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APPLYING CUSTOMER KNOWLEDGE MANAGEMENT TO ALIGNMENT AND INTEGRATION OF STRATEGY MAPS

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ABSTRACT

Customer knowledge refers to understanding customers' needs, wants and aims. It is essential for an organization to align its processes, products and services to build customer relationships. Managers need to understand how the acquisition and use of customer-related knowledge create value for the organization. Customer knowledge management (CKM) is a strategy that focuses on the task of gathering information including finding effective ways to extract data from customers as well as to locate and absorb information from other sources. This paper builds an information retrieval (IR) and information extraction (IE) system to analyze customer knowledge from the Web. The system is designed to assist organizations in conducting the alignment and integration of strategy objects in strategy maps.

Keywords: Customer Knowledge Management, Information Retrieval, Information Extraction, Strategy Maps

INTRODUCTION

Gaining corporate advantage depends on how quickly the organizations can acquire business knowledge and fulfill customer requirements in the rapidly changing market [1]. Organizations have long recognized knowledge management (KM) as an important business strategy [2]. How to apply customer knowledge effectively to improve business strategy in order to enhance corporate advantage is an important challenge. Traditionally, customer behavior analysis means understanding and distinguishing customers from a variety of different perspectives with a goal to develop products and services. The purpose is to manage the relationship between enterprises and customers to achieve higher customer satisfaction, loyalty and profit contribution [3]. With a global competition, rules of the market change forcing enterprises to adapt swiftly. Exploration and management of the remaining knowledge in customers' mind can help enhance the predicting, responding and value-creating abilities of an enterprise to strengthen its competitive advantages in a dynamic environment [4].

Knowledge is considered as a key factor in global competition and viewed as a foundation of potential competitive advantage for an economic entity to identify or develop core competences [5]. Analysis of knowledge for customers can satisfy customers' needs for information about products, market, and other relevant issues. Exploring knowledge about customers can capture customer's background, motivations, expectations, and preferences for products or services. Comprehending knowledge from customers can help understand the patterns of customers' needs and/or experience of product and/or service consumption [6]. Customer knowledge can be a critical source of competitive advantage. The issue of customer knowledge management (CKM) is widely discussed by many researchers. CKM is a dynamic combination and application of customer's experiences, demands, and insights in customer's contacts with a company [7]. The processes of CKM, which include acquisition, analysis and integration of customer knowledge, can help an organization to record, analyze, share and create customer information [8]. Through these processes, enterprises transform data into customer information and integrate the information throughout the business model to develop customer knowledge competence [9]. CKM provides information related to customers and their experiences to help organizations effectively develop strategic planning to improve competitive advantage.

Traditionally, operational and management control systems in most companies are built around financial measures and targets, which bear little relation to the progress of a company in achieving long-term strategic objectives. Thus, the emphasis most companies place on short-term financial measures leaves a gap between the development of a strategy and its implementation [10]. A strategy map is a diagram that describes how an organization creates value by aligning strategic objectives in explicit cause-and-effect relationships in the four balanced scorecard perspectives (financial, customer, internal processes, learning and growth) [11]. Financial perspective includes two important financial strategies, i.e., expansion of product markets as well as increased productivity. Customer perspective concerns satisfaction of customer requirements and customer expectations. Internal processes perspective refers to transforming intangible assets into customer and financial outcomes through operational management in order to achieve value-creating processes. Learning and growth perspective signifies that the foundation of strategy rests on aligning and integrating intangible assets and activities to achieve value creation. Customer knowledge can effectively provide reference and basis for strategy planning around the four perspectives.

Customer knowledge includes the following domains: conversational knowledge, observational knowledge and predictive knowledge. Observational knowledge is the most difficult to gather and acquire from customers. Web mining is the application of data mining techniques to discover patterns from the Web. Observational knowledge can be gathered and acquired with the mining, extraction and integration of useful information and knowledge from web content. This paper integrates information retrieval (IR) and information extraction (IE) to discover customer knowledge from the Web. Customers can provide their experience, creative ideas, and satisfaction or dissatisfaction with the products or services. Having customer feedback, the

system can effectively analyze, explore and comprehend customer knowledge to assist organizations with conducting the alignment and integration of strategy objects in strategy maps.

The remainder of this paper is organized as follows. In section 2, some related literature is reviewed. Next, we describe how to apply CKM to identify strategic objectives in Section 3. Finally, the concluding remarks are made in Section 4.

