

## Selection of Market Demand Forecast Methods: Criteria and Application

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*The article deals with the theoretical aspects of the market demand method selection criteria and their application in practice. As the definition of market demand and conditions is related to the achievement of important general strategic decisions and consumers' behaviour on the competitive market, the accurate identification of the market demand method selection criteria and their application can reduce decision indefiniteness. Hence, the main aim of the article is to analyse market demand forecast method selection criteria, and apply them in developing Lithuanian furniture demand forecast.*

*The theoretical part of the article starts with the analysis of the forecast method reasoning and forecast method classification under various economic literature criteria. The analysis of the main forecast method groups disclosed that it was rather difficult to determine the advantage of any method in forecast estimation, whereas, always the risk of the wrong method selection remained. It was determined that usually unanimous authors' opinion on the complex application of quantitative and qualitative forecast methods differed in two aspects: one group of researchers supported the priority of quantitative forecast methods by using qualitative forecast methods as an auxiliary or alternative means, while the other group of authors stated that equal application of both types of forecast methods guaranteed higher reliability and carried more information.*

*Quite often any market demand forecast encounters the relevant forecast method selection problem. It should be noted that there are advantages and disadvantages of the forecast method selection in every case; therefore, the analysis and differentiation of the main forecast method selection criteria is expedient. The selection of the forecast method should be based on several criteria taking into account the applicability of the forecast method complexity, i.e., forecast accuracy level, period of time, the scope of initial data, forecast costs, and the level of result appropriateness and applicability.*

*The article deals with the research related to the selection of the forecast method for the Lithuanian furniture industry to define the furniture demand forecast for 2007. The object of research is furniture sales on the national market that reflect the solvent part of the furniture demand. The comparison of the forecast accuracy assessment indicators that were estimated by using different forecast methods indicate that the lowest furniture sales forecast error values were achieved by applying exponential smoothing method where  $\alpha=0.3$ : forecast error value ( $e_t = 77.19$ ) demonstrated the smallest difference between furniture sales forecast and fact, mean*

*absolute percentage error (MAPE = 8.29 proc.) indicated high forecast accuracy, and mean percentage error (MPE = 8.29 proc.) described small positive forecast deviation. In order to achieve the qualitative forecast assessment, forecast reliability intervals were calculated where criterion  $z = 1.960$ . The results allow to assume that furniture sales forecast for 2008 with 95 per cent probability can vary from LTL, 844.64 mio. to LTL, 1147.20 mio.*

Keywords: market demand, forecast methods.

### Introduction

**The problem.** The intensive competition and rapid market changes have increased the need for forecast information related to general market demand. Little experience in market demand forecast under dynamic market conditions predetermines inaccurate market demand research results and unsubstantiated enterprise operations decisions. The effective selection of market demand forecast methods and their application can reduce the uncertainty of solutions. The forecast results have become of particular importance to the Lithuanian industrial enterprises who seek to forecast market development prospects and tendencies in order to survive on the competitive market.

Different forecast method classification criteria were analysed by Bails, Perpers (1993), Bolt (1994), Peterson, Lewis (1999), McGuigan, Moyler (1989). In the economic literature, rather unanimous authors' opinion on the complex application of quantitative and qualitative forecast methods differs in two aspects: Kinnear, Taylor (1996), Reekie, Crook (1998), and Kennedy (1999) support the priority of the quantitative forecast methods and use qualitative forecast methods as an auxiliary or alternative means; whereas, Bolt (1994), Hall (1994), Makridakis, Wheelwright and others (1998), Clemen (1989), Kirsten (2000), Goodwin (2002), Larrick, Soll (2006), Green and Armstrong (2007), state that the synthesis of quantitative and qualitative forecast methods guarantees more reliable and informative forecast.

**The aim of the article** – analyse the criteria for the selection of market demand forecast methods and apply them in the development of the Lithuanian furniture demand forecast.

**The object of the article**– criteria for the selection of market demand forecast methods.

**Research methods.** In investigating and analysing the theoretical aspects of market demand forecast method selection criteria, general research methods were applied – systematic, comparative and logical analysis.

The methods of simple moving average, exponential smoothing and simple regression were applied in developing the Lithuanian furniture demand forecast. In order to identify the most accurate forecast method, *ex post* indicators were used such as forecast error, mean absolute percentage error and mean percentage error.

