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A Systematic Knowledge Management Approach Using Object-Oriented Theory in Customer Complaint Management

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Abstract: Research into the effectiveness of customer complaint management has attracted researchers, yet there has been little discussion on customer complaint management in the context of systematic knowledge management approach particularly in the domain of hotel industry. This paper aims to address such gap through the application of object-oriented theory for which the notation of unified modelling language has been adopted for the representation of the concepts, objects, relationships and vocabularies in the domain. The paper used data from forty seven hotel management staff and academics in hospitality management to investigate lessons learned and best practices in customer complaint management and knowledge management. By providing insights into the potential of a knowledge management approach using object oriented theory, this study advances our understanding on how a knowledge management approach can systematically support the management of hotel customer complaints.
Keywords: *Knowledge management, Object oriented theory, Customer complaint management, and Systematic approach*

1. Introduction

Businesses dedicate considerable money and resources to research on consumer behaviors in an attempt to understand their target markets. As Drucker (1973) has argued, the purpose of business is to create and then retain a satisfied customer. Similarly, Sheth and Mittal (2004) have pointed out that a business makes money only if it satisfies its customers by catering for their needs. Customer complaint management is relevant to all products and service providers, since it is important to maintaining a successful business. So research into customer complaint management has attracted researchers from various academic disciplines, including marketing (e.g., Fornell et al. 1984; Lovelock et al. 2004), customer behavior (e.g., Blackwell et al. 2006; Gilly & Gelb 1982), psychology (e.g., Brown & Leigh 1996), and service management (e.g., Tax & Brown 1998). Despite such studies, research (e.g., Bounchen 2002) reveals that hotel industry is slow in adopting formal and systematic knowledge management practice and appears lacking the ability to plan strategic and practical progress. More specifically, although research into the effectiveness of customer complaint management has attracted researchers, there has been little discussion on customer complaint management in the context of systematic knowledge management approach particularly in hotel settings.

The aim of this paper is to fill such gap by developing hotel customer complaint management knowledge using an object-oriented theory that provides facilities

to identify actors and objects involved in the domain of hotel industry, and model the relationships among the actors and objects. The paper first discusses the area of customer complaint management in terms of service failure and complaint handling in hotels. The concepts of knowledge management and object oriented theory are reviewed and the systematic knowledge management approach developed is introduced. The development of the approach is to provide insights into the potential of systematic knowledge management in the management of hotel customer complaints.

2. Research Methods

This paper is based on the analysis of the interview data in the context of knowledge management applications in hotel customer complaint management. The primary data analysis includes interviews and discussions with forty seven hotel management staff and academics in Hospitality Management. Each interview took approximately one and a half hours and a semi-structured interview method was used. The focus of the interviews was on knowledge acquisition and validation from the domain experts in terms of lessons learned and best practices in customer complaint management and knowledge management in hotels. The interview data were transcribed, analyzed and used to support the formulation and validation of theoretical and practical understanding of the domain. The data analysis included a two-phase process of: i) data standardization, and ii) data comparison and interpretation.

The data standardization phase is the initial step of the data analysis and interpretation process. At this stage, the research focused on producing a detailed transcription of the interview data. Following the completion of the initial data standardization and input phase, the next step was the process of identifying key concepts, objects and relationships through an iterative qualitative data comparison and interpretation. In common with the frequently used qualitative coding processes such as open coding, axial coding process and selective coding process, this research identifies patterns and concepts through the comparison, categorization, and interpretation of the interview data. The conceptual formation of concepts and relationships is based on the interpretation of the interview data. It is based on the context and the quality of the data, rather than the frequency of the appearance of certain terms from the data**.**

3. Hotel Customer Complaint Management

In the hotel industry, a service failure is considered to be a situation where a hotel organization is unable to deliver the promised quality of services to meet the customer's expectation. Hoffman and Bateson (2001) have argued that service failures are inevitable breakdowns in delivering hotel service because of the intensive involvement of human elements in service delivery. Jones and Newton (1997) have argued that the service performance gap can be further drilled down to the considerations of: a) the differences between the management perceptions of customers' expectations and the actual customers' expectations; b) the service specifications; c) management perceptions of customers' expectations; and d) the service specifications and services actually performed. In practice, an incidence of service failure reveals a service performance gap that is a mismatch between a customer's expectations and the actual service received. It is one of the primary sources for customer complaints. A service failure breaches the central promise concept of a

prospective relationship. This deficiency leads to unfortunate experiences for both the hotel and the customer.