LITERATURE REVIEW

CKM can be regarded as a comprehensive concept which integrates customer relationship management (CRM) and knowledge management (KM) [12]. It emphasizes “knowledge from customers” and can be viewed as an extension and development of CRM. CKM uses knowledge gathered through the interactions with customers required for the organization [13]. CKM is mainly used to increase revenue, reduce potential risks and avoid the production of products that do not match customers' needs. It helps to enhance mutual understanding between the company and its customers. CRM emphasizes sustainable long-term relationship with the customers and cultivates customer loyalty what reflects a customer-oriented strategy. CRM involves the processing of customer knowledge to pursue the goals of relationship marketing. Knowledge flows in customer relationship management processes can be classified into three categories including knowledge for customers, knowledge about customers and knowledge from customers [14]. KM emphasizes effective capturing, sharing and diffusion of customer knowledge in the organization. Knowledge asset is an important element for an enterprise in creating value. It includes customer's regarding products, market and suppliers [15]. Through the interactions with customers and by accumulating knowledge, the company can sustainably grow. CKM goals include achieving new product development, establishing or improving customer loyalty, and developing marketing strategies.

Data mining was proposed recently as a useful approach in the domains of data engineering and knowledge discovery [16]. Over the last decade, it has been successfully introduced into the research of Web data management [17] [18]. Web mining is the extraction of interesting and useful knowledge and implicit information from the activities related to the Web [19]. The term “web mining” originally denoted the use of data mining techniques to automatically discover Web documents and services, extract information from the Web resources, and uncover general patterns on the Web [20]. Over the several years, web mining research has been extended to cover the use of data mining to discover resources, patterns, and knowledge from the Web and Web-related data. We use information retrieval (IR) and information extraction (IE) to extract content from the web. Information retrieval (IR) is an activity of obtaining and collecting information resources relevant to information need. Information extraction (IE) is a task of automatically extracting structured information from unstructured and semi-structured machine-readable documents. When extracting web content with web mining, there are four typical steps: 1) collecting, i.e., fetching content from the Web; 2) parsing, i.e., extracting usable data from formatted data; 3) analyzing, i.e., -tokenizing, rating, classifying, clustering, filtering, and sorting information; and 4) producing, i.e., turning the results of analysis into something useful.

Strategy map is a component that represents cause-effect relationships among strategic objectives and summarized depictions of the main parts of a business system that link to drive firm's sustainable competitive advantage [21]. The concept of strategy mapping was originally developed by Kaplan and Norton as part of the balanced scorecard system, a means of assessing how successful a company is in terms of delivering on stated goals. The balanced scorecard of strategy map has four perspectives: learning and growth, financial, customer and internal processes. Strategy map presents how a number of indicators integrate in a company's strategy through the balanced scorecard and also develops the strategy in an efficient way. In business operations, organization must comprehend the market and meet the expectations of target customers' in order to find a unique value proposition. In other words, organization in the strategic planning process must find the target to implement [22]. The purpose of strategy map is to help execute the strategy, that is, after drawing up the measure of indicators for the organization's strategic objectives, we improve employees' abilities and skills for a better customer satisfaction, loyalty, performance. The effect of the strategy map will reflect on enhancing the turnover and shareholders' value.

METHODOLOGY

Business model describes how an organization captures, creates, and delivers value. The process of business model construction is part of a business strategy [23]. A business provides the kinds of products or services based on the propositions of customer, technology and operation. Among them, the proposition of customer is the most difficult to comprehend. How to understand customer requirements, meet customer expectations and manage customer complaints is a challenge in strategy planning. If businesses wish to know the customer, they need not only to quantify the customer-related information but more importantly to comprehend customer knowledge by organizing and analyzing it. Integrating customer, knowledge and management becomes a practical action to execute. CKM can be classified into four categories [24]:

- Management of knowledge for customers: this is knowledge that company provides to satisfy customers' knowledge needs. Examples include knowledge on products, markets and suppliers.
- Management of knowledge about customers: this is accumulated knowledge to understand customers' motivations and address them in a personalized way. This includes customers' profiles, connections, requirements, expectations, and their purchasing behavior.
- Management of knowledge from customers: this is knowledge that customers own with regard to products,

services, suppliers and markets. Through interactions with customers, this knowledge can be gathered to sustain continuous improvement.

