

## Article

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# Customer Knowledge Management and Potential Risk Identification: Does Customer Feedback in the Field of CKM Contribute to Identification of Potential Risks

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### Keywords

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customer knowledge management  
risk identification  
customer feedback  
severity level of risk  
risk matrix

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**Abstract:** Customer Knowledge Management (CKM) is a term describing a business-level strategy used by organizations, in collaboration with their customers, to capture, share and disseminate customers' knowledge about their needs, wants and expectations. CKM is recognized as one of the most important product and service improvement strategies of the manufacturing and service sector. In many business fields, including healthcare industries, customer feedback contributes to service improvement.

Relating to this paper, there are two research areas: the first area is customer feedback and service improvement in the field of healthcare; the second area covers risk management in the field of healthcare.

This empirical study builds on existing research by focusing on the links between customer feedback and potential risk identification which results in product and service safety improvement, mainly in the healthcare field. As a comparison, CKM is also examined in the transportation service field.

The first purpose of this study is to specify risk-related customer feedback in pharmaceutical and food industries, hospitals, and transportation service industries. The second purpose is to investigate whether risk-related customer feedback has any significant impact on potential risk identification of products and services. The third purpose is to analyze how organizations assess the severity level of risk, based on a risk matrix. The severity levels are categorized as high, medium and low risk.

The research results provided examples of specific cases where risk-related customer feedback has resulted in implementation of product and service safety improvements, or risk mitigation efforts in Japanese organizations. Typical risk-related customer feedback included requests arising from product design, material, labels, packaging, and facility maintenance and services. The questionnaire survey showed that customer feedback departments recognized the value of customer feedback for both service improvement and risk identification. In almost all industries which were included in this study, customer feedback departments recognized that customer feedback contributed to potential risk identification of low severity-level, rather than potential risk identification of medium or high severity-level.

## 1. Introduction

Customer Knowledge Management (CKM) is a term describing a business-level strategy used by organizations, in collaboration with their customers, to capture, share and disseminate customers' knowledge about their needs, wants and expectations. CKM is recognized as one of the most important product and service improvement strategies of the manufacturing and service sectors. One of the most important functions of CKM is customer feedback. In order to improve relations

with customers and gain competitive advantage, many organizations publish customer feedback and company responses. In many business fields, including healthcare industries, customer feedback contributes to service improvement (Murante, 2014).

Does customer feedback in the field of CKM also contribute to identification of potential risks, resulting in safety improvements? In the field of healthcare, this study examines links between customer feedback and potential risk identification, focusing on pharmaceutical and food industries, and hospitals. As a comparison, CKM is also examined in the transportation service field.

This study has three main purposes. The first purpose is to specify risk-related customer feedback in pharmaceutical and food industries, hospitals, and transportation service industries. Risk-related customer feedback includes requests arising from product design, material, labels, packaging, and facility maintenance and services. The second purpose is to examine whether risk-related customer feedback has any significant impact on potential risk identification of products and services. The third purpose is to analyze how organizations assess the severity level of risk, based on a risk matrix. The severity levels are categorized as high, medium and low risk.

Data collection includes secondary data and primary data. Secondary data are collected from organization official websites and company reports issued by pharmaceutical and food industries, hospitals and transportation service industries in Japan. Primary data are collected from a questionnaire survey sent to these four industries.

This study has two features which have not been highlighted by previous studies. The first feature is to show links between customer feedback and potential risk identification. The second feature is to provide specific cases where risk-related customer feedback has resulted in implementation of product and service safety improvements, or risk mitigation efforts in Japanese organizations. Specific case study approach is useful for decision making by company officers in charge of risk management.

The second section of this paper reviews existing literature on the subject. The third section describes the research methodology of this study. The fourth section discusses survey results. The fifth section concludes with a summary of research findings, followed by limitations of study and suggestions for future research.

## 2. Literature Review

This section provides reviews of literature related to this study in three areas: The first area is customer feedback and second area is service improvement in the healthcare field; the third area covers risk management in the healthcare field.

