## Key Concepts of Designing Business Processes in Hospitality Enterprises: Trend Analysis

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*Abstract:* - The article is devoted to studying design business processes concepts with the use of trend analysis. The study aims to develop a methodology for designing business processes based on the study of the business design theoretical foundations and data trend analysis. The field of research is the business processes of the hospitality industry, which includes the operation of hotels and restaurants. The article proposes a methodology as well as a set of methods for business process design. These are statistical and economic analysis methods, trend analysis, correlation analysis, and horizontal and vertical analysis. The result of the study is the methodology for designing business processes for new and existing hospitality enterprises. The flowchart of business process formation, based on the outgoing data, is shown. Outgoing data for new companies are collected by market research, demand or expert methods. The trend analysis method is used for existing companies, taking into account the seasonality level. Practical value of the research in improving the business analysis methodology in the hospitality sector.

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### **1** Introduction

Business processes are a set of interrelated and interacting elements or tasks designed to create a specific product or service of customer value. A well-documented and described business process is a unique tool for analyzing a company's performance and planning the efficient use of resources in the future. At the root of business processes is the work with data, which is collected, processed, and used as input to justify the actions of an organization's management.

Getting input data to design business processes is a task that is solved in many ways. The tender analysis is one of the most used methods based on historical data, which implies the ability to plan the company's activities based on past study periods. The hospitality field allows the tender analysis method to be the most effective in the business process design. This method allows getting a justification for the construction of business processes and creating their automation regardless of the difficulty. The study's relevance is determined by the need to improve existing methods and approaches to business process modeling. Today in business analysis, there is a lack of practical recommendations for applying concepts, principles, and techniques to work with companies in different industries. Especially relevant are methodological studies and proposals in the hospitality industry, which require modern management approaches and efficiency improvement.

The study aims to develop a methodology for business process design based on the study of the business design theoretical framework and data trend analysis.

The following tasks should be carried out in the course of the research to achieve the goal:

- to investigate the theoretical rationale for the use of trend analysis in business process design;

- to form different approaches and methods of business process design;

- to show the practical application of trend analysis in business process design;

- to consider different business process design approaches in an unstable environment.

## 2 Literature Review

Today's theory of business modeling is quite seriously described at the scientific and professional levels. It is worth highlighting the research on new business modeling forms, [1], which appeared because of the new business conditions of companies. Fedorov, [2], showed the peculiarities of business process conceptual modeling based on specific techniques, proposing his forecasting theories, methods. Different methods, and methodologies of business modeling have been described by researchers Mineev, [3], Scheer, [4], Tishchenko, [5], Repin, [6], and other authors.

Apart from general studies, studies on business modeling in the hospitality industry are worth highlighting. For example, Davydova, [7], showed innovative management approaches in the restaurant industry based on the construction of business models. Chang et al., [8], and Wang et al., [9], investigated different business models for the hotel industry. The authors show that the business processes of other companies are different, so they may have characteristics that are not susceptible to some standardization. Mizjuk et al., [10], showed the peculiarities of business modeling in restaurant corporations. Plyuta, [11], showed new business modeling formats. Umehara, [12], investigated the basics of restaurant business modeling in Japan.

The primary purpose of business modeling is management efficiency. In addition, it is used to build predictive models. In order to study the application of tender analysis were studied the works of Grabovetsky, [13], on the basics of forecasting and planning, Matvienko, [14], on innovation management, Harrynhton, [15], on the optimization of business processes, Kryvda et al., [16], which show different planning models. Furthermore, since the study proposed a methodology for business process design based on trend analysis, the works in the field of statistical and economic analysis were also analyzed.

Scientists in the field of economic analysis Aivazyan et al., [17], Yeliseeva & Mitavishnikov, [18], Orlova & Polovnikov, [19], showed examples of using trend analysis in the study of socioeconomic models of company development. The authors show that the dynamic processes that occur in companies show themselves as several arranged in chronological sequences order. reflecting the development of the studied phenomenon. The indicators serve as the basis for the development of trend models. The authors understand the trend as a stable systematic change over a certain period. Trend analysis allows the creation of economic and mathematical models

based on companies' business processes. The method is widely used in financial analysis, which allows for planning the company's financial results. However, it is not only used in the field of finance. Blechschmidt, [20], shows the use of the method in studying business processes. The application of trend analysis in business modeling has become especially relevant for Ukrainian companies, which are moving to a new level of management, documentation of processes, and organization of activities.