- Management of knowledge co-creating with customers: knowledge management seeks to facilitate interactions between customers and the company for the development of new knowledge.

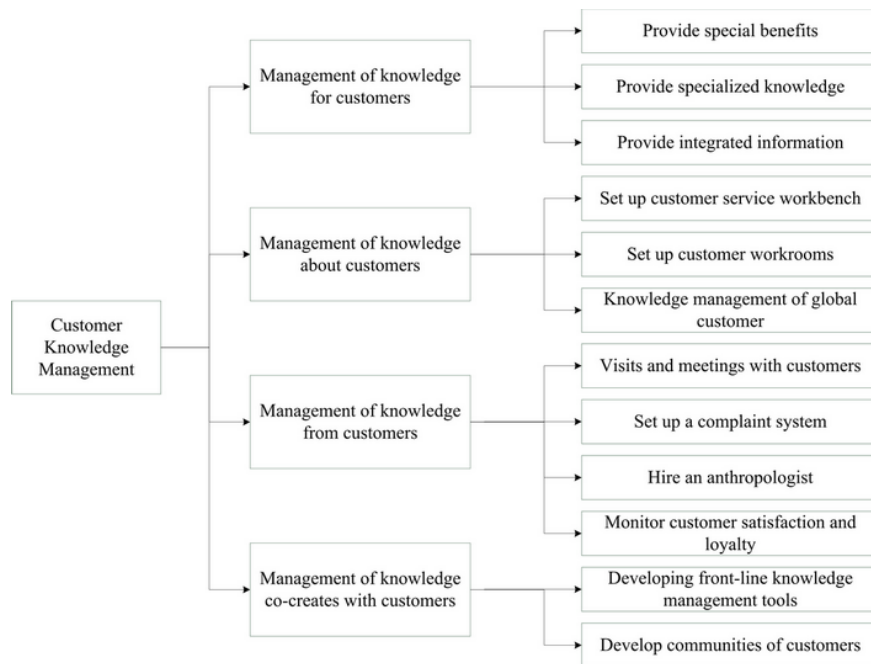


Figure 33. Conceptual model of CKM [7][24][25].

CKM activities should focus primarily on knowing what the customer wants. There are three domains of knowledge related to customers [26] and each domain is defined on the psychological basis associated with the customer. These domains are:

- Conversational knowledge (understanding what customers’ needs via interactions between customers and employees, employees and suppliers, and so forth);
- Observational knowledge (knowledge acquired through observing how customers use products and services);
- Predictive knowledge (knowledge based on analytic models designed to predict likely outcomes).

Observational knowledge is the most difficult to gather and acquire from customers. How to observe and obtain the customers’ usage of products and services is a critical point. Tacit knowledge acquisition is a very difficult task which requires a large number of customers with direct and indirect connections taking the forms of observation or experience exchange. With the rise of Web 2.0, web content services move towards the emphasis on " interactive sharing" and "user experience". By effectively observing, capturing, organizing and analyzing web content, we will be able to have a better understanding of the tacit customer knowledge.

Because of increasing sophistication and changing customers’ preferences, we should apply a dynamic customer-centric approach to observe, capture, organize and analyze customer knowledge. Social media refers to the means of social interactions among people using online services. People can create and share information and ideas in virtual communities and networks through highly accessible and scalable web-based publishing techniques [27]. Social media can support multi-way communication between organizations and their customers with relatively lower costs and higher levels of efficiency than traditional communication channels [28]. Many researchers emphasize the importance of social media in bringing the customer’s aspect into the CKM. Social media support CKM framework which integrates social media services to facilitate the CKM strategies. The framework is shown in Table 1 [29].

Table 24. CKM framework supported by social media [29]

	Management of knowledge for customers	Management of knowledge from customers	Management of knowledge about customers
Micro-blogging services (MBS)	Serve as an avenue for organizations to supply knowledge for customers about their products, markets, offers and also provide customer service	Allow organizations to draw knowledge from customers by actively seeking out customer-driven innovation in their design and production	Keep organizations knowledgeable about their customers and better manage the potential areas of concerns among them
Social networking services (SNS)	Help organizations provide knowledge for customers by keeping them abreast of changes in their products and services	Enable organizations to gain knowledge from customers by comprehending how they react to changes	Facilitate accumulation of a body of shared knowledge about customers, which in turn help promote customer loyalty
Location-aware mobile services	Permit organizations to provide knowledge for customers about offers	Allow the checked in customers to leave tips and comments, which can	Separate customers and help organizations acquire knowledge