Customer complaint handling has been one of the main functions for customer relationship management. Customer relationship management has been characterized by Eppler et al (1999) as both knowledge intensive and process complex. The former characterization indicates that the customer relationship management process requires knowledge to be gathered from heterogeneous sources and the latter shows that the customer relationship management process mainly involves complex structures. These characteristics imply the importance of a high degree of knowledge in the design and implementation of customer relationship management processes. Research by Piccoli et al. (2003) and Bose & Sugumaran (2003) supports the notion that managing customer knowledge effectively is critical for the design and implementation of customer relationship management systems. Research by VonHippel (1977) has found that most product innovations come not from within the company that produces the product, but from end users of the product. Many hotels use professional marketing people to conduct surveys to find what their customers want. Complaints, on the other hand, tell that what aspect of the service that could not meet customers satisfaction. Customer complaints are a valuable source of information for companies to improve their services or products. Complaints reveal the weak points of the products and services of the company. An enhanced understanding on hotel customer complaint management knowledge will not only benefit the resolution of customer complaints but also improve service quality in hotels.

4. Knowledge Management

Many authors have avoided an epistemological debate on the definition of knowledge, by comparing knowledge with information and data. Data, information, and knowledge are not interchangeable concepts. Watson (1998) has described data as a collection of facts, measurements, and statistics. There is no inherent meaning in data. In organizations, data may be the raw material used in decision-making, but data represents only structured records of transactions. Information is different from data because it has meaning. Drucker (1994) has noted that information is data endowed with relevance and purpose. Watson (1998) has also claimed that information is organized or processed data that is timely (i.e. inferences from the data are drawn within the time frame of applicability) and accurate (i.e. with regard to the original data). Jonscher (2000) describes information as data interpreted by the person who is being informed. Information, then, can be thought of as a message that is intended to have an impact on the receiver. Knowledge resides in the user's subjective context of action based on information (Nonaka & Takeuchi 1995). It is the social construction element of information that has important consequences for knowledge constructs.

Knowledge has been discussed as something that is actively constructed in a social setting Wenger et al. (2002). Group members produce knowledge by their interactions, creating a group memory. Social constructivism views knowledge not as an objective entity but as a subjective, social artifact (Berger & Luckmann 1967). Social constructivists argue that knowledge is produced through the shared understandings that emerge through social interactions. As individuals and groups of people communicate, they mutually influence each other's views

and create or change shared constructions of reality. This perspective views knowledge as context dependant and thus as something that cannot be completely separated from the people that hold the knowledge. The context helps distinguish between knowledge and information. The implication is that knowledge has strong experiential and reflective elements that distinguish it from information in a given context. Having knowledge implies that it can be exercised, for example to solve a problem, whereas having information does not carry the same nuance. An ability to act is an essential part of being knowledgeable. For example, two hotel employees in the same context with the same information may not have the same ability to use the information to the same degree of achievement in a complaint management situation. Hence, there is a difference in the human capability to add value. Knowledge is not a radically different concept from information; rather information becomes knowledge once it is processed in the mind of an individual. In effect, understanding what data, information, and knowledge are and how to get from one to another, could be the quintessence of knowledge management initiatives.

5. Object Oriented Theory

An object orientation views the world as being related between objects. Coad and Yourdon (1990) propose that an object is an abstraction of something in a problem domain, reflecting the capabilities of the system to keep information about it, interact with it or both. Objects are used to model an understanding of the application domain, which concerns the system and abstraction. The central idea of the object orientation subsumes abstraction, generalization and specialization, and polymorphism - concepts that, on the face of it, lends to the re-use, which has been valued by engineering disciplines such as in automobile and software development. The reuse approach is starting to have influence on service-oriented organizations as well. For example, McDonalds' fast food restaurant promotes reuse of rules and procedures in quality control to achieve a consistent brand image.

The object oriented approach has led to the development of readily reusable patterns, components and application frameworks (Fayad et al. 1999a; Fayad et al. 1999b). An object is a building block of any systems or models. Bennett et al. (2002) claims that an object is an abstraction within a system. It can be either a model or the resulting software. A class is a set of objects that share the same attributes, operations, methods, relationships and semantics and the purpose of a class is to declare a collection of methods, operations and attributes that fully describe the structure and behavior of objects. By contrast, an object is an instance that originates from a class; it is structure and behaves according to its class. Abstraction, Generalization and Specialization, and Polymorphism are the most important concepts in object-oriented theory.

Generalization and specialization are two important notions in the object oriented approach. Generalization describes the logical relationship between elements that share some characteristics or describe the grouping of objects that have a common set of properties and operations. Fowler (1997) states that generalization is a taxonomic relationship between a more general element and a more specific element. Specialization is the refinement of an abstraction by adding additional features. The object-oriented approach uses generalization and specialization techniques to realize abstraction. In an employee-manager relationship, an employee object is a generalization, which contains the

attributes of employee id and employee name, and possibly other attributes such as the date of appointment, date of birth and line manager. The manager object has all of the attributes of the employees but with added other responsibilities, for example a manger may be assigned to a special responsibility or be given a right to overwrite certain rules defined in hotel customer complaint management procedures or rules.

