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Work Package1

Comprehensive Survey Report on Demand Forecasting Practices in V4 Countries

1. Previous background

1.1 Survey by MLBKT and Bonitat Ltd. (2013)

In the autumn of 2013, the HITA (Hungarian Investment and Trade Agency) organised its so-called SME Academy at the fourth location that year, where Bonitat Ltd. represented the logistics field. The typical participants of this series were suppliers in the automotive industry or other manufacturing supply chains, which gave us the opportunity to learn about the state of demand forecasting in these segments at the time, and we also began to map the then-current status of customer–supplier relationships.

In our previous practice, we had become accustomed (though we did not accept) to short-term forecasts having errors of 30–40% (which encouraged us to develop our own approach). However, these companies had not yet reached this level of reflection. Based on the responses collected from the three locations surveyed at that time, it is worth highlighting some characteristic data from the answers to the questions.

The supplier profile of the companies surveyed presented a mixed picture: at some manufacturers, the product portfolio was spread across several categories (Tier 1, Tier 2, or Tier 3). Based on their product portfolios and supplier relationships, 50% of the surveyed companies were involved in Tier 1, 50% in Tier 2, and 21% also in Tier 3 relations.

In 64% of the organisations surveyed, the logistics function reports directly to top management; in 14% it reports to the commercial manager; and 22% have no designated logistics organisation at all.

Among our questions, we also examined the average reliability of real processes: in this sample, production showed 88%, procurement 80%, warehouse processes 83%, and distribution 85% reliability.

In response to the question of how characteristic stockouts, delayed deliveries, or inability to deliver were for their products, answers resulted in an average score of 1.77 with a 33% deviation (on a scale where 1 = not at all characteristic, 5 = fully characteristic).

The answers to the following questions followed a somewhat different pattern. The time required to replace an unavailable product was rated at an average of 2.33 on a 1–5 scale (very short – very long), with a 32% deviation. Meanwhile, the severity of errors and problems related to forecasting was rated at an average of 2.55 (1 = not at all characteristic, 5 = fully characteristic), with a 37% deviation.

At 50% of the companies, the basis of forecasting included historical data, while 70% primarily relied on the demand-giver (OEM, regional distributor, the preceding Tier level, etc.).

The time horizon of forecasts at all three levels (total volume, product group, product) was typically 52 weeks for long-term planning, 14 weeks for medium-term, and 5 weeks for short-term planning.
The update frequency was 13 weeks for long-term forecasts, and 1 week for both medium- and short-term forecasts.

Forecast accuracy for long-term forecasts was around 71%, while medium-term accuracy varied between 51–68–70% (depending on the level of aggregation; in other fields this relationship is reversed). Short-term forecasts had the highest accuracy, fluctuating around 90%.

Only 57% of the companies surveyed indicated that an effective ‘actual sales vs. forecast’ feedback mechanism was in place within their processes.
The importance of responding to hard-to-predict demand in operating the supply chain (1 = low, 5 = high) was rated at 4.38, with a 20% deviation.

Based on the highlighted characteristics, it appears that the assessed picture of forecast accuracy looks ‘somewhat’ better than reality. This observation is supported

by the rating of 4.08 (with a 20% deviation) for the proportion of decisions made within the reaction time (1 = very low, 5 = very high).

As we have seen, even in a relatively well-regulated segment the situation is rather unclear, and we can observe that in rapidly changing areas (such as the FMCG market) the situation can be even more chaotic.

Earlier that spring, the Supply Chain Management Review also addressed the issues of demand forecasting. Its survey, conducted with the participation of more than 300 companies, sought to identify the root causes of the problems in three key areas: the role of supply chain centres of excellence, the ten most painful issues perceived by supply chain leadership, and the importance of IT systems along with the practical satisfaction associated with their use.