Customer feedback is a key component of studies in the field of knowledge management. Customer feedback is a process consisting of gathering, sharing, storing, analyzing and utilizing

customer opinions concerning products and services. Organizations continuously gather customer opinions, requests, viewpoints, complaints in order to gain competitive advantages, and to react smoothly to changing customer needs. Knowledge about products and services is obtained formally and informally through customer feedback websites, service communication, and customer satisfaction surveys.

Gebert et al. (2003) summarized three types of customer knowledge: knowledge from customers, knowledge about customers and knowledge for customers. Knowledge from customers is knowledge created through the customers' experience derived from customer relationship activity. Knowledge about customers may include characteristics of customer behavior and demographics, and previous purchasing history accumulated from customer interactions through various touch-points in CRM, and knowledge from external organizations such as data mining consulting firms, credit bureaus and public transportation. Knowledge for customers is generated in process within the enterprises, such as R&D and production.

In our study of CKM and potential risk identification, customer feedback relates mainly to knowledge from customers, and knowledge for customers. Knowledge about customers is not disclosed on company websites.

### **Customer feedback and service improvement in the healthcare field:**

Liang et al. (2018) summarized types of patient management activities for hospital service improvement. Using published empirical research, this study identified three categories of patient involvement: providing feedback through questionnaires, participating in hospital management meetings, and partnering with healthcare providers. The authors stressed the importance of assessing the relationship between patient involvement and organizational impact.

King et al. (2010) discussed adverse events in the hospital, which are defined as an injury resulting from medical management rather than from an underlying illness. They concluded that organizational reporting by healthcare providers, by itself, is insufficient to increase patient safety. Using literature review and analysis, their findings pointed out that patient reporting systems, where patient feedback was publicly disclosed, could enhance patient safety through analysis of trends, identification of causes and implementation of solutions.

Based on survey data, Murante et al. (2014) revealed that patient feedback played an important role in improving hospital service quality. When hospitals made a concerted effort to convey patients' perspectives to primary healthcare providers, improvements in service performance were measurably better. The authors recommended that hospital managers should ensure that staff pay more attention to patient feedback.

O'Hara et al. (2018) examined inpatient feedback and concluded that patients were able to

provide insight about safety, which complemented existing organizational patient safety measurement. Patients' unique perspective about hospital safety differs from, and adds to, current definitions of patient safety incidents. From patient feedback, the most common issue is staff—patient communication, connected to the second issue of staff availability. The third issue, physical environment, relates to noise, lighting and ward layout.

Sheard et al. (2017) analyzed the reasons why UK hospital staff found it difficult to make improvement resulting from patient feedback. Their qualitative research identified three stages of challenges: normative legitimacy, structural legitimacy, and organizational readiness to change. This study concluded that making service improvement requires both normative legitimacy and structural legitimacy, and furthermore, requires organizational readiness, especially when external assistance is necessary.

### **Risk management in the healthcare field:**

The first step of risk management is risk identification. According to ISO 31000, risk identification is defined as the process of finding, recognizing and describing risks, which involves the identification of risk sources and events, their causes, and their potential consequences.

In the healthcare field, participants in risk identification activities include managers, risk management units, specialists, doctors, nurses, staff, technicians, patients and their families, and other stakeholders.

Simsekler et al. (2018) discussed the structure of risk identification and the analytical framework in the healthcare field. The structure is composed of three stages: system familiarization, identification of risks, and presentation of risks. In the risk identification stages, the authors highlighted the importance of an integrated approach, which is especially useful to identify risks under conditions of rapid changes of environments.

Etges (2018) conducted case study analysis to examine the popular tools, techniques and methods used by healthcare organizations. At the stages of risk identification and analysis, healthcare organizations use risk management matrix, root-cause analysis, failure mode and effective analysis, brainstorming and others. The authors stressed that, in the field of healthcare risk management, tacit knowledge sharing and the coordinated involvement of professionals at all levels ensures successful care of patients.