**Research novelty.** The assessment of positive and negative characteristics of market demand forecast methods in the quantitative and qualitative forecast methods groups was carried out, and the main criteria describing market demand forecast methods were selected.

### Concept and types of forecast methods

In research literature, the forecast method is defined as a way of forecast task solution or forecast development that guarantees the identification of the way out for different forecast users. The main objective of the forecast method is to transfer the current information into the future and move from the processed information to forecast.

Due to the abundance of the forecast methods (there are more than 200 methods mentioned in the economic literature), it is rather cumbersome to review all of them. Therefore, the analysis was carried out by classifying them into groups. Depending on the research area and research object, the most commonly used forecast method classification in the research literature is based on the following criteria (Bails, Peppers, 1993, Bolt, 1994, Peterson, Lewis, 1999, Cox, Loomis, 2001):

- *Type of information* (quantitative and qualitative forecast methods).
- *Forecast time span* (short-term, mid-term and long-term forecast development methods).
- *Forecast object* (micro and macro economic indicator forecast methods).
- *Forecast goal* (genetic and normative forecast methods).

The most popular and universal, and the most commonly applied in research papers is the classification based on quantitative and qualitative forecast methods because of its characteristic to involve the methods classified in other groups. The literature review discloses that qualitative or subjective methods are based on intuitive information (opinions, intentions, and feelings) which is received from various surveys (consumers, sales people, company personnel) by carrying out expert point of view analyses. Whereas, quantitative or objective methods analyse objective and reliable, most often the past time data by making assumption that other values will not change, while current regularities will remain the same (Peterson, Lewis, 1999).

The method classification according to the time span for which the forecast is developed is relative with regards to the same period of time. Usually, short-term forecasts are developed from 1-2 weeks to 3 month period. G. Bolt (1994) thinks that, depending on the forecast object, and internal and external environment aspects, short-term forecasts encompass the period from one week to 2-3 years.

Classification under the forecast object is applied in the analysis of the forecast method possibilities to forecast and assess different (micro and macro economic) indicator evolution trends and future states.

In the above-mentioned forecast method classification, the goal of the forecast is considered to be twofold: in case of genetic forecast, the goal is to foresee possible market demand trends in the future (genetic forecast starts with the assessment of the current market state), while in the normative forecast, there are several ways how to reach market demand future state (normative forecast starts with the selection of the preferred market demand state alternative).

In the early 1980s, when the growth of the quantitative forecast methods was observed, the attention was drawn to the development and analysis of the qualitative forecast methods. D.G. Bails, L.C. Peppers (1993) identified the following assumptions for the qualitative forecast:

- *The forecast problem is clearly defined and structured in order to avoid the respondents' or experts' biased opinion.*
- *Specific experts' knowledge is necessary.*
- *The selection of respondents and experts must be grounded and objective.*

Even though the forecast based on these assumptions is quite logic, some authors (McGuigan, Moyler, 1989) do not accept the above-mentioned procedures to be research-based forecast methods that could generate reliable and grounded results. Meanwhile, Hirschey, Pappas (1992), and Goodwin (2002) have no doubts that qualitative forecast is inevitable in developing market demand long-term forecasts, and, in particular, estimating qualitative movements and interrelationships in the economic and technological context.

While reliability of the qualitative forecast is essentially pre-determined by the factors related to experts and respondents (Rowe, Wright, 2001), the assumptions of quantitative forecast are based on the principles and expression of the economic data (Makridakis, Wheelwright and others, 1998):

- *Information about the economic data of the previous periods.*
- *Numeric expression of economic data necessary for forecast.*
- *Totality of the economic data (phenomena) is developed by reiterated processes rather than individual, rarely met and typical reasons.*

After the analysis of various research papers (Karsten, 1990, Bails, Peppers, 1993, Bolt, 1994, Makridakis, Wheelwright, Hyndman, 1998, Goodwin, 2002), the assessment of positive and negative aspects of quantitative and qualitative forecast was performed and is depicted in Table 1. Quite a few contradictions can be found in the research papers on the prioritisation of the forecast method application. The recent increased popularity of qualitative forecast has been caused by relatively low costs, and simple application methodology, whereas, the majority of the quantitative forecast methods are known to be of complicated application and biased result interpretation. As Tashman, Hoover (2001) states, this problem can be partially eliminated by the expanding software usage that simplifies method application and reduces costs. Armstrong (1985) states that software progress causes the development of more complicated quantitative forecast methods whose success and reliability are under doubt.