Moreover, nevertheless, despite a sufficiently large amount of literature in the field of business modeling, the theory of economic analysis, and the specifics of the restaurant industry, particular practical methodologies for the design of business processes in the hotel and restaurant industry are lacking. It formed the practical novelty of the study and the scientific novelty, which consists of continuing the methodology of trend analysis to design business processes in the hospitality industry.

## **3 Research Methods**

This research is devoted to developing the business process design methodology based on trend analysis. In addition, the author's team offers a methodology of business process formation based on planning the number of visitors in new and existing companies.

The described methodology includes approaches and methods for designing business processes. In particular, for the formation of the design method of new business processes, the "Preliminary modeling" technique is used based on the data collected from the results of competitive intelligence, analysis of user requests, and expert method. As a result of the data obtained, it is possible to predict the minimum and optimal number of customers of a hospitality company. The company's business model is based on these data; staffing is made, stock, and preparation of facilities for servicing an optimal number of users.

Trend modeling is based on the trend analysis of a hospitality company. As a result of trend analysis, combined with seasonality indicators, the company can plan the cost of material resources, labor resources, and staffing of the premises in which services are provided based on a reliable forecast of the customer numbers in future periods.

The study also applies general scientific methods of knowledge, in particular, analysis and synthesis. Methods of financial, trend analysis, correlation relationships, and vertical analysis are used. The methods of induction and deduction allowed forming the problem and finding ways of its solution based on the studied scientific works and practices of business analysis specialists.

### 4 Research Findings

There are several approaches to business process design. Object-oriented and functional approaches are generally used among business model design approaches. Two approaches are used in designing business processes simultaneously, but each has meaning and purpose. First, let us consider the object-oriented approach. Its essence is to describe the consumer's behavior toward the final product.





Business analysts use such diagrams to describe the sequence of customer and staff actions to serve the product. In the case of defining a user behavioral process, only the white components of Fig. 1 are used. Schemes can become more complex depending on options like offering cash or payment card payment or modifying depending on a preorder's availability. The practical use of objectbased business process design is the development of automated customer service systems.

Another approach to business process design is the functional approach. The functional approach describes the components of business processes used to serve the customer. The main element of the functional approach is a business function or a set of functions that transform incoming data into outgoing data using different resources. A feature of functional modeling methodologies is the clear separation between the functions that process the data and the data set. For example, there needs to be a clear separation between material flows and labor operations in the restaurant business case to deliver the final product to the customer.

In the hospitality industry, a team of specialists, material resource planning, and supply management for uninterrupted service are used to serve a single customer. For example, a restaurant or hotel cannot serve people much more significantly than predicted because there is not enough room for everyone. Nor can a restaurant or hotel provide poor service because such a business requires constant and substantial expenditures, and a minimum allowable income must be covered.

Let us look at an example of a functional business process model for a restaurant.



Figure 2 shows that the main functional components of business processes are the warehouse, service, and kitchen, which interact with each other through the management structure. For example, this is a simplified scheme of business processes in the restaurant business when the information flows to the kitchen. As a result, the staff receives an order, executes it, and transmits the finished work to the service staff.

The management system makes purchases and plans for the products needed. Also, the management system plans the number of people and the possibility of creating new seating or break rooms. Thus, we can identify that a core element of the system is the service, the work of which depends on the collection of information on the necessary labor and material resources. For example, the warehouse and kitchen depend on planned customer service readiness. Therefore, it can be concluded that the initial data for developing the business process model is the planned attendance of the institution. The indicator is formed by the data collection results (input element of business design).

Consider the flowchart of the sequence of business design based on a trend analysis of the number of visitors in Figure 3.



Fig. 3: Block diagram of clients' number planning Source: author's elaboration

According to the scheme's data, it is clear that it is necessary to have data on the possible and minimum number of customers to get information for the planned expenditure of resources.

Designing business processes based on the planned number of customers is formed not only by the approaches but also by the design methods, which depend on the company's life cycle (or product). Different business process design concepts are selected depending on the type of activity. Therefore, understanding the theoretical aspects of building different concepts is necessary to choose the necessary one for a certain sphere. Let us consider two basic approaches to business process design.



Fig. 4: Two basic methods of business process design

Let us consider each of the proposed methods' features to determine the most appropriate one for the design of business processes in hospitality.