Vatanpour et al. (2015) discussed both advantages and limitations of the risk assessment matrix. The authors pointed out that the matrix method can be useful to promote discussion to distinguish high risks from low risks. With regard to limitations, this study illustrates that risk predictions can be misleading due to negative correlations between frequency and severity. Users should fully understand this potential weakness when applying the risk matrix, and use risk matrix predictions

as only one factor of decision-making.

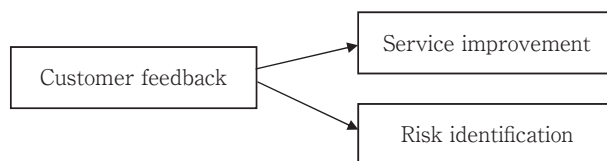
In summary, existing papers independently study two research areas: customer feedback and service improvement in the healthcare field, and risk management in the healthcare field. Existing studies have not highlighted the connection between customer feedback and risk identification. Our empirical study builds on existing research by focusing on the links between customer feedback, risk identification, and product and service safety improvement, mainly in the healthcare field.

### 3. Methodology

Research methodology, such as data collection and research procedures, is introduced in this section. Also, survey questions are listed and a conceptual model for analysis is presented. Data collection includes a questionnaire survey as primary data. Secondary data was collected from organization official websites and from company reports issued by the four industries which are the focus of this study: pharmaceutical industries, food industries, hospitals and, for comparative purposes, the transportation service industry.

#### Conceptual model

Figure 1 illustrates a conceptual model of customer feedback contributing to service improvement and risk identification for the four industries. Previous studies have examined the relationship between customer feedback and service improvement (eg. Pyon et al, 2010, Fidel et al. 2015, Stelzer et al., 2016, Zand et al., 2018) This research study, however, is directed toward the relationship between customer feedback and risk identification.



**Figure 1: Customer feedback, Service improvement and Risk identification**

**Table 1: Risk assessment matrix**

| Severity level of Risk      | Low | Medium | High |
|-----------------------------|-----|--------|------|
| Yes (Existence of cases)    |     |        |      |
| No (Non-existence of cases) |     |        |      |
| Total                       |     |        |      |

As Table 1 shows, this study uses a simplified 3 x 2 risk assessment matrix with two categories of frequency (existence of cases, non-existence of cases) and three categories of severity-level of risk (Low, Medium, High).

## Hypotheses

This study presents the following hypotheses.

Hypothesis 1: The number of cases where customer feedback identifies high severity-level risks is expected to be low.

Reason 1: The main purpose of customer feedback is to improve service rather than to identify risks.

Reason 2: Most companies, rather than relying on customer feedback, have a risk management department to anticipate and mitigate risks in advance.

Hypothesis 2: The number of cases where customer feedback identifies low severity-level risks is expected to be high.

Reason 1: The customer base is broad and highly diverse. As a result, minor difficulties lead to numerous minor complaints.

Reason 2: A risk management department cannot possibly anticipate every variation in customer usage of a product or service. A high number of customers can be expected to lead to a high number of low severity-level risk complaints.

## Survey questions

The primary data collection survey is composed of five questions, related to the second and third purposes of this study: to examine whether risk-related customer feedback has any significant impact on potential risk identification, and to analyze how organizations assess the severity level of risk which is categorized as high, medium, or low risk.

The five questions are listed below:

Q1: Do you think that customer feedback contributes to service improvement at the overall corporate level?

Q2: Do you think that customer feedback contributes to identification of potential operational risk?

Q3: Can you identify any cases where customer feedback contributed to catastrophic or critical risk identification in your organization? Catastrophic or critical risk means high severity-level risks, which could result in serious injuries or death.

Q4: Can you identify any cases where customer feedback contributed to moderate or marginal risk identification in your organization? Moderate or marginal risk means medium severity-level risks, which could result in injuries requiring medical or hospital care.

Q5: Can you identify any cases where customer feedback contributed to minor or negligible risk

identification in your organization? Minor or negligible risk means low severity-level risks, which could result in only slight injuries or personal discomfort.