In their survey, they found that supply chain efficiency had become the central focus of operations, and 64% of companies had established so-called supply chain centres of excellence to support this. Their study also examined the importance of the main functions of these centres.[1]

We repeated the same survey among medium-sized companies in Hungary, exploring two perspectives: what they think about their own practices and what they think about Hungarian practice in general.[2]

Regarding the functions of a supply chain centre of excellence, the following opinions and feedback were given:

	Supply Chain Insights	practice in Hungary		the respondents' individual practice	
	the weight and importance of the functions				
Identifying the best practices for the process	84%	65%		80%	
Identifying the key supply chain metrics	79%	63%		75%	
Supply chain design	67%	67%		75%	
Inventory management strategy	66%	72%		85%	
Network design	56%	52%		58%	
Support for horizontal processes	55%	70%		80%	
Evaluation of new technologies	53%	60%		78%	
Defining objectives	52%	80%		85%	
Strategic supply chain management	44%	60%		75%	
Supplier capability development	23%	60%		73%	
	58%	**65%**		**76%**	

[1] Forrás: Supply Chain Insights LLC, Cross-Survey Analysis 2012 (Mar.-Dec. 2012)
[2] Forrás: MLBKT és Bonitat Kft közös felmérése, 2013 október

Regarding the ten most painful problems for supply chain leaders, the foreign sample is much more diversified than the Hungarian one; overall, the self-assessment of Hungarian companies is closest to the foreign sample:

	Supply Chain Insights	practice in Hungary		the respondents' individual practice	
	the extent of the pain				
insufficient supply chain transparency	78%	42%		25%	
variability in demand	75%	68%		65%	
the complexity of the supply chain	70%	53%		50%	
the increase in goods prices	50%	48%		48%	
data quality issues	45%	50%		40%	
the increase in product variety	45%	62%		73%	
the lack of talent	38%	47%		35%	
ensuring manufacturing reliability	33%	48%		35%	
Achievement and recognition	28%	65%		73%	
globalization challenges	25%	48%		38%	
	49%	53%		48%	

The research on the importance of IT systems and the level of satisfaction associated with them shows the largest deviation from the foreign sample: it appears that in this regard everything looks very good here at home!

	international sample			Hungarian sample				
	importance	level of satisfaction	difference	importance	level of satisfaction	difference		
Enterprise Resource Planning (ERP)	74%	23%	-51%	90%	80%	-10%		
Order management	74%	31%	-43%	97%	92%	-5%		
Demand planning	62%	35%	-27%	93%	88%	-5%		
Production planning	59%	22%	-37%	90%	84%	-6%		
Manufacturing Execution Systems (MES	59%	24%	-35%	77%	80%	3%		
Warehouse management	58%	30%	-28%	93%	92%	-1%		
Tactical supply planning	53%	17%	-36%	70%	76%	6%		
Transportation planning	53%	35%	-18%	87%	88%	1%		
	62%	**27%**	**-34%**	**87%**	**85%**	**-2%**		

Delving into the possible causes and extending the search for root problems to both the literature and discussions with industry contacts, it is worthwhile to collect and systematise the potential factors that influence forecast quality.

Along the value chain stretching between performance and customer satisfaction, the greatest deficiency lies in the quality of supply chain planning. The supply chain is a complex system, but most companies do not treat it as one. Every supply chain has a unique potential based on optimisation across the factors of growth, cost, cycles, and complexity.
Influencing inventory plays a critical role in increasing supply chain potential, as it has a direct impact on operating profit relative to revenue. The key to accurate inventory management is improving forecasts (sales and demand).

With the spread of globalisation — meaning the expansion of distribution networks and the growing depth and breadth of supplier structures — this task is becoming increasingly complex. Traditional supply chain planning and, within it, forecasting mechanisms are becoming less capable of detecting and adapting to increasing demand variability and the growing complexity of demand characteristics.

At most companies, the tactical planning process typically spans 12–18 months. These systems periodically—weekly or monthly—detect demand based on orders and shipment data, and from this they hope to create optimal processes. This approach therefore responds rather than senses. A fundamental shift could be achieved through an adaptive system that first senses and then responds, thereby flexibly following variability.

The true ‘forecastability’ of products — which rests on the ability to apply optimisation techniques to improve forecast accuracy — is based on a structured approach: breaking down demand by customer channels (‘outside-in planning’), identifying their characteristics, using optimisation techniques to actively shape demand, and complementing this with advanced analytical methods to enable intelligent responses. A key element of this philosophy is the reduction of bias and errors.

The new approach also requires a new type