Preliminary modeling. The most common is modeling for preliminary process modeling. In this kind of process, models need to be organized in advance. Then, based on the organization's results, the finished project could be changed; for example, adding new functions, work directions, or exceptions is possible. Modeling of business processes is based on standard models of business behavior in some industries; it includes the peculiarities of the company, which will further distinguish the examined company from its competitors.

It is impossible to plan the number of customers of the future establishment based on historical data. The planned number of visitors is formed based on market research. Let us consider methods of collecting information about the projected number of visitors. - Reconnaissance method. It is necessary to organize observation of the work of competitive establishments and, based on these indicators, decide which market part will be able to entice the newly created restaurant (hotel) to determine the number of possible visitors.

- The method of analysis of user requests. Based on field research, surveys and interviews, investigate what kind and quantity of product the user wants to consume.

– Expert method. Experts in the industry can give information about competitors' customer service volumes. Often, such experts are food suppliers to restaurant establishments who know the volumes of purchases of many market participants.

Based on this information, planned customer service volumes are generated. For example, market volume can be obtained by estimating major competitors' approximate number of customers.



Fig. 5: Input data for the forecast of the customer's number in the new hospitality establishment Note: the conditional data provided by the author for the algorithm for calculating the future number of visitors to the restaurant

If	the	three	main	competitors	served
305 + 4	455 +	623 = 1,	383 cust	omers in Janua	ary, it is

possible could get the optimal and minimum figures for the new company customers.

Clients per month	1	2	3	4	5	6	7	8	9	10	11	12
Optimal	346	322	333	353	367	353	364	373	399	414	424	358
Minimum	277	258	267	283	293	282	291	299	319	331	339	286

Table 1. Estimated number of customers for the new restaurant based on market research

Note: author's calculations.

The optimal figure would be dividing the existing consumer market by four players, 1383 / 4 = 345 customers per month. It means that the company expects to be able to perform the current business indicators from the first day.

The minimum indicator is a part of the optimum value (60–80 %), which is projected with the material, labor, and marketing costs to promote a new project. Therefore, in planning a minimal index of clients, it is necessary to consider the break-even point of new business.

Figure 5 shows the average trend line, which shows how even the number of customers in each month is. The R 2 value is 0.57, which means that planning the monthly number of customers requires considering the seasonality of demand. Therefore, it can be concluded that applying the trend analysis method is not reasonable in the preliminary modeling of business processes.

It should also be considered that preliminary modeling of new business processes creates approximate figures on the possible number of customers, depending on the level of internal processes and financial support.

Trend-based modeling. The second approach to business process design is modeling based on trends (historical data). It is based on the analysis of existing processes shaped by fact. It is necessary to investigate the data on the customers received for one to three years to form automated business process management systems. When using this method, the trend analysis method is used.

Trend analysis begins with collecting information about the institution's past visitors. The longer the data sampling period is, the more reliable the forecast will be. Next, a linear trend model predicts the number of future customers.

The linear trend model is the simplest, most intuitive, and most common of existing models. It describes a constant change in an indicator over time.

The linear trend equation is as follows: y(x) = a + bx,

where:

y – the value or sequence of values of the number of customers.

x – period number (serial number of the year);

a – the point of intersection with the y-axis on the graph (minimum level);

b is the value by which the next value of the time series increases.

Let us look at an example of planning the number of restaurant users based on three years of data.

Year 1 - 4,566 customers

Year 2 – 4655 customers

Year 3 – 4788 customers.

We can use Excel functions for the calculations, which makes the planning process simple.



Fig. 5: Determination of the future number of clients based on the trend line

A high R 2 value at 0,98 indicates a high level of forecast reliability. The equation for predicting the number of customers: y = 111x + 4448. So, we can make a user forecast based on trend analysis by

substituting years four and five into the equation instead of x.

Year 4 = 111 \* 4 + 4448 = 4892 customers Year 5 = 111 \* 5 + 4448 = 5003 customers. When designing business processes, annual figures are not enough. In addition to determining the customer number for the year, it is possible to determine the number of customers per month, per week, or per day, if there are such raw data. It is worth taking into account the seasonality factor. It is necessary to determine the average percentage of customers per month for three years to determine the seasonality factor mathematically. Let us see an example of the calculation in Table 2.