(LMS)	and discounts available at a particular branch, encouraging them to check-in at that location	be a useful source of knowledge from customers	about the variations in customers' preferences based on different locations
Corporate discussion-forum services (CDS)	Allow organizations to provide knowledge for customers by publishing content related to their existing products and services, as well as ideas that are currently under experimentation	Encourage customers to express their needs, doubts, purchase intentions, and to contribute novel ideas, which are valuable knowledge that can be acquired from customers	Promote exchange of customer-to-customer know-how, which may be monitored to unearth knowledge about customers in the form of opinions, preferences and electronic word-of-mouth

In order to gather tacit customer knowledge, we use web mining to automatically discover and extract information from the Web documents and services. Web mining generally consists of web usage mining, web structure mining and web content mining as depicted in Figure 1.

- Web structure mining is the process of using graph theory to analyze the node and connection structure of a website and discover useful knowledge from hyperlinks which represent the structure of the web.
- Web content mining is the mining, extraction and integration of useful data, information and knowledge from web content. Furthermore, we can mine forum postings and customer reviews to discover opinions from customers.
- Web usage mining is the process of extracting useful information from server logs and discovering user access patterns from web usage logs.

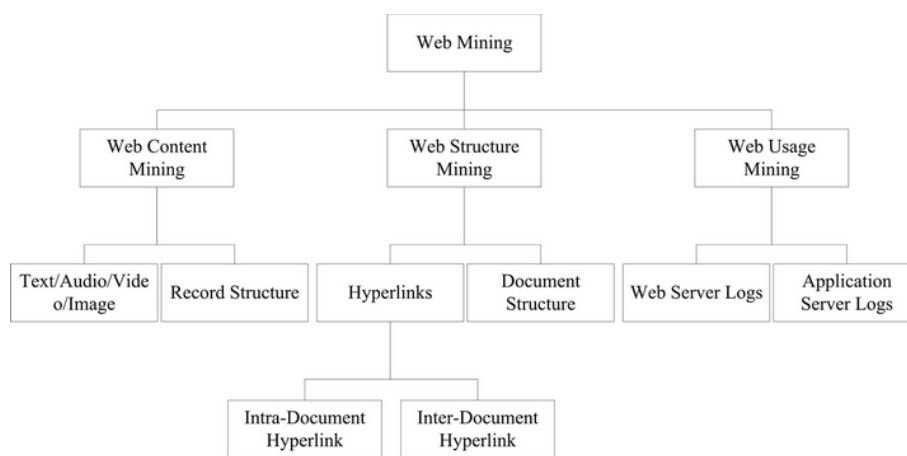


Figure 34. Types of web mining [30].

We apply web content mining to gather and extract customer's experience of using products and services. When extracting web content information using web content mining, there are four typical steps:

- Collecting – fetching content from the Web.
- Parsing – extracting usable data from formatted data.
- Analyzing – tokenizing, rating, classifying, clustering, filtering, and sorting information.
- Producing – turning the results of analysis into something useful.

Organizations plan strategy to define direction and make decisions on allocating their resources according to vision and mission. In order to determine the organization's future direction, it is necessary to understand its current position and possible avenues through which to pursue particular courses of action. Strategy map is a diagram that is used to document the primary strategic goals pursued by an organization or management team. It also provides a visual framework for integrating the organization's objectives. Strategy map portrays the cause-and-effect relationships that link specific capabilities in human, information and organization capital with process excellence, and process excellence with the desired outcomes in the customer and financial perspectives. Organizations pursue these strategic goals to improve competitive advantages in a dynamic environment. The process of developing a strategy map is depicted in Fig. 3.

- Definition of vision and mission. Company establishes organizational identity (vision) and where it wants to go (mission).
- Identification of strategic themes. Strategic themes provide vertical links through the four dimensions seeing the strategy as a parallel and complimentary theme.
- Definition of general objectives. General objectives are generated from the company's vision and mission. A method to select the most important objectives is presented later.
- Internal and external analysis. Strategic internal and external analyses are carried out through SWOT analysis.
- Generation of specific objectives. Specific objectives are derived from a modified SWOT matrix. The consistency between the specific strategic objectives with the organizational strategy on the one side and the general objectives derived from the vision and mission on the other side should be revised.