Table 1

## Assessment of quantitative and qualitative forecast

	Positive assessment	Negative assessment
<b>Quantitative forecast</b>	<ul style="list-style-type: none"> <li>• Uncomplicated data accessibility;</li> <li>• Possibility to forecast business change points;</li> <li>• Assessment of economic indicator interrelationship and fluctuation.</li> </ul>	<ul style="list-style-type: none"> <li>• Unsuitable for new product demand forecast;</li> <li>• High costs: often requires constant market analysis and regular compilation of data;</li> <li>• Often complicates application and misinterprets results.</li> </ul>
<b>Qualitative forecast</b>	<ul style="list-style-type: none"> <li>• The data of the previous periods is not necessary;</li> <li>• Suitable for demand forecast: 1) in new markets; 2) in current markets through new sales people;</li> <li>• Allows the development of opinion diversity;</li> <li>• Experts' anonymity increases forecast reliability.</li> </ul>	<ul style="list-style-type: none"> <li>• Subjective experts' opinion;</li> <li>• Data sequence fluctuations (seasonal, cyclic, trend like, random) are not taken into consideration;</li> <li>• Economic data interrelationship is not assessed;</li> <li>• Not applicable for the development of short-term forecast.</li> </ul>

Source: prepared by the author.

Karsten (1990) considers that the insufficiency of quantitative forecast methods is quite often determined by the too deep theoretical background and the lack of practical approach. This problem becomes more obvious in using qualitative forecast method priority because, by far, its practical application is much simpler. Besides, nobody doubts about the exclusivity of the qualitative forecast methods in making new market demand forecast. Nevertheless, the advantage of the quantitative forecast methods is determined by their property to assess the market demand changes which can be of seasonal, cyclic, random or trend like nature.

The analysis of the main forecast method groups shows that in making forecast estimation it is difficult to define the advantage of one method in particular, and the risk of the selection of the wrong method always remains.

It has been defined that the unanimous approach on the complex application of the forecast methods is different in two aspects: one group of researchers (Hirschey, Pappas, 1992, Reekie, Crook, 1998 Kennedy, 1999) is for the preference of quantitative forecast methods and applies qualitative methods as auxiliary or alternative ones, while the other group (Clemen, 1989, Schmittlein, Kim, Morrison, 1990, Bolt, 1994, Batchelor, Dua, 1995, Makridakis, Wheelwright and other, 1998, Goodwin, 2002, Larrick, Soll, 2006, Green and Armstrong, 2007) states that the parity synthesis of quantitative and qualitative forecast methods guarantees higher reliability and informativeness of the forecast.

### Selection criteria of market demand forecast methods

When carrying out market demand forecast, one often confronts with the problem of the inappropriate selection of a forecast method. It should be noted that in every actual forecast situation methods have their advantages and disadvantages, hence, it is important to define and analyse forecast method selection criteria.

Despite the fact that there are a lot of different forecast methods, the researchers define common assumptions for forecast method application based on their accuracy. Firstly, most of the quantitative forecast methods are based on the assumption that a certain reasonable linkage that

existed in the past, will remain in the future. Secondly, the forecast accuracy by using any forecast method gets reduced with the increase of the forecast time span. In other words, long-term forecast is less reliable than the short-term one due to the factors that cause potential uncertainty. Thirdly, the forecast for the whole market demand is usually more accurate than the forecast for a separate product because in the former case, the demand forecast errors for separate product groups just eliminate each other (Herbig, Milewicz, Golden, 1994).

The analysis of the most significant forecast method criteria in the research literature discloses two-sided opinion: on the one hand, Bails, Peppers (1993), Kress, Snyder (1994) state that the selection of the forecast method should be based on the assessment of its accuracy; on the other hand, Waddell, Sohal (1994), Clifton, Nguyen, Nutt, (1998) associate the forecast process with defined forecast objectives. However, the selection concept of the forecast method reflects only one criterion - either forecast accuracy or forecast objective.