## 4. Results

This section discusses the findings of both secondary data and primary data.

Secondary data from organization official websites and company reports:

Table 2 shows published cases of customer feedback and company responses which contribute to product and service risk identification. While most published cases seem to be low severity-level risk, there are differences between the manufacturing sector and the service sector. In the manufacturing sector, customer feedback includes cuts or injuries incurred by opening packages, bottles and cans, unclear or missing information on the labels showing expiration date, and allergy-causing substances. In the service sector, risks arise from difficulties due to poor facility for vulnerable people and possible accidents due to poor equipment maintenance.

**Table 2: Examples of customer feedback and company responses**

|    | Industries              | Customer feedback                                                                                                                                              | Company responses                                                                                                                               |
|----|-------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | Pharmaceutical          | Injuries when opening the glass ampoules                                                                                                                       | Plastic ampoules have been developed.                                                                                                           |
| 2  | Pharmaceutical          | The expiration date is printed only on the exterior package. When it was thrown away, we can not know the expiration date of the product.                      | Our department has implemented printing the expiration date directly on the label of the eye drop container as well as on the exterior package. |
| 3  | Pharmaceutical and Food | Your glass bottle is heavy. I am worried about dropping and breaking the bottle.                                                                               | Bottle material has been changed from glass to plastic.                                                                                         |
| 4  | Pharmaceutical and Food | I almost cut my fingers. The warning notice on the label is not clear.                                                                                         | Our department has moved the location of the warning notice and enlarged it.                                                                    |
| 5  | Pharmaceutical and Food | The allergy-causing substances are not clearly informed on the label of the product.                                                                           | Our department has implemented printing a list of individual allergy-causing substances on the label of each product.                           |
| 6  | Food                    | The oxygen absorber was stuck to the food.                                                                                                                     | New packaging will be prevent this problem from recurring.                                                                                      |
| 7  | Hospital                | In my wheelchair, I hit my head on the toilet seat cleaner dispenser.                                                                                          | We will change the location of the seat cleaner dispenser.                                                                                      |
| 8  | Hospital                | There is an electrical outlet on the wall in the pediatrics department, where kids wait. If they touch the outlet, an accident / electric shock may be caused. | The electrical outlet in the pediatrics waiting room has been removed from the wall.                                                            |
| 9  | Transportation service  | The stairs are slippery due to rain entering from open sides.                                                                                                  | We have installed clear glass walls in order to prevent rain water collecting on the stairs.                                                    |
| 10 | Transportation service  | When crossing the railway track by car, visibility is poor because of bamboo trees.                                                                            | Bamboo trees have been cut down.                                                                                                                |
| 11 | Transportation service  | On my way from the air terminal to the bus pool, there is a one-step floor level difference.                                                                   | Yellow warning tape has been placed on the curb.                                                                                                |

# Primary data from a questionnaire survey

The questionnaire survey was conducted in March, 2018, sent to the customer feedback department of forty organizations including pharmaceutical and food industries, hospitals, and transportation service industries. These four industries were selected for two reasons: First, they belong to Business to Customer (B to C) industries. Secondly, many customer feedback cases are posted at their web sites. Twelve responses (30%) were obtained. Each response is a corporate response from the customer feedback department, representing the organizational viewpoint rather than an individual viewpoint.

In the questionnaire survey, all respondents were asked question one: Do you think that customer feedback contributes to service improvement at the overall corporate level?

Respondents were asked to select one most appropriate answer from four choices: “Very useful contribution”, “Useful contribution”, “Somewhat useful contribution” and “We do not know”.

As Table 3 shows, “Very useful contribution” was chosen by 66.6% of respondents and “Useful contribution” was 33.4%.

