

Information Quality Issues in Telco Database Marketing Campaigns

Georgios P. Papamichail

Department of Management Science & Technology
Athens University of Economics and Business
47A Evelpidon & 33 Lefkados Str., 11 362 Athens, Greece
phone:+30-210-8203671
pmichael@aub.gr

Ioannis P. Antoniadis

OTE International - ROMTELECOM
Counsellor Executive Directorate Technical Operations 3
No. 15 Calea Victoriei, B Entrance 4b31 room, Bucharest Sector 3
Romania
ioannis.antoniadis@romtelecom.ro

Abstract

This paper discusses information quality issues concerning consumer data assimilated by telecommunication companies (telcos) in regional and global ventures. First, it describes various problematic and evolving environmental constraints that necessitate the adoption of new integration technologies. Then, it describes the consumer information characteristics and demonstrates that they require handling as a product having a full life-cycle. Our prime objectives are to assess the business impact of consumer data quality and to determine effective information technology decision-making strategies for telco database marketing campaigns.

Keywords

Consumer Data Quality, Telco Database Marketing, Integration technology, Computer Science, Global Environment Competing.

1. Introduction

Market deregulation coupled with the creation of new regional emerging markets (e.g., Balkan territory and Eastern European countries) has rendered telecommunications as one of the most demanding business areas. Telecommunication companies (telcos) strive to design and develop new infrastructures, novel products or enriched bundles of existing products in order to improve their market shares. At the same time, they form larger, more global markets across heterogeneous physical or logical communication networks. The times between the development of a service or product, the exposure to the market and its final disposal have shortened significantly. At the same time, there exists a significant segmentation of customers into discrete groups for distinctive contact strategies and promotional offerings, respectively (Setnes & Kaymak 2001). In this way, the struggle for achieving and retaining larger market share is further intensified.

Telcos efficiently target discrete groups of customers spending large sums of money trying to identify profitable prospect segments. They initially partition the contact population into a small number of suitably different groups and eliminate unlikely buyers. In a more sophisticated step, they divide the population using key characteristics that are believed to be purchase determiners. However, it is possible that this partition creates overlapping consumer categories (Russell & Loadwick 1999). Finally, after a campaign, results are evaluated enabling a learning process by tuning the categorization and the corresponding products or services (Sinkula *et al.* 1997).

In all cases, the information used in telco database marketing campaigns must have certain “quality” characteristics. These include: excellence, value, fitness for use, usefulness, conforming to specifications and meeting or exceeding consumer expectations, among others (Reeves & Bednar 1997). It is interesting to note that the latter two can be defined and measured more effectively than the others. Conforming to specifications, corresponds directly to the completeness, accuracy and freedom-from-error databases, and to the process used to deliver the services to the consumer. Meeting or exceeding consumer expectation corresponds to the usefulness and relevance to the needs of the information consumer, and to his ability to further utilize information to add value to his tasks (Kahn *et al.* 2002).

The purpose of this study is to establish a research framework on managing consumer data and information as a product with quality features in telco database marketing campaigns. It identifies the most critical data quality issues and justifies them in a straightforward manner. It presents the research methodology used, giving special attention to the consumer data semantics acquisition and integration technology concerns. Finally, it comments on the implications of a holistic consumer data quality approach and future research directions.

2. The Need for Research

Several research attempts can be found where data quality is described as a significant integration technology research need (see, for example, Wang *et al.* 1995, Madnick 1995). By the term integration technology, we refer to the intersection area between computer science and information systems, otherwise named information systems and technology (ITS) core. Along with data quality, two other equally important dimensions are: data semantics acquisition and evolving semantics. Data semantics acquisition involves capturing and disseminating knowledge about data meanings and it facilitates the data reconciliation and integration process (Siegel & Madnick 1991). It proves especially valuable when business operations become dispersed both geographically and functionally, and usually takes place before the reconciliation between conflicting definitions of database terms. Evolving semantics involves changes in semantics as well as context in autonomous databases which evolve independently. The apparent objective of this dimension is to establish a 2-way communication model through which the independent databases can capture and represent the meanings of various contexts under the same prism over time.

Characteristically, Madnick (1995) mentions that: “*An organization can be simultaneously “data rich” and “information poor” if they do not know how to identify, categorize, summarize and organize the data*”. In the telecommunication sector, this translates to a need for efficient data modeling and development of computational methods that will take into account the temporal characteristics of the consumer data and transform it to organizational information useful for database marketing campaigns. Several efforts have been materialized towards achieving these goals

implementing data warehousing concepts (Vassiliadis 2001) and fuzzy clustering in data mining (Russell & Lodwick 1999). XML-based approaches have made it possible to develop data interchange formats to accommodate the delivery of conditionalized content and the enforcement of business rules in distributed database systems (Van Amstel *et al.* 2000).

Due to the above facts:

As a result of the above-mentioned factors, the heterogeneity of communication networks in different regions or emerging markets, creates challenging consumer data quality and information issues. Data semantics acquisition becomes a necessity for telcos if they want to provide global infrastructures, universal access patterns, and adaptable products to different structured markets while satisfying consumer needs in different geographical regions.

Since the times between product conception to production and the response time to competition have shortened, information must be handled as a product with temporal characteristics. Under this perspective, different integration technologies must be carefully examined to identify those that can serve better this temporal nature.