Polymorphism denotes the ability to response to the same command differently. Graham (2001, p16.) defines polymorphism as *"the ability to use the same expression to denote different operations"*. Many modern programming languages support polymorphic behavior. In the hotel customer complaint management domain, a particular customer complaint is viewed differently by the front line customer complaint handling staff and the management staff. The frontline staff's responsibility is to resolve the customer complaint whereas management is more concerned with the frequency and risks associated with the customer complaints.

Object-oriented programming languages derive most of their power from inheritance and runtime binding of function calls. Bennett et al. (2002) indicate that the object-oriented approach encourages the decoupling of subsystems. The original object does not need to know which class is going to receive the message on any particular occasion. Instead, a receiving object is responsible for knowing how to respond to messages. Objects can respond differently to the same message and the same message with different implementations. The polymorphism notion permits knowledge engineers to design customer complaint management systems that provide consistent feedback to dissatisfied customers.

Abstraction is one of the principal concepts of object orientation and aims to reduce the level of detail required for implementing software systems. The concept does not refer to a concrete object. Rather, it denotes a quality, an emotion, or an idea. In systems engineering, knowledge is to be seen as an abstraction that is difficult to engineer directly, but the principles can be applied by classes that are more concrete. For example, a customer complaint management knowledge class might be able to capture codified customer complaint management knowledge. The rationale behind the argument is that the more abstract the class, the more difficult it is for the knowledge engineer to articulate the knowledge, especially if it is tacit. Abstraction is a powerful tool for business analysts and software developers. It allows the knowledge engineer to define the top domain in a well-researched domain, without the need to reinvent the wheel.

Most of the modern object oriented software development languages support the notion. Within an inheritance hierarchy, it is likely that some of the topmost classes may contain features whose definitions differ from the subclasses. In other words, there are no implementation details for these features within the super class. This type of class is subsequently known as an abstract class. For example, a knowledge class in the knowledge engineering domain is an abstract class. An abstract class is a class that cannot be instantiated (Szyperski 1997). That is to say that no object can be a direct instance of an abstract class. An abstract class can have unimplemented methods/abstract methods. Concrete classes that inherit from an abstract class have to implement all such abstract

methods. An ideal abstraction should encapsulate all of the essential properties of an object, including data and processes. In a knowledge engineering term, abstraction allows the knowledge engineer to develop top-level concept to support the development of typologies in a given domain.

6. The Systematic Knowledge Management Approach in Customer Complaint Management

This section explains how a knowledge management approach can systematically support the management of hotel customer complaints by incorporating the application of object-oriented theory. The principles accumulated to date in knowledge management and object oriented theory can be applied in domains that are more specific, that is a hotel customer complaint management domain. As the abstract nature of knowledge of object oriented theory provides a powerful means to allow not only knowledge engineers to follow principles and theories but also to apply, validate and enrich the theories in a specific problem situation such as customer complaints in a hotel setting. The representation of the application has adopted the class diagram notation of Unified Modeling Language (UML), based on object-oriented theory, in order to illustrate the concepts, objects, relationships, and vocabularies in the domain. The class diagrams used in the object-oriented approach provide facilities to identify actors and objects involved in a system domain, and model the relationships among the actors and objects. A class is represented as compartmentalized rectangles in the UML notation.

The systematic knowledge management approach in customer complaint management depicted in Figure1 promotes the application of the domain knowledge. In this systematic knowledge management approach in hotel customer complaint management, the main classes are named as customer, employee, complaint, type of complaint, business rule, and communication channel. These are identified through the interviews with domain experts in the hotel industry and hospitality management academics. The hotel customer complaint management knowledge is generated and applied through the management process of the customer complaints. In this domain, the various parties (such as the dissatisfied customers, employees, and suppliers) communicate each other through different channels. With reference to Figure 1, the notations of multiplicity (e.g., 1 or 0..*, or *) are used to indicate how objects may fill the property (e.g., an employee may handle none or many complaints). In UML, the multiplicity between objects/classes is commonly defined as having a lower bound and an upper bound; between classes including the class itself can have association (e.g., the employee class and the complaint class), aggregation (is *the part-of relationship*, e.g., A is part of B).

