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Issues and methods of quantitative and qualitative data analytics for business operations optimization

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Abstract

Nowadays reliable data analyses of business activity of an enterprise is becoming a crucial part of making effective decisions that can help optimize business processes. The theses considers data analysis of both quantitative and qualitative research for business processes optimization. Explanation of the typical cases in which each of the method is used are given.

Keywords: data analysis, quantitative research, qualitative research, optimization

1 Introduction

The nowadays amount of data an organization can collect from a variety of sources enables them to get a deeper outlook on the business processes, understand which of them are working, and help teams predict future trends. However, without properly analysis and comprehension of the data collected, all the management has is figures and numbers with no context.

There isn't one universal data analysis method. Depending on a company's needs and the type of data collected, the right data analysis methods can vary. This also makes it necessary to understand each type of data, and which methodology can deliver the best results. Nevertheless, there are some common techniques that are included into most data analytics software as they were proven to be effective [3].

2 Main part

Data Analysis is the process of systematic application of statistical and/or logical techniques to describe and illustrate, condense and recap, and evaluate data. In this sense, various analytic procedures provide a way of making inductive inferences from data and distinguishing the signal (the phenomenon of interest) from statistical fluctuations present in the data. An essential component of ensuring data integrity is the reliable and appropriate analysis of research findings. Improper statistical analyses distort scientific findings, mislead casual readers and may negatively influence the public perception of research.

2.1 ISSUES OF RELIABLE DATA ANALYSIS

There is a number of issues that researchers should take into account respecting data analysis. Those include:

- Having the necessary analytical skills
- Accurate selection of data collection methods and appropriate analysis
- Unbiased inference drawing
- Analysis of inappropriate subgroup
- Statistical significance determination
- Lack of clearly defined and objective outcome measurements
- Methods of data collection
- Validity and Reliability
- Extent of analysis

2.2 QUANTITATIVE AND QUALITATIVE DATA

Quantitative data deals with quantities and exact numbers. This data includes sales data, marketing data, such as clickthrough rate, salary data, revenue and other data that can be calculated and measured objectively

- Regression analysis

Regression studies are usually used to make predictions and forecast future trends. Regressions measure the relationship between a dependent variable (what a researcher wants to measure) and an independent variable (the data a researcher uses to predict the dependent variable). While there can be only one dependent variable, having a nearly limitless number of independent ones is possible. Regressions also help uncover areas in business operations that can be optimized by highlighting trends and relationships between factors.

- Correlation analyses

Correlation analysis is a statistical method used to evaluate the strength of relationship between two quantitative variables. A high correlation means that two or more variables have a strong relationship with each other, while a weak correlation means that the variables are hardly related. This technique is strictly connected to the linear regression analysis that is a statistical approach for modeling the association between a dependent variable, called response, and one or

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more explanatory or independent variables.

The standardized values can vary between -1 and +1, where 1 indicates perfect positive (linear) relationships, -1 a perfect negative (liner) relationship, and 0 stands for no correlation at all.
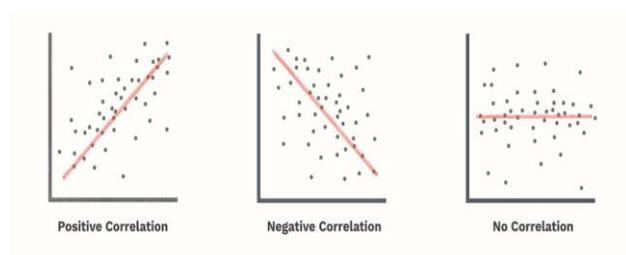

Figure 1 Visual interpretation of correlation of +1, -1 and 0

- Monte Carlo simulation

Monte Carlo simulations are usually perceived as to calculate the effect of unpredictable variables on a specific factor and use probability modeling to help predict risk and uncertainty. To test a hypothesis or scenario, a Monte Carlo simulation will use random numbers and data to stage a variety of possible outcomes to any situation based on any results. This tool is widely used among a number of fields including project management, finance, engineering, logistics etc. By testing a variety of possibilities, a rearcher can understand how random variables could affect your plans and projects [2].

Qualitative data is more interpretive and subjective as it pertains to aspects of an organization and is used to determine patterns. That includes information taken from customer surveys, interviews, and generally refers to qualities over quantities.

- Content analysis

The content analysis method helps to understand the general patterns that emerge in qualitative data. Usage of techniques like color coding specific themes and ideas helps parse textual data to find the most common threads. Content analyses is most effective when analysing data such as user feedback, interview data, open-ended surveys, and more. This can help identify the most important improvement areas.

- Narrative analysis

The narrative analysis focuses on the way stories and ideas are communicated throughout a company and can help a researcher better understand the organizational culture. This might include interpreting how employees feel about their jobs, how customers perceive an organization, and how effective operational processes are viewed. It is usually implemented when contemplating changes to corporate culture or planning new marketing strategies [1].

3 Conclusion

Concerning the mentioned above issues, there is no universal standard for statistical analysis or right way to conduct quality data analysis. On one hand, researchers face a number of issues concerning both accuracy of the primary data and skills set of an analytical team members coupled with the level of their work coordination. On the other hand, there is a variety of data analysis methods for either quantitative or qualitative research. The method chosen by a researcher should always correspond to the data they have collected, and the type of insights they want to extract. Matching the right data and analysis helps uncover deeper insights to optimize business processes.

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