There is a crucial need for a methodology that assesses how well telecommunication organizations develop information products and deliver information services to consumers. This methodology must be able to provide benchmarks for comparing information quality across different organizational settings. Furthermore, it must facilitate the efficient transformation of consumer data to organizational quality information.

3. Research Methodology

In this paper we examine integration technology research factors in the telecommunication industry context such as consumer data quality, data semantics acquisition and evolving semantics. In a first step, we developed a conceptual model for describing data quality by extending the model described in Kahn *et al.* (2002). Taking into account the research needs described in the previous section, we assigned four views of quality as the rows of the model (see Table 1). While excellence and value are subjective measurements of quality they provide a means of estimating the impact of the products and services to the mind of the consumer. Excellence makes products distinct augmenting brand building, and gives higher ranking for services among these offered by competitors. Value describes the durability of products in the marketplace and the value-adding characteristics of services to the consumer functions. Conformity to specifications indicates that product information is accurate, complete and free from error while service information is dependable and the customer can always refer to it in a timely manner. Meeting or exceeding consumer expectations covers the consumer view of the product or service, which must be useful and usable.

	Product Quality	Service Quality
Excellence	Brand-building information	Level-of-service information

Value	Durability information	Value-adding information
Conforms to specifications	Sound information	Dependable information
Meets to or Exceeds Consumer Expectations	Useful information	Usable information

Table 1. Aspects of the Information Quality Model

In a second step, we mapped the dimensions of data quality (Wang & Strong 1996), which we extended in the cases of excellence and value, into our conceptual model, as depicted in Table 2. In order to perform this mapping we interviewed 30 professionals in the telco sector to determine which dimension belongs to which quadrant. We considered whether each dimension is an aspect of product or service quality and we found that in all but the case of one they fell solidly into one category. Security appeared to be equally important, in the telecommunication business area to the sound information (product quality) and to the dependable information (service quality) quadrants.

Some simple observations are that product quality refers not only to tangible aspects but also to intangible such as reputation, replacement cost and reselling capability of a product. The consumer requires the excellence and value of the product to be reflected in his ability to preserve the product in good shape (durability) and resell or replace it without losing money or face. In parallel, he requires that the corresponding services preserve a high ranking in the marketplace and add value to his other business or personal functions when combined.

	Product Quality	Service Quality
Excellence	Brand-building information Reputation	Level-of-service information Ranking in the marketplace
Value	Durability information Durability Replacement Cost Reselling capability	Value-adding information Value-Added
Conforms to specifications	Sound information Free of error Concise representation Completeness Consistent representation Security	Dependable information Timeliness Security
Meets to or Exceeds Consumer Expectations	Useful information Appropriate amount	Usable information Believability

	Relevancy Understandability Interpretability Objectivity	Accessibility Ease of manipulation
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Table 2. Dimensions in the Information Quality Model

Finally, we performed a rigorous case study in three subsidiaries of a European multi-national telecommunications company to demonstrate the efficacy of our model and to examine possible drawbacks. Approximately 40 people in each subsidiary completed a 60-item questionnaire assessing the quality of their customer data according to the information quality dimensions. All items were measured on a 7-point Likert scale. The statistical results showed interesting differences among the three sites. Although we expected that organizations focus primarily in the conforming to specifications quadrants, great concern was given to meeting to or exceeding consumer expectations especially in markets just being deregulated. Excellence and value appear to be important by marketing departments for retaining customers and shaping a better image for the company in the market.

4. Expected Research Contributions

In the research context explained above our paper attempts to:

1. Demonstrate the efficacy of the conceptual model presented above through rigorous case studies in the telco sector in different regional markets. It is expected that variations in information quality dimensions importance will appear when comparing different markets, especially those having diverse cultural and demographic characteristics, (e.g., Balkans).
2. Examine organizational issues in the telecommunications sector affecting information quality through:
 - Investigating the necessity and role of an Information Quality Product Manager for information products developed by telecommunication companies taking into account the particularities of regional markets (Wang *et al.* 1998).
 - Examining how integration technologies and the corresponding development of products and services might disrupt the organizational processes.
 - Identification of the way that telcos manage information quality in sudden business changes when the “tried-and-true” methods of conducting business lose effectiveness.
3. Develop information quality benchmarks differentiating between telecommunication products and services since a “one size fits all” set of metrics is not a solution. These will utilize methods and approaches taking into respect the sensitiveness of data in telecommunications, especially its ethical dimensions.
4. Determine effective information technology decision-making strategies for telco database marketing campaigns. This can be achieved by comparing methods and results with more open environments where they are also useful, such as other database marketing application areas.

5. Implications and Conclusions

The first results of our research suggest that information quality affects effective business decision-making in the telecommunication sector. The conceptual model presented provides a means for organizations to assess the development of sound, useful, durable and brand-building products. At the same time, it allows the delivery of usable, dependable, value-adding, top-ranked services to the consumers. The efficacy of the model is delineated through a series of case studies in the telco sector, which take into account the diverse cultural and demographic characteristics of consumers in different geographical regions.

Future research directions include the development of benchmarks for information quality in different organizational settings and the examination of the role and functions of people responsible for information quality in the service or product divisions of the telecommunication industry. Furthermore, it is of great importance to identify how business decisions regarding customer data quality are affected when new technologies are introduced in rapidly changing technological areas like mobile computing.

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