a clear picture to define the complex process and further, facilitate the requirement analysis. Therefore, this study proposes a three-step process for requirement analysis, i.e., define customer strategies, identify consumer and

marketing characteristics, and determine system requirements. Important findings have been concluded. In general, while firms adopt different customer strategies in market competition, i.e., acquisition, retention, and strategic customer care, the determinants in building CRM, i.e., consumer and marketing characteristics, are greatly different. As a result, complex domain on CRM can be defined in terms of the particular customer segments or marketing approaches and further, base them on effectively eliciting user requirements.

The implications for practitioners are noted as below. While eCRM is complex and dynamic in nature, it is difficult to manage the requirement determination process. System analysts can base the adopted customer strategies and further, emphases on consumer and marketing characteristics on clearly defining the scope or the boundary of eCRM. The findings are summarized in Table 4. Accordingly, user requirements can be effectively defined and stabilize under the particular boundary. Besides, this will also facilitate the effective allocation of organizational resources and reduce the development cost. The implications for researchers are discussed as below. A strategy-based approach for requirement analysis is critical for eCRM development since it intends to overcome system analysts' and users' inability in recognizing problem unstructuring issues. This is a common problem for system analysts in developing complex information systems. Traditional method is operation-based and often difficult to converge in requirement determination process. Prior research has not discussed the important role of customer strategies in eCRM development and has only reported partially for the implementation process. This research provides a new thinking for emerging research on this research issue.

Furthermore, subsequent research could be based on this foundation. First, this study is primarily at developing a theoretical framework to effectively determine requirements and further, empirically validates it by survey data. Future research could specifically conduct case studies longitudinally to understand the usefulness of this framework in building eCRM in practice. Second, the empirical survey is sampled from a combination of industries, so the conclusions are more general and comprehensive. Future research could be targeted toward the particular industries, for instance, the banking industry, to understand their differences and similarities. Third, IS managers or CIOs (from developer perspectives) are chosen as participants in this survey since this study mainly involves the planning work of system development. However, a complementary study from the perspective of marketing personnel (from user

perspectives) would provide further insight to understand requirement analysis.

Finally, although this research has produced some useful results, a number of limitations may be inherent in it. First, the response rate is lower than desirable, despite the various efforts to improve it. This may be due to lack of strategy-based planning experience in eCRM development. However, the sample data indicates no systematic non-response bias in the responding sample and is well representative of the sample frame. Next, CIOs from larger firms are primarily chosen for the participants in the survey; however, some of the questionnaires may have been completed by subordinates, and as a result the data may be some biases.

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