- Generation of the strategy map. Strategy map is generated by establishing the cause-effect relationship between general and specific objectives.

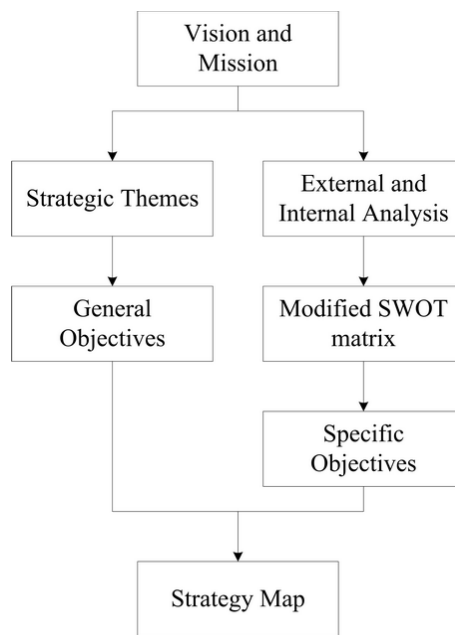


Figure 35. The process of strategy map generation [31].

Strategy mapping encourages managers to look beyond traditional financial measures by applying four different perspectives.

The four performance perspectives are:

- Financial: What do investors expect and what should be followed to reach the strategic goals of the financial perspective?
- Customer: Which strategy goals are to be set with regard to meeting customer needs in order to attain financial goals?
- Internal processes: Which strategic goals are to be set for internal processes in order to fulfill the expectations of customers and investors?
- Learning and growth: Which strategic goals are to be pursued to develop key potentials in order to provide an excellent basis for outstanding results in the other perspectives?

We apply CKM to identify strategic objectives in order to align and integrate strategy maps. We use web mining to automatically discover and extract information from social media. Through the process of collection, parsing, analysis and production, customer knowledge can be extracted and organized. The process is depicted in Figure 4.

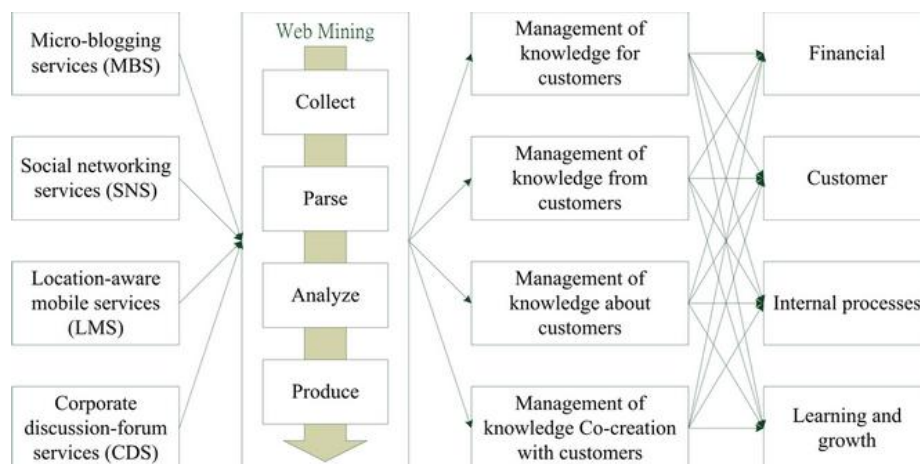


Figure 36. The processes of CKM.

CONCLUSION

The thrust of CKM is to capture, organize, share, transfer and control customer knowledge for organizational benefits. It can help organizations address the specific needs of their customers and make them more effective in enhancing customer satisfaction [32]. Researchers have indicated that CKM can shorten the duration of service calls and improve the quality of the provided service, enhance knowledge transfer to the customer resulting in higher customer satisfaction, higher loyalty and higher revenue, and facilitate more efficient content creation resulting in lower costs [33][34][35]. CKM applies the acquisition and use of customer-related knowledge through direct and indirect interactions with the customers to create value for the organization.

Strategic objectives are derived from the organization's vision and strategy and then classified into the four perspectives which include financial, customer, internal processes, and learning and growth. This paper builds a web mining system to analyze customer knowledge from the Web for identifying strategic objectives as part of the design of strategy maps.

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