International Journal of Applied Engineering Research
ISSN 0973-4562 Volume 10, Number 11 (2015) pp. 27827-27833

http://www.ripublication.com

An Integrated Inference Platform Using Customer Feedback for Performance Management of the Service Industry

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Abstract

The importance of the service industry keeps growing in Korea; however, its level of productivity seems to be lower than other industries as well as that of other advanced countries. Thus, enhanced competitiveness of the service industry requires a comprehensive system for the analysis of customer feedback, evaluation and process improvement. This paper proposes an integrated inference platform and framework process in which customer feedback can be monitored in real-time, a set of issues and problems can be identified, and suggestions can be proposed. For this purpose, an ontology-based system can store related information on service and quality factors, search for necessary information for a raised issue or problem, and conduct the process of drawing inferences.

Keywords: Service Industry, Social Media, Customer Feedback, Framework Process, Integration Inference Platform

1 Introduction

The service industry currently accounts for approximately 60% of the nation's total GDP in Korea. This proportion has been increasing, but its productivity is rather low compared to that of other manufacturing industries as well as that of other OECD countries. This might result from repetitive occurrence of the same problems, which in turn can be attributable to lack of proper quantitative and qualitative evaluation of services provided to customers. It might be assumed, as a consequence, that customer satisfaction and the industry's competitiveness would remain low. The improvement of competitiveness, then, would require customer-oriented feedback analysis, process improvement, and a transition to an evaluation system. To implement this transition, development of an intelligent decision-making support tool is necessary [1][2].

Customers have changed their stance from passive to active and the service providers' sales now heavily depend on customers' opinions and word-of-mouth displayed in blogs, club cafes and SNS. However, the information coming from customer feedback has not been successfully used for the improvement of internal processes, which might partly explain the weak competitiveness of the service industry in Korea [3].

The current paper proposes an organized system of inference platform and framework that will contribute to effective performance management of the B2C industry. The system of platform & framework will enable us to collect and analyze customer feedback, identify customer satisfaction levels and customer needs, and draw inferences of necessary service elements for improvement. The proposed system can monitor feedback data from various channels such as process mining, analysis of customer satisfaction and sensitivity, and analyze the causes of perceived problems. Then, it makes an ontology-based inference of suggestions or remedies for the issues [4].

2 Integrated Platform Framework Process

The target platform consists of a series of systems: (i) a Real-Time Feedback Analysis System for collection and analysis of customer feedback, (ii) a Process Mining System for collection and analysis of process information from a Legacy System, and (iii) an Integrated Inference System for integrated inference in connection with all the systems. Each system consists of an independent ontology-based inference model which in turn acts as part of the comprehensive integrated inference model [5][6].

The current platform consists of a set of components including customer feedback system, web & mobile, multimedia, and online survey. The analysis/inference model is structured as ontology-based so that the total framework can function without change even in the case of channel expansion or model change [7]. The target platform framework is illustrated in Figure 1.