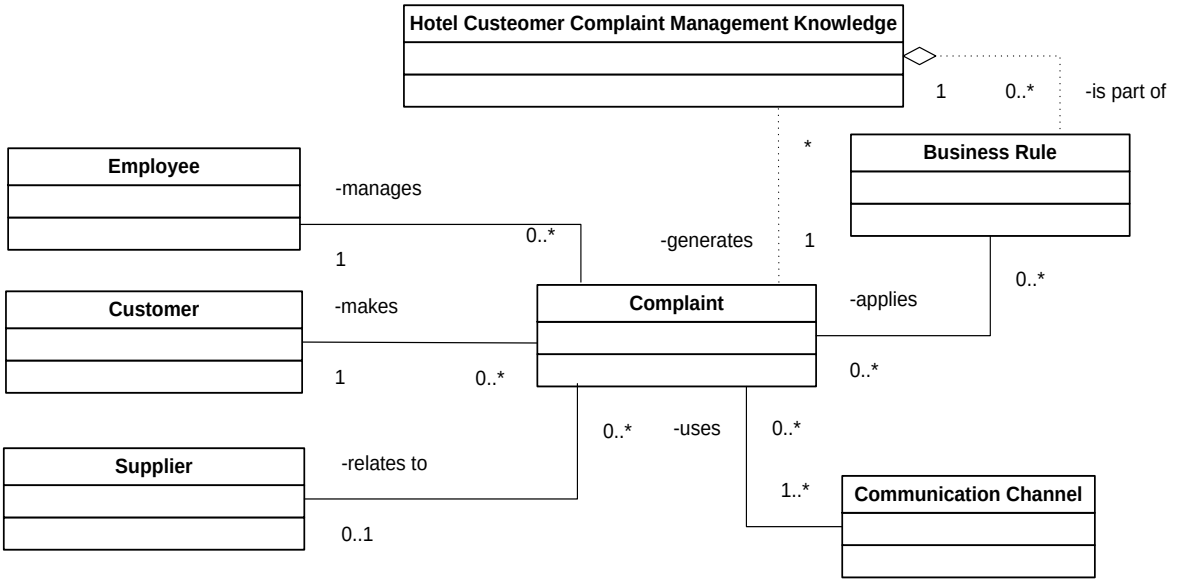


Figure 1: Systematic Knowledge Management Approach

The multiplication between the complaint class and the hotel customer complaint management knowledge class (1 : *) denotes that the management of every customer complaint case can generate many forms of knowledge relating to the management of a customer complaint. The use of a dotted line rather than a solid line between the complaint class and the business rule class to the hotel customer complaint management knowledge class denotes that unless knowledge management activities are being pursued, the concerned hotel might not be able to generate and use the hotel customer complaint management knowledge. The aggregation relationship (i.e., a *part of relationship*) between the business rule class and the hotel customer complaint management knowledge class (0..* : 1) denotes that a business rule in complaint management is a artifact, which is part of the hotel customer complaint management knowledge.

An effective business rule for customer complaint management should be based on the application of the hotel customer complaint management knowledge. The multiplicity between the employee class and the complaint class (1 : 0..*) denotes that at a given time an employee might or might not be involved in many customer complaint cases. The multiplicity between the customer class and the complaint class (1: 0..*) denotes that at a given time a customer might or might not be involved in many complaints. The multiplicity between the supplier class and the complaint class (0..* : 0..*) denotes that suppliers are involved in the management process of customer complaints when complaints are related to the suppliers who provide services to hotels (it is possible that none of suppliers are involved). The multiplicity between the complaint class and the communication channel (0..*: 1..*) denotes that a customer might choose one or more channels to communicate with hotels.

7. Implications and Conclusion

This research demonstrates that the provision of the systematic knowledge management approach is essential for hotels in identifying actors and objects involved in customer complaint management strategies and systems, and in modelling the relationships among the actors and objects. The application of object-oriented theory provides a structure for modelling and representing knowledge of customer complaint management. As
Figure1 illustrates, hotel customer complaint management can generate knowledge to support the development of business rules. In turn, the application of the business rules can support the management of customer complaints by providing effective decision making support. The effectiveness of customer complaint management for a hotel might be affected by the ability of the hotel in managing the hotel customer complaint management knowledge.

Hotel customer complaint management knowledge can be tacit or explicit. The former relates to know how such as, how an individual resolves a customer complaint related problem. It is more difficult to articulate than the latter, but is important in the process of customer complaint resolution and complaint management. This is especially true in an uncertain problem situation, which often requires the problem holders to make certain decisions relying more on experiences in interpreting hotel complaint handling policies and procedures. The effective knowledge management approach to customer complaint management in a hotel relies on the development of business rules for the management of customer complaints. The business rule class is a broad description of how the management of customer complaints can be effectively carried out in a hotel. In practice, the business rules are often defined by the means of customer complaint handling policies and procedures in hotels. The better a hotel's ability to acquire, analyse, and use its customer complaint data, information, and knowledge, the better the hotel in a position of developing their own business rules to support the management of customer complaints.

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