The selection of the forecast method should be based at least on several criteria taking into account forecast method applicability and additional things proposed by researchers such as:

- *Forecast accuracy degree.*
- *Time span.*
- *Amount of necessary initial data.*
- *Forecast costs.*
- *Result implementation and applicability level.*

The priorities of forecast method application are determined according to the forecast time span which is traditionally divided into short- (1-3 months), mid- (3 months-2 years) and long- (more than two years). Simple quantitative forecast methods are applied for short- and mid- period of time (simple moving average and exponential smoothing), while for long-term forecast regression and econometric models are applied.

Bails, Peppers (1993) believe that the restriction of the application of the high accuracy reasonable methods is caused by inappropriate definition of the research object, and involvement of the economic processes that are not substantiated by approved regularities. It should be marked that the most complicated forecast methods (regressive, econometric, and cost – yield models) enable analysing

micro and macro economic indicator interrelationship, business change points and economic process dynamics (Remus, O'Connor, Griggs, 1998).

In the selection of the forecast method for market demand, much attention should be paid to the possibility to assess consumer demands or the changes of competitive environment. Though quite often there is a sceptical approach to qualitative forecast methods due to their high subjectivity, the selection of these methods can be beneficial when it is impossible to express the main market demand causing factors in a quantitative way, or there is no sufficient data for quantitative forecast.

### Research methodology

Lithuanian furniture comprises about 70 per cent of the furniture sales in Lithuania. A good ratio of price and quality determines the competitive advantage of the Lithuanian furniture in comparison with the imported one. The furniture demand analysis empirical results could be of significant value to the Lithuanian furniture manufacturing companies in forecasting current and future consumer demand and in assessing the potential of new markets and segments.

Thus, the main objective of the research was to select a forecast method for the furniture demand analysis. The object of the research was the furniture sales on the national market that reflected the solvent part of the furniture demand.

To develop the quantitative forecast, the forecast methods that reflect the main quantitative forecast method groups were selected depending on the scope of information in hand about the Lithuanian furniture market. Therefore, the methods of *simple moving average*, *exponential smoothing* and *simple regression* were chosen.

In order to identify the most accurate forecast method, quite often *ex post* indicators are used in the research literature. The main *ex post* indicators defining the forecast accuracy are as follows (Boguslauskas, 2007):

1. Forecast error  $e_t$ , which is calculated as a difference between actual economic indicator value  $y_t$  and forecast economic indicator value  $\hat{y}_t$ :

$$e_t = y_t - \hat{y}_t \quad (1)$$

2. Mean absolute percentage error (MAPE) that reflects the relative forecast accuracy, is calculated as follows:

$$MAPE = \frac{1}{n} \sum_{t=1}^n \frac{|e_t|}{y_t} \times 100\% \quad (2)$$

MAPE error is one of the main criteria describing the forecast method accuracy level. Its value interpretation is like 10 per cent – great accuracy; 10-20 per cent – good accuracy; 20-50 per cent – sufficient accuracy; 50 per cent and more – insufficient accuracy.

3. Mean percentage error (MPE) demonstrates the forecast deviation and is calculated in the following way:

$$MPE = \frac{1}{n} \sum_{t=1}^n \frac{e_t}{y_t} \times 100\% \quad (3)$$

In case of accurate forecast, MPE should be up to 5 per cent. If the forecast is ideal, the deviation up or down should come close to zero.

Taking into account the impact of qualitative forecast and the final forecast variation limits, the reliability interval is calculated (Makridakis, Wheelwright and others, 1998):

$$F_{n+1} \pm z\sqrt{MSE} \quad (4)$$

Where: MSE – mean squared error;

$z$  – a criterion that defines the relativity of the reliability interval.

### Selection of methods for furniture demand forecast in Lithuania

The forecast method was selected by applying the numerical values of the national furniture market that reflect a solvent part of the furniture demand. The dynamics analysis of the furniture sales on the national market in 1998-2006 (Figure 1) discloses that the linear trend is characteristic to national furniture sales, and the seasonal fluctuations are slight: the sales peaks were reached in Quarters 3 and 4, while the lower sales were observed in Quarters 1 and 2.