**Table 3: Customer feedback and service improvement**

| Q1: Do you think that customer feedback contributes to service improvement at the overall corporate level? | Number | %     |
|------------------------------------------------------------------------------------------------------------|--------|-------|
| Very useful contribution                                                                                   | 8      | 66.6  |
| Useful contribution                                                                                        | 4      | 33.4  |
| Somewhat useful contribution                                                                               | 0      | 0     |
| We do not know                                                                                             | 0      | 0     |
| Total                                                                                                      | 12     | 100.0 |

In the second question, all respondents were asked: Do you think that customer feedback contributes to identification of potential operational risk?

Respondents were asked to select one most appropriate answer from four choices: “Very useful contribution”, “Useful contribution”, “Somewhat useful contribution” and “We do not know”.

As Table 4 shows, “Very useful contribution” was chosen by 58.3% of respondents. “Useful contribution” was 33.3%. “Somewhat useful” was chosen by 8.3%.

In the third, fourth and fifth questions, respectively, all respondents were asked whether customer feedback contributed to identification of any risk-related cases, which were categorized as high severity-level risk, medium severity-level risk or low severity-level risk. Respondents answered “Yes” or “No” to each question.

Table5 shows the relationship between existence of any cases and severity level of risks. From the left, the results indicated that customer feedback mainly contributed to minor or negligible risk

**Table 4: Customer feedback and risk identification**

| Q2: Do you think that customer feedback contributes to identification of potential operational risk? | Number | %     |
|------------------------------------------------------------------------------------------------------|--------|-------|
| Very useful contribution                                                                             | 7      | 58.3  |
| Useful contribution                                                                                  | 4      | 33.3  |
| Somewhat useful contribution                                                                         | 1      | 8.3   |
| We do not know                                                                                       | 0      | 0     |
| Total                                                                                                | 12     | 100.0 |

identification. 83.3% answered Yes, while the remaining 16.7% answered No. With regard to medium severity-level risks, 25.0% answered Yes, while the remaining 75.0% chose No. In the high severity-level risk category, in direct contrast to the low severity-level risk category, 91.7% of respondents answered No, while 8.3% of respondents answered Yes.

These results show that, in almost all industries, customer feedback departments recognized that customer feedback contributed to low severity-level potential risk identification, rather than medium or high severity-level potential risk identification.

**Table 5: Customer feedback and severity level of risk**

| Severity level of Risk      | Low        | Medium    | High       |
|-----------------------------|------------|-----------|------------|
| Yes (Existence of cases)    | 10 (83.3%) | 3 (25.0%) | 1 (8.3%)   |
| No (Non-existence of cases) | 2 (16.7%)  | 9 (75.0%) | 11 (91.7%) |
| Total                       | 12 (100%)  | 12 (100%) | 12 (100%)  |

## 5. Conclusions

This study investigated whether risk-related customer feedback contributed to safety improvement of products and services in Japanese organizations, focusing on pharmaceutical and food industries, hospitals, and transportation service industries. The secondary data listed risk-related customer feedback and company responses. The primary data, based on a questionnaire survey, analyzed whether risk-related customer feedback had any significant impact on potential risk identification, and how organizations categorized the severity level of risk identified through customer feedback: high risk, medium risk or low risk.

With regard to pharmaceutical and food products, typical potential risks identified by customer feedback include cuts or injuries incurred by opening packages, bottles and cans, unclear or missing information on the labels showing expiration date and/or allergy-causing substances. Potential risks related to healthcare and transportation service industries arise from inconvenience

due to poor facility for vulnerable people and possible accidents due to poor equipment maintenance.

Our questionnaire survey showed that customer feedback departments recognized the value of customer feedback for both service improvement and risk identification. Finally, in almost all industries which are the focus of this study, customer feedback departments recognized that customer feedback contributed to potential risk identification of low severity level, rather than potential risk identification of medium or high severity level.

## Future research

To continue to move forward on issues related to risk identification using customer feedback, we need case study analyses covering risk management process: risk identification, risk assessment and risk treatment.

## Limitations of study

In this study, the limited number of questionnaire responses reduces the generalizability of research conclusions. A research of other influencing factors such as industry regulations, corporate strategy and organization size will provide a wider scope of analysis.

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