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Research on Big Data Ad Hoc Query Technology Based on an Accident Insurance Campaign †

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Abstract: Lots of Insurance companies have constructed databases for ad hoc query software in Taiwan that combines customer relationship management and marketing campaign management. An ad hoc query is a non-routine and specific query performed in real time to filter specific customer information from big data. Ad hoc query has the strength to retrieve customer information more quickly and conveniently than by filtering target customer lists using a mainframe or OLAP. In this study, the strengths and weaknesses of ad hoc query, online analytical processing (OLAP), and general query using a mainframe are analyzed. The results indicate that ad hoc query has the advantage of flexibility for users' specific needs. Ad hoc query has obstacles and challenges for users regarding how to learn its system fields and writing programs. It is concluded that the design between individual assured suggestions and a convenient operation process is critical for raising the response rate. Additionally, precisely filtering technology for target customers is the key success factor for an accident insurance campaign.

Keywords: ad hoc query; big data; accident insurance campaign

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1. Introduction

1.1. Research Motivation and Objective

Originally, most insurance companies query and filter customer data using an existing mainframe. However, mainframe queries are not convenient for users and marketers. Today, lots of insurance companies have constructed customer relationship management (CRM) using big data. There are many analyses and query tools in CRM such as ad hoc query and online analytical processing (OLAP) tools [1–3].

The staff of all non-IT departments execute customer management and marketing campaign management using ad hoc query, an OLAP platform, and CRM. There are different strengths and weaknesses of ad hoc query, OLAP query, and general query when using a mainframe system. We study what query needs are suitable for ad hoc query campaigns and their key success factors via accident insurance campaigns. It is helpful to realize feasible and specific campaign needs to summarize the critical success points of a direct mail campaign.

1.2. Research Scope and Methods

This research compares the strengths and weaknesses of ad hoc query, online analytical processing (OLAP), and general query using a mainframe system. It is helpful to realize which of these methods is feasible for specific campaign needs.

This research endeavors to summarize the critical success points of a direct mail campaign by reviewing campaign experience. The details of the research are shown in Figure 1.

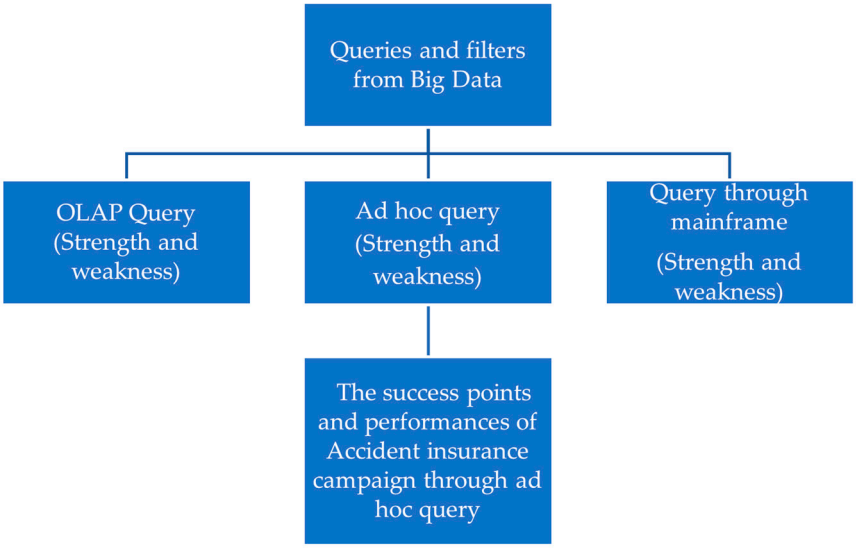

Figure 1. Structure of research.

1.3. Research Restrictions

1. There are few studies on the campaign performance of direct mail in the insurance industry. The research can only compare the performance of a general product campaign rather than an accident insurance campaign.
2. The research compares campaign performance by evaluating response rate rather than other indicators.
3. Data mining or other query tools are not within the scope of the research.