Total	Year				Structure	•	Average Tar		rget Year	
	1	2	3	1	2	3	%	4	5	
	4566	4655	4788	100%	100%	100%		4892	5003	
1	350	352	372	7,7	7,6	7,8	7,7	375	384	
2	342	348	362	7,5	7,5	7,6	7,5	367	376	
3	355	368	375	7,8	7,9	7,8	7,8	383	392	
4	358	366	355	7,8	7,9	7,4	7,7	377	386	
5	366	385	406	8,0	8,3	8,5	8,3	404	413	
6	395	405	425	8,7	8,7	8,9	8,7	428	437	
7	402	422	433	8,8	9,1	9,0	9,0	439	449	
8	489	485	480	10,7	10,4	10,0	10,4	508	520	
9	430	423	420	9,4	9,1	8,8	9,1	445	455	
10	371	393	413	8,1	8,4	8,6	8,4	411	420	
11	366	368	388	8,0	7,9	8,1	8,0	392	401	
12	342	340	359	7,5	7,3	7,5	7,4	364	372	

Table 2. Estimated monthly number of clients, based on trend analysis, seasonally adjusted

Note: author's calculations.

Thus, business analysts, using the method of trend analysis in combination with the analysis of the seasonality of demand, have the opportunity to form the planned indicators for the current period. In addition, it allows for preparing business processes, in particular, organizing product purchases for a certain number of visitors and preparing personnel for customer service.

The application of trend analysis allows us to solve several business intelligences tasks:

- Organize the personnel structure by examining labor productivity and their loading level in past periods. It selects the executive (production staff) and a team of managers to ensure efficient and smooth business processes.

- Organize the minimum necessary stock of products to meet the kitchen's needs. In the restaurant business, it is essential to have an optimal stock of products, as they have a strictly limited period of use. Excessive stock leads to the risk of product spoilage; insufficient stock will not be able to meet demand.

- Prepare the room to serve the planned number of customers.

#### **5** Discussion

The modeling approach choice depends on factors such as the degree of dynamism of the enterprise structure, the degree of stability of the processes, the purpose of modeling, etc. Today, in the domestic market, companies try to use American and European systems for business modeling, which work in a stable environment, [21]. However, such business models are ineffective in an emerging market or unstable economy, [17], [18], [19]. To create their own management model, the considered approaches are often combined, combining the advantages of different methods that will be accepted in each situation, [11]. For example, if the company operates in an unstable environment, trend analysis in business process planning will not be appropriate.

The problem arises in collecting incoming data to form valid business models. Different researchers offer their ways of implementing the problem.

Implementation of the break-even point approach. This method is widely used in financial analysis in business planning. In an unstable environment with a negative impact on business processes, companies plan a minimum number of customers that will provide the ability to repay the necessary costs associated with taxes, payment of utilities, payment of production personnel, and payment for material resources, [13], [21].

Implementation of the approach based on market forecasts. If a company works in a developing market, planning the visitors by the trend method will not allow a full measure of demand because it considers only internal and external processes (e. g., income growth, closing of competitors). Thus, to predict the number of customers, adjusting the trend analysis results by the indicator of projected market growth, [14].

#### **6** Conclusions

This article provides a business process design methodology for new and existing hospitality companies.

The article shows two approaches to business process design: object-oriented, showing how the business works in customer service, and functionoriented, showing the resources used and their relationships.

At the base of the function-oriented business processes of the restaurant is the data flow, which the company receives from the results of information collected by the service department. In carrying out its activities, the department generates a constant flow of information about customers, which allows for a systematic accumulation of data to predict the future number of customers. As a result, the company gets an indicator that should cover the enterprise's expenses and profit provision. If the indicator is achieved, decisions are made to design future business processes.

For new companies, obtaining data on future customers is formed using the exploration method, analysis of user requests, and the expert method. As a result of the study, the company receives the optimal and minimum number of users. However, companies face significant risks of underestimating the market when forming new business models, so the predicted number of customers may differ significantly from the real one.

Unlike preliminary modeling, the trend-based method considers the company's past performance trends. The method of trend analysis, in combination with seasonality, allows for a reliable forecast of the number of future clients with insignificant deviations.

Under unstable planning conditions, the method of trend analysis is not adequate. If market conditions negatively impact business, the breakeven point method is applied, and if it is positive, the market forecast is considered.

The developed methodology is available for application in any company in the hospitality sphere. Its practical value in the improvement of business management technologies. The field of further research forms the planning of business processes in conditions of instability. References:

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