In order to select the most accurate forecast method by using furniture sales in Lithuania in 1998-2006 numerical values, and simple moving average, exponential smoothing and simple regression methods, furniture sales forecast was developed for Quarters 1-4 of 2007. The selection of the forecast methods was caused by the following reasons:

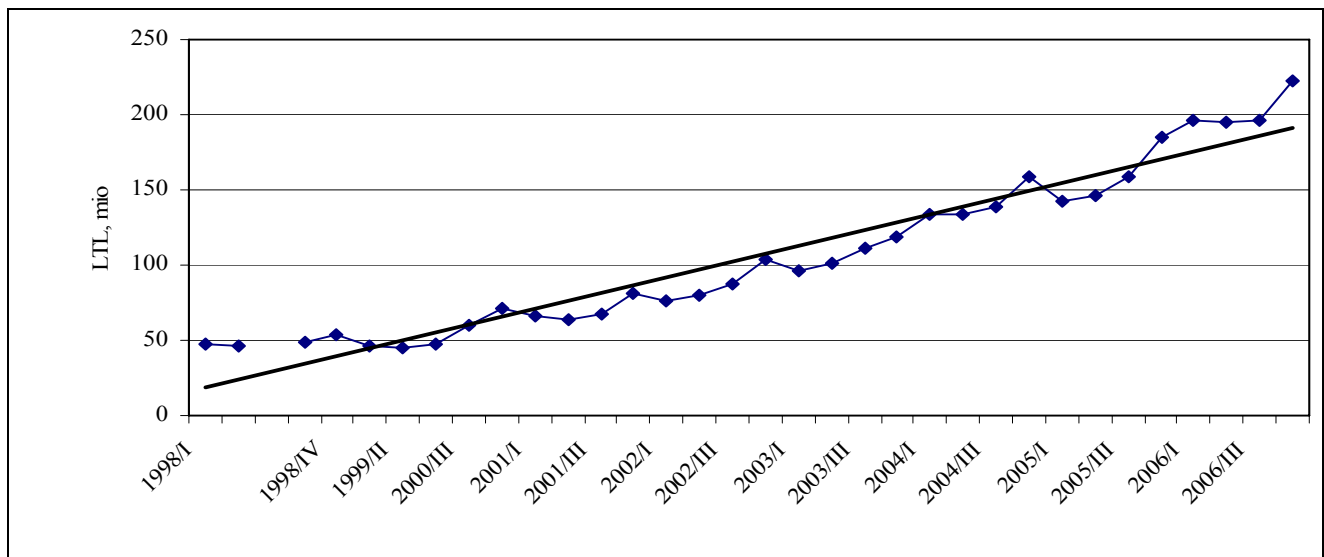
- The above-mentioned methods reflected the main quantitative forecast method groups.
- The nature of the information about national furniture market on hand.
- The application of the complex forecast methods (e.g., matrix type) was limited due to the lack of technical possibilities.

When using the method of simple moving average, it is very important to select the number of period  $k$ . The forecast furniture sales were calculated where  $k = 3; 5; 7$ . When applying the exponential smoothing method, the forecast furniture sales were calculated by choosing different values  $\alpha$  of the smoothing constant ( $\alpha = 0.3; 0.5; 0.8$ ). Furniture sales forecast based on the simple regression method was calculated, and simple regression equation was developed  $\hat{y}_t = 15.66 + 5.12 t$ .

Developed furniture sales forecast for Quarters 1-4 of 2007 by using simple moving average, exponential smoothing and simple regression methods is presented in Table 2.

When comparing furniture sales forecast with the fact by using formula (1) – (3), forecast accuracy assessment indicators were calculated: forecast error  $e_t$ , mean absolute percentage error MAPE, and mean percentage error MPE (Table 3).

After comparison of error values calculated by using different forecast methods, it was estimated that the values of the lowest forecast, mean absolute percentage and mean percentage errors were achieved by using exponential smoothing method where  $\alpha=0.3$ . Forecast error value ( $e_t = 77.19$ ) demonstrates the smallest difference between furniture sales forecast and fact; mean absolute percentage error (MAPE = 8.29 proc.) discloses high forecast accuracy; and mean percentage error (MPE = 8.29 proc.) describes a small positive forecast deviation.



Source: Data of the Lithuanian Statistics Department

Figure 1. Quarterly furniture sales dynamics in Lithuania in 1998–2006, LTL, mio.