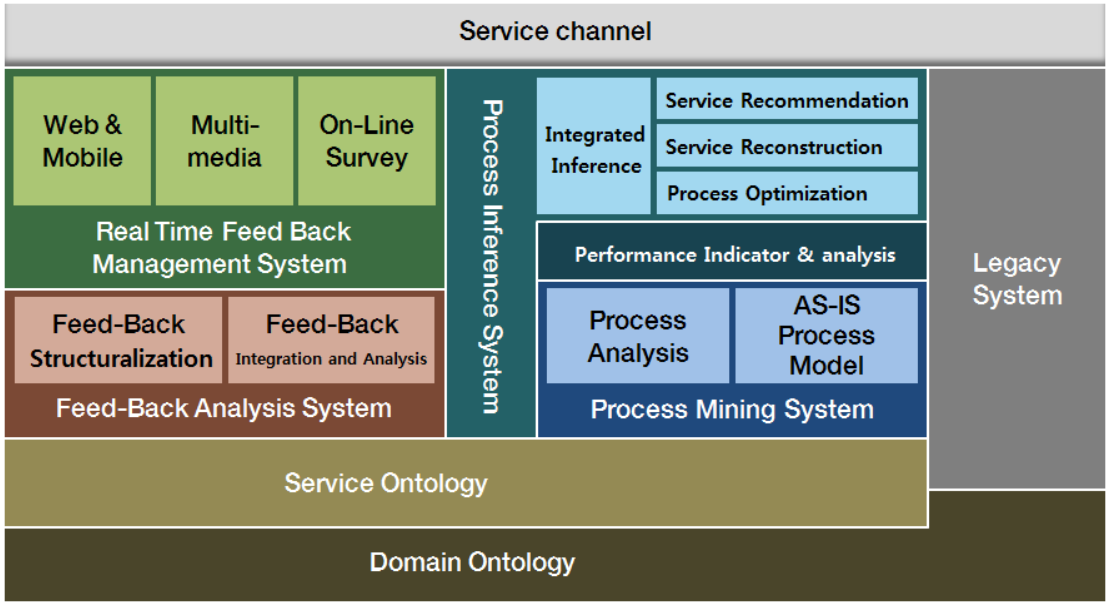

Fig. 1. Target Platform Framework

The proposed system provides technical infrastructure for collecting and analyzing customer feedback, and makes systematic inferences of desirable service elements based on the identified customer satisfaction and their needs from real-time customer feedback. The personalized services are expected to help improve service quality and business performance [8].

The presented inference framework was designed in such a way that it can integrate knowledge obtained by analysis and infer suggestions for processes, reflecting monitors' opinions.

The integrated inference framework shown in Figure 2 proceeds in the following way to support the cycle of PDCA (Plan Do Check Action).

(1) A user monitors customers' feedbacks such as process mining, customer satisfaction level and the results of sensitivity analysis, analyzes the causes of problems or issues and asks for recommendations for improvement.

(2) The suggested recommendation can be selected and applied or another one can be requested.

(3) The change in customers' feedbacks after applying the recommended suggestions is monitored through the dashboard.

(4) The next action is determined according to the change in customers' feedbacks.

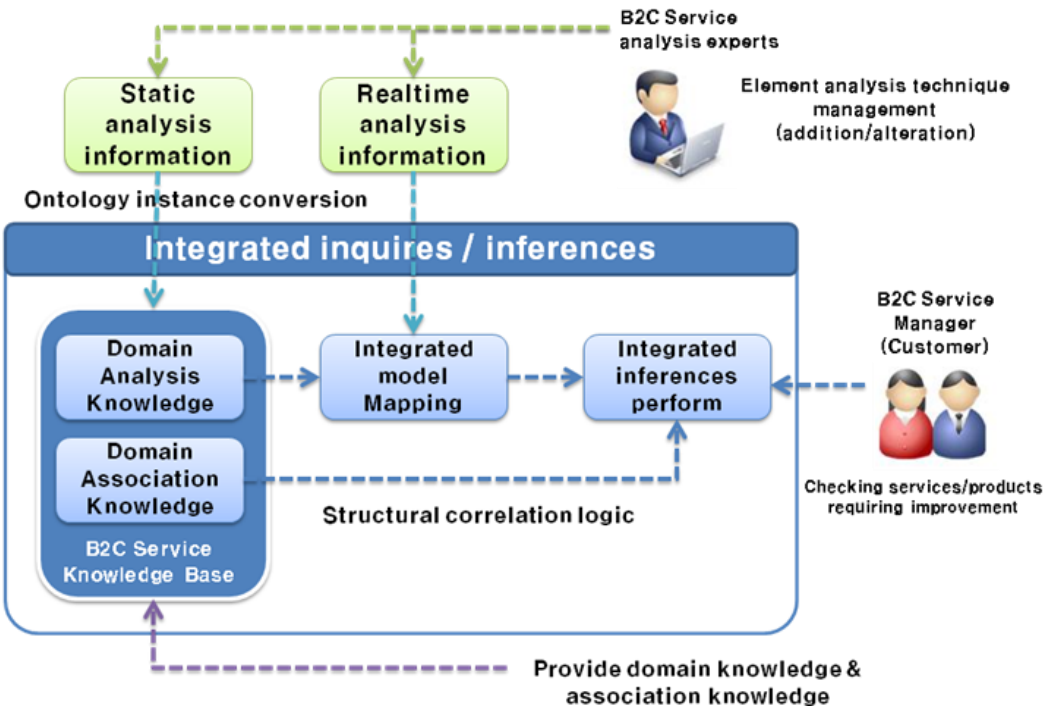

Fig. 2. Integrated Inference Framework Process

3 Ontology-based inference and derivation of improvement suggestions

The flow of analyzing problems and making inferences for improvement suggestions on the basis of the scenario, as shown in the following [9].