2. Literature Review

There are many approaches to consider for customer relationship management databases, including ad hoc queries, OLAP queries, and general queries using mainframe systems. A general query is the original approach used to retrieve customer and policy information before the construction of CRM. Employees of insurance companies need to prepare the system requirement documents and send them out to the information and technology department for system program development and permission. An ad hoc query is a one-time or specific query performed in real time to retrieve specific information from big data. Users need to write SQL or related programs to filter data from the database [1–3].

The OLAP platform is related to relevant statistical analysis by the performance of online real-time and multidimensional customer analysis via the user's simple click-and-drag operation. The OLAP platform is an interactive business intelligence and data pre-aggregation application for data querying [1,4,5]. However, the system fields and functions of OLAP are restricted to defined functions.

The response rate of direct mail marketing campaigns has been on a downtrend in the past few decades in several areas [6]. According to the related literature, traditional product-directed mail campaigns typically receive a response rate of around 0.5−2% [6–10].

3. Comparison among Ad Hoc Query, OLAP Query, and Query Using a Mainframe

3.1. The Comparison among Ad Hoc Query, OLAP Query, and Query Using a Mainframe

We compare the strengths and weaknesses of ad hoc query, online analytical processing (OLAP), and general query using a mainframe system. Although mainframe query is not convenient for the operations of users and marketers, it has the strength of the widest range of data. However, it needs complicated programs and system knowledge.

Ad hoc query filters customer name lists more quickly and conveniently than a general data query using a mainframe. Ad hoc query has flexibility in writing SQL programs. On the other hand, ad hoc query has obstacles and challenges for writing programs and system fields. An example SQL program is shown in Table 1.

Table 1. An example of a SQL program in ad hoc query.

Items	Content
Tables	• Database Table 1: applicant_table • Database Table 2: acct_life_table • Product: personal accident insurance • Channel: agency channel
SQL ProgramExample	sel applicant_ID, Name, address, total_assured from applicant_table inner join acct_life_table on insured_id = insured_id where total_assured < '1,000,000' and channel = '1' and product_code like any ('IPA%', 'PAR%')

Source: this research.

OLAP query has the strength of being easier to operate. However, the OLAP platform is for regular and defined requirements, so the scope and function are highly restricted. Ad hoc queries and OLAP queries are based on real time, but the database must be updated regularly.

3.2. The Comparison Summary for Three Approaches

1. The most flexible and feasible campaign management approach is the ad hoc query approach.
2. The approach that allows the easiest operation of the drag and drill process is the OLAP query approach.
3. The approach with the widest range of data, which are updated immediately, is the mainframe query approach. The details of these approaches are shown in Table 2.

Table 2. Comparison among ad hoc query, OLAP query, and general query using a mainframe.

Approach	Strengths	Weaknesses
Ad hoc query	• Flexible and non-regular needs. • It is feasible and convenient to plan marketing campaigns. • Wider data range. • The recency rule is easily contained. • Authorized users can query by themselves.	• The obstacles of learning and writing SQL programs. • The obstacles of learning system fields.
OLAP query	• Easier operation of the drag and drill process. • Regular and defined query needs. • Authorized users can query by themselves.	• The system fields and functions are highly restricted. • The recency rule cannot be easily contained for a specific campaign.
General query using a mainframe	• The widest range of data, which are updated immediately.	• Complicated professions of the program are necessary. • Only specific staff of the department can query by themselves.

Source: this research.

4. Design and Performance of Insurance Campaign

4.1. Planning and Design of Campaign

After a CRM system is constructed, the customer management and the marketing campaign management become convenient for the operations and the launch. Big data

marketing needs more precise marketing to enhance the campaign performance. If the campaign is launched while target customers need a timely and automatically combined management process, the campaign performance may be better. The planning and design processes of the direct mail campaign are as follows [1]:

1. Querying and filtering target customers: after comparing the mainframe query, OLAP query, and ad hoc query, the ad hoc query approach is selected to filter target customers.
2. The recency rule of target customers is defined.
3. The appropriate insurance and product recommendations are provided for each target customer.
4. Personalized customer letters are prepared with touching, warmer, and life-oriented care.
5. A simple insurance application and premium withholding process is planned for target customers.
6. Follow-up reminders and statistics tracking management are prepared.