Table 2

Actual furniture sales and forecasts in Quarters 1-4 2007 by applying selected methods

Period	Furniture sales fact LTL, mio.	Simple moving average method where k=3	Simple moving average method where k=5	Simple moving average method where k=7	Exponential smoothing method where &=0.3	Exponential smoothing method where &=0.5	Exponential smoothing method where &=0.8	Simple regression method
2007 Q1	221.57	204.50	198.84	185.56	201.33	213.60	203.73	194.83
2007 Q2	213.55	207.81	201.60	191.23	199.88	212.22	205.62	199.94
2007 Q3	235.88	211.67	202.79	195.85	201.17	214.19	205.43	205.06
2007 Q4	259.97	207.99	204.43	197.40	202.20	213.77	205.45	210.18
Total	930.97	831.96	807.65	770.04	804.58	853.78	820.24	810.02

Table 3

Forecast percentage error estimation results

Type of error	Simple moving average method where k=3	Simple moving average method where k=5	Simple moving average method where k=7	Exponential smoothing method where &=0.3	Exponential smoothing method where &=0.5	Exponential smoothing method where &=0.8	Simple regression method
$e_t$	99.01	123.32	160.92	126.39	77.19	110.73	120.95
MAPE, per cent	10.63	13.25	17.29	13.58	8.29	11.89	12.99
MPE, per cent	10.63	13.25	17.29	13.58	8.29	11.89	12.99

Based on the results of the quantitative forecast method selection and forecast accuracy assessment, exponential smoothing method was applied to estimate furniture sales forecast for 2008 where &=0.5. The estimate showed furniture sales forecast in 2008 to reach LTL, 995.92 mio. or increase by 6.5 per cent compared with 2007.

It should be noted that the estimate done by applying exponential smoothing method reflects only the statistical furniture sales change tendencies, while qualitative external changes remain to be estimated. Trying to eliminate the absence of qualitative forecast at least

partially, forecast reliability intervals, i.e., the limits within which the furniture sales in 2008 can fluctuate were defined. Meanwhile, it was assumed that the economic situation in Lithuania will remain stable, and the reliability intervals had the probability of 95 per cent where criterion  $z = 1.960$ :

$$F = 995.92 \pm 1.960 \sqrt{5958.46} \Rightarrow 995.92 \pm 151.28 \Rightarrow \{844.64; 1147.20\}$$

The estimated reliability interval results helped to forecast furniture sales in 2008 with the probability of 95 per cent, which meant the probable fluctuation from LTL,

844.64 mio. to LTL, 1147.20 mio. On the other hand, the value of research results might be limited as it does not include quantitative changes of Lithuania's macro environment, especially economical. These changes could be essential for the forecast of any sector, especially when Lithuania's economy is slowing down.

## Conclusions

1. Forecast method classification should be based on the information nature; period for which the forecast is developed; forecast object; and forecast goal.
2. It was defined that almost unanimous authors' opinion on the complexity of the forecast method application differed in two aspects: one group of researchers is for the quantitative forecast method priority and uses qualitative methods as an auxiliary or alternative means, while the other group of researchers states that the synthesis of quantitative and qualitative methods guarantees higher reliability and informativeness of the forecast.
3. The selection of the forecast method should be based on several criteria taking into account the applicability of the forecast method for market demand forecast, like forecast accuracy level, period, the scope of initial data, forecast costs, and the level of result application and implementation.
4. The comparison of forecast accuracy assessment indicators estimated by using different forecast methods identified that the lowest furniture sales forecast error values were received by applying the exponential smoothing method where  $\alpha=0.3$ : forecast error value ( $e_t = 77.19$ ) demonstrated the smallest difference between furniture sales forecast and fact; mean absolute percentage error (MAPE = 8.29 per cent) indicated high forecast accuracy; and mean percentage error (MPE = 8.29 proc.) disclosed a small positive forecast deviation.
5. In order to assess the qualitative character of the forecast, forecast reliability intervals were calculated where criterion  $z = 1.960$ . The results lead to the conclusion that furniture sales forecast in 2008 with 95 per cent probability can fluctuate within the range of LTL, 844.64 mio. and LTL, 1147.20 mio.
6. On the other hand, the value of research results might be limited as it reflects only methodological aspects of the forecast development and does not include quantitative changes of Lithuania's macro environment, especially economic. These changes could be essential for the forecast of any sector, especially when Lithuania's economy is slowing down.