(1) The system monitors the KPI index through analysis of process mining, the identified customer satisfaction from surveys, and real-time social sentiments index.

(2) Monitoring can help identify some issues at stake and analyze the causes of the identified problems.

(3) Ontology-based suggestion checking function recommends improvement suggestions on the basis of analyzed problems and their causes. In case proper suggestions are not derived, the manager can input a new suggestion, using a suggestion registration tool.

(4) Newly registered suggestions are stored in the ontology server and mapped onto related information. Then, it can be later used for a similar or identical problem or utilized as knowledge base data in other organizations in the same domain.

As shown in Figure 3, all the analysis results are monitored real-time so that data sharing between analysis technologies can improve the framework. When an issue occurs, the system extracts a list of kinds of information to check from the knowledge base in order to clarify the issues at stake and analyze the causes of the

problems. Each analysis service is asked to deliver the results of analysis so that inferences can be made.

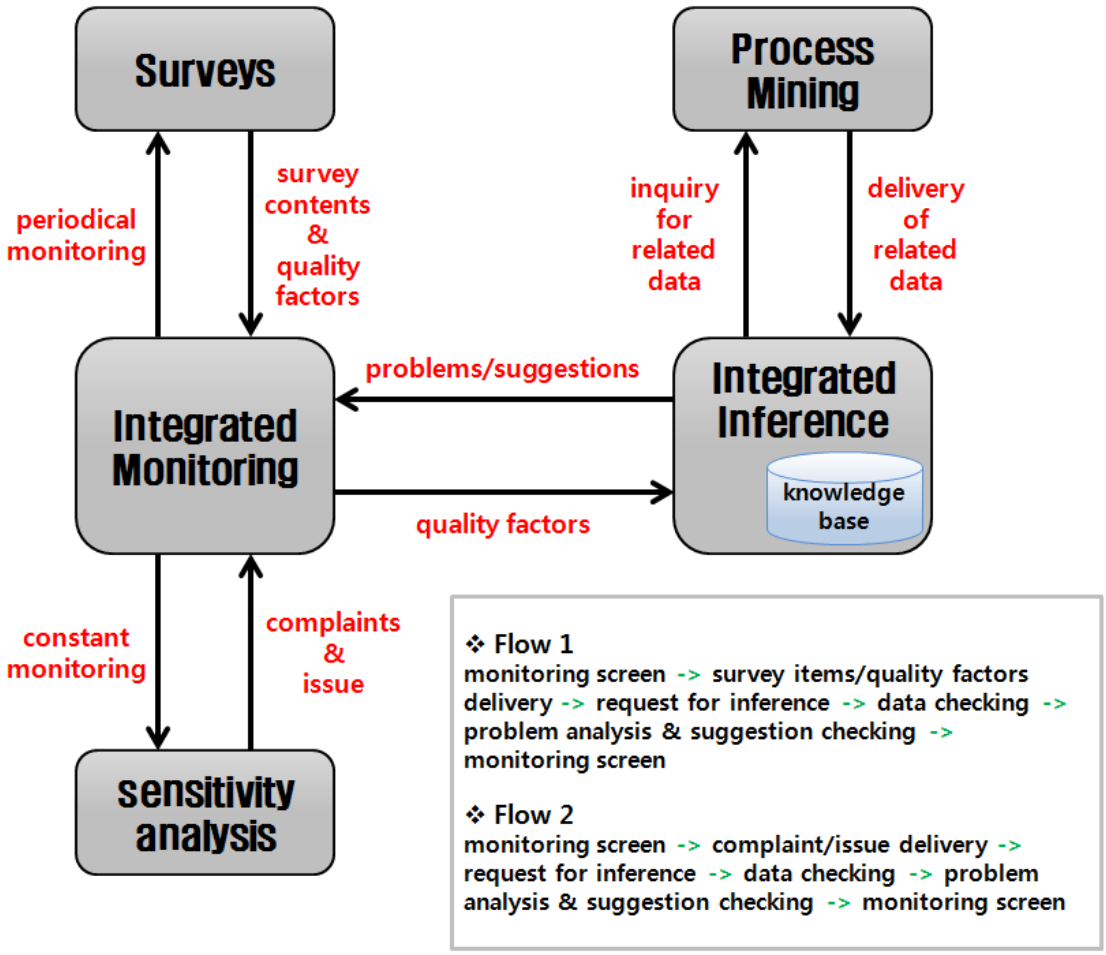

Fig.3. Data Flow for Services under Analysis

Also, the system does not store simple information to notify that a particular suggestion can be provided to a particular service. Rather, the ontology structure can perform multiple functions of problem analysis, suggestion checking, and management of application of the provided suggestions.

For the purpose of problem analysis and suggestion checking, the information of the relationship between services and quality factors is additionally stored in the ontology, which is used when searching for related information for newly emerging issues on a certain service. In particular, a knowledge management service based on an ontology inquiry template is designed for improvement suggestions. This is a module in which users can input, check, revise or delete improvement suggestions by themselves. The crucial idea is that the system, with added templates, should be easily expandable to support the inquiries the user might want to make.

4 Conclusions

Effective management in any business would require adequate collection and analysis of customer feedback. Social big-data is an effective channel to identify customer feedback, since they post spontaneous opinions real-time on social media platforms [10][11]. However, service industries might become uncompetitive resulting from repeated occurrences of the same problem and low customer satisfaction. This may be attributable to insufficient evaluation of provided services in B2C service industry, which might result in a lack of process improvement.