4.2. Filtering Criteria

The filtering criteria of the accident insurance campaign are summarized as follows:

1. Target customers need to be existing and effective individual customers.
2. The insured must be the same person as the applicant of the main contract for every responding target customer.
3. The range of insured ages is restricted between 20 and 60 years old.
4. The occupation level of target customers is restricted to level 1.
5. Target customers must have no claim records.

After filtering from the CRM database, the campaign retrieves around 41,700 customer name lists. Precisely filtering technology for target customers is the key success factor for the accident insurance campaign.

4.3. Direct Mail Planning of Accident Insurance Campaign

The accident insurance campaign is focused on direct mail marketing based on target customers via ad hoc queries. The accident insurance marketing campaigns are combined with individual assured suggestions and a convenient operation process. The key process of the direct mail accident insurance campaign is listed as follows:

1. Adopting two-stage direct mail marketing.
2. Offering appropriate accident insurance rider suggestions: suggestions for accidental death, dismemberment, major burn, and disability coverage are included for every customer.
3. Health statements: customers do not need any health statements.
4. Premium payment method: the same premium payment method as the main insurance contract.
5. Simplified insurance application process: Every policyholder directly signs the preauthorized insurance application form and sends it back to the company. The company automatically underwrites the insurance application for every customer.

4.4. Campaign Performances and Recommendations

The campaign sent out around 41,700 direct letters, and around 1300 physical letters received back. The total response rate of the campaign was around 3.1%. The average annualized paid premium per policy was around NTD 3100, and the total annualized premium was around NTD 4 million.

Traditional product-directed mail campaigns typically receive a response rate of around 0.5−2% according to related studies [6–10]. The response rate of the researched insurance campaign, thus, has a better response rate than a traditional direct mail campaign. There are some recommendations for the insurance campaign, which are listed as follows:

1. If the budget is sufficient, the control group and the test group may be included for comparison purposes.
2. Several customers complained about higher premium expenses compared to other accident insurance companies in the insurance market. It is feasible to launch a campaign with less coverage and a lower premium expense basis while the number of target customers is sufficient.

5. Conclusions and Recommendations

5.1. Conclusions

Although mainframe query is not convenient for the user's customer management and campaign management, it has the strength of a complete range of data. Additionally, ad hoc query filters customer name lists more quickly and conveniently than a general data query. Ad hoc query has the strengths of flexibility and a wider range. On the other hand, it has obstacles and challenges for users regarding how to learn its writing programs and system fields. OLAP query has the strength of an easier operation process for defined query needs. However, the system fields and functions are restricted in the OLAP query platform.

The researched campaign sent out around 41,700 direct letters with a total response rate of around 3.1%. The average annualized premium per policy was around NTD 3100, and the total annualized premium was around NTD 4 million. The response rate of the direct mail campaign using ad hoc query was higher than the response rate of a traditional direct mail campaign.

The research finds that the the design of personalized assured suggestions and a convenient application operation process are critical for the performance of direct mail campaigns. Additionally, precisely filtering technology for target customers is also important for the researched campaign.

5.2. Recommendations

1. It is recommended to include other kinds of insurance products in the direct mail campaign.
2. There are many measure indicators for marketing campaigns. It is recommended to include comprehensive campaign performance indicators.
3. It is recommended to include comparisons with other data mining or other query tools.
4. If the budget is sufficient, the control group and test group may be included for comparison purposes.
5. It might be feasible to launch a campaign with less coverage and a lower premium basis while the number of customers is sufficient.

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