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Vaida Pilinkienė

## Rinkos paklausos prognozavimo metodų parinkimas: kriterijai ir taikymas

Santrauka

Straipsnyje nagrinėjami teoriniai rinkos paklausos metodų parinkimo kriterijų aspektai ir atliekamas praktinis jų pritaikymas Lietuvos baldų paklausos metinei prognozei sudaryti. Rinkos paklausos ir jos sąlygų nustatymas susijęs su priimamais svarbiais strateginiais sprendimais bendram įmonės tikslui ir palankiai vartotojų reakcijai konkurencinėje rinkoje pasiekti. Tikslus rinkos paklausos prognozavimų metodų parinkimo kriterijų identifikavimas ir jų taikymas gali sumažinti šių sprendimų neapibrėžtumą. Įvairūs prognozavimo metodų klasifikavimo kriterijai nagrinėti D. G. Bails, L. C. Peppers (1993), G. Bolt

(1994), H.C. Peterson, W.C. Lewis (1999), J. R. McGuigan, R. Ch. Moyler (1989) darbuose. Gana vieninga autorių nuomonė dėl kompleksinio kiekybinių ir kokybinių prognozavimo metodų taikymo ekonominėje literatūroje išsiskyrė dviem požiūriais: T. C. Kinnear, J. R. Taylor (1996), W. D. Reekie, J. N. Crook (1998), P. Kennedy (1999) teigia, kad svarbiausi yra kiekybiniai prognozavimo metodai, kokybinius metodus taikant tik kaip pagalbinę ar alternatyvią priemonę; tuo tarpu G. Bolt (1994), S. G. Hall (1994), S. Makridakis, S. C. Wheelwright ir kt. (1998), R. T. Clemen (1989), R. Kirsten (2000), P. Goodwin (2002), R. P. Larrick, J. B. Soll (2006), K. C. Green ir J. S. Armstrong (2007) nuomone, lygiavertė kiekybinio ir kokybinio prognozavimo sintezė užtikrina kur kas patikimesnes ir informatyvesnes prognozes.

**Straipsnio tikslas** – ištirti rinkos paklausos prognozavimo metodų parinkimo kriterijus ir pritaikyti juos sudarant Lietuvos baldų paklausos prognozę.

**Tyrimo objektas** – rinkos paklausos prognozavimo metodų parinkimo kriterijai.

Tiriant ir analizuojant teorinius rinkos paklausos prognozavimo metodų parinkimo kriterijus aspektus, straipsnyje taikomi bendramoksliniai tyrimo metodai: sisteminė, lyginamoji ir loginė analizė. Sudarant Lietuvos baldų paklausos prognozę, taikomi slankiojo vidurkio, eksponentinio išlyginimo, vienmatės tiesinės regresijos metodai. Siekiant nustatyti tiksliausią prognozavimo metodą, naudojami ex post rodikliai: prognozavimo paklaida, vidutinė procentinė absoliutinė paklaida, vidutinė procentinė paklaida.

Atliktas rinkos paklausos prognozavimo metodų teigiamų ir neigiamų savybių vertinimas kiekybinių bei kokybinių prognozavimo metodų grupėse bei išskirti pagrindiniai rinkos paklausos prognozavimo metodo pasirinkimą apibūdinantys kriterijai.

Straipsnio teorinė dalis pradeda nuo „prognozavimo metodo“ sampratos analizės ir prognozavimo metodų klasifikacijos pagal įvairius ekonominėje literatūroje kriterijus. Atlikta pagrindinių prognozavimo metodų grupių analizė parodė, kad vykdant prognostinius skaičiavimus, sunku nustatyti kurio nors vieno metodo pranašumą, be to, visada rizikuojama pasirinkti neteisingą metodą. Nustatyta, kad gana vieninga autorių nuomonė dėl kompleksinio kiekybinių ir kokybinių prognozavimo metodų taikymo išsiskyrė dviem aspektais: vieni mokslininkai teigia, kad svarbiausi kiekybiniai prognozavimo metodai, o kokybiniai metodai taikomi tik kaip pagalbinė ar alternatyvi priemonė; kitų autorių nuomone, lygiavertė abiejų prognozavimo metodų tipų sintezė užtikrina, kad prognozės bus kur kas patikimesnės ir informatyvesnės. Atliekant rinkos paklausos prognozavimą, neretai susiduriama su tinkamo prognozavimo metodo parinkimo problema. Pažymėtina, kad konkrečioje prognozavimo situacijoje metodai turi savo pranašumus ir trūkumus, todėl tikslinga detaliau išnagrinėti ir išskirti pagrindinius prognozavimo metodo parinkimo kriterijus.