This paper has proposed an integrated platform and framework process in which businesses in the B2C service industry can collect/analyze real-time customer feedback and make inferences for improvement suggestions. The collection of data comes from various channels including sensitivity analysis on the social media, surveys and process mining. Then, service elements demanded by customers are systematically integrated and inferred by the system to provide and support personalized services. In particular, in case appropriate improvement suggestions are not identified by the ontology-based framework, the manager can input a new suggestion for solving the problems by using an input tool. The newly registered suggestion, in turn, is stored in the ontology server and can be used later for similar problems, which means that improved inferences can be made as time goes on with the accumulated list of suggestions.

References

[1] D. H. Rho and S. G. Chung, "A Study on the Adoption Behavior of B2C Public Cloud Service in Korea". Journal of the Korean OR and MS Society, 37, 3, (2012),57-69.

[2] Y. T. Park and Y. E. Moon, "An Empirical Study on the Relationship between Experience and Customer Loyalty in B2C Shopping Mall from An IS Success and Customer Satisfaction", Korean Internet e-Commerce Association, 10,2, (2010),101-128.

[3] H. Yun, "Quantifying Influence in Social Networks and News Media" , Journal of information and communication convergence engineering,10,2, (2012),135-140

[4] H. Yun,"Ontology Versions Management on the Semantic Web", Journal of information and communication convergence engineering, 2 ,1, (2004),26-31.

[5] H. Kumar and P. S. Park, "A Knowledge Ontology for an Enterprise in an Industrial Domain", International Journal of Database Theory and Application (IJDTA), 3, 1, (2010),23-32.

[6] W. M. P van Aalst and A. J. M. M. "Weijters, Process Mining: a research agenda", Computer in Industry, 53, (2004), 231-244.

[7] E. J. Song and M. S. Kang, "An Integrated Inference Platform for B2C Service Customers' Feedbacks", Proceedings International Workshop Networking and Communication 2015, ASTL 94, (2015),9-12.

[8] E. J. Choi and S. H. Kim, "The Study of the Impact of Perceived Quality and Value of Social Enterprises on Customer Satisfaction and Re-Purchase Intention", International Journal of Smart Home (IJSH), 7,1, (2013),239-252.

[9] F. Colace, M. De Santo, "A Network Management System Based on Ontology and Slow Intelligence System", International Journal of Smart Home (IJSH),5,3, (2011),25-38.

[10] A. Enders, H. Hungenberg and S. Denjer Mauch, "The Long Tail of Social Networking: Revenue Models of Social Networking Site", European Management Journal, 26, 3, (2008),199-211.

[11] Ames Manyika, "Big Data: The next frontier for innovation, competition, and productivity", McKinsey Global Institute Report (2011).