Parentant prognozavimo metodą, tikslinga remtis keliais kriterijais, kompleksiskai įvertinančiais prognozavimo metodo tinkamumą, t. y. prognozės tikslumo laipsniu, laikotarpiu, reikalingų pradinį duomenų kiekiu, prognozavimo kaštais, rezultatų įsisavinimo ir pritaikymo lygiu.

Prognozavimo metodų taikymo prioritetai skiriasi priklausomai nuo laikotarpio, kuriam atliekama prognozė ir kuris tradiciškai skirstomas į trumpą (1 – 3 mėn.), vidutinį (3 mėn. – 2 metai) bei ilgą (daugiau kaip 2 metai). Trumpoms ir vidutinėms laiko atžvilgiu prognozėms gauti tikslinga taikyti paprastuosius kiekybinius metodus (slankiuosius vidurkius, eksponentinį išlyginimą), o ilgalaikėms prognozėms gauti – regresijos ar ekonometrinius modelius. Gana dideliu tikslumu pasižymi kai kurių priežastinių metodų naudojimo ribotumą sąlygoja netinkamas tyrimo objekto apibrėžimas, ekonominių procesų, neturinčių nusistovėjusių dėsningumų, įtraukimas į analizę. Reikia pastebėti, kad sudėtingesni prognozavimo metodai (regresiniai, ekonometriniai, sąnaudų–išėigos modeliai) įgalina ištirti mikro- ir makroekonominių rodiklių sąveiką, verslo posūkio taškus ir ekonominių procesų dinamiką. Parentant prognozavimo metodą rinkos paklausai prognozuoti, ypač didelis dėmesys kreiptinas į galimybę įvertinti vartotojų poreikius ar konkurencinių sąlygų kintamumą. Nors neretai į kokybinius prognozavimo metodus dėl jiems būdingo didelio subjektyvumo žiūrima skeptiškai, tačiau jų pasirinkimas gali būti naudingas, kai neįmanoma kiekybiškai išreikšti daugelio, ekspertų vertinimu, svarbiausių rinkos paklausą sąlygojančių veiksnių arba kai kiekybiniam prognozavimui nepakanka turimų duomenų.

Straipsnyje pateiktas tyrimas yra skirtas prognozavimo metodui parinkti tam, kad būtų sudaryta 2007 m. Lietuvos baldų paklausos prognozė. Tyrimo objektu pasirinkti baldų pardavimai šalies rinkoje, atspindintys mokios baldų paklausos dalį. Palyginus apskaičiuotus prognozių tikslumo įvertinimo rodiklius, gautus taikant skirtingus prognozavimo metodus, nustatyta, kad mažiausios baldų pardavimų prognozių paklaidų reikšmės gautos, taikant eksponentinio išlyginimo metodą, kai  $\epsilon = 0,3$ : prognozavimo paklaidos reikšmė ( $\epsilon_i = 77,19$ ) parodė mažiausią faktinių ir prognozuojamų baldų pardavimų skirtumą, vidutinė procentinė absoliutinė paklaida (MAPE = 8,29 proc.) nusakė didelį prognozavimo tikslumą, vidutinė procentinė paklaida (MPE = 8,29 proc.) apibūdino nedidelį teigiamą prognozės nuokrypį. Siekiant kokybinio gautos prognozės įvertinimo, apskaičiuoti prognozės pasikliautinumo intervalai, kai kriterijus  $z = 1,960$ . Gauti rezultatai leidžia daryti išvadą, kad prognozuojami baldų pardavimai 2008 m. esant 95 proc. tikimybei, gali svyruoti nuo 844,64 mln. Lt. iki 1147,20 mln. Lt. Kita vertus, gautus rezultatus reikėtų vertinti atsargiai, nes jie neįvertina makroaplinkos, ypač ekonominės aplinkos, pokyčių. Pastarieji tampa itin svarbūs bet kurio Lietuvos ūkio sektoriaus tendencijoms prognozuoti, juolab, kad pastaruoju metu fiksuojamas Lietuvos ekonomikos lėtėjimas, kurio nagrinėjami statistiniai duomenys ir atlikti skaičiavimai neatspindi.

Raktiniai žodžiai: *rinkos paklausa, prognozavimo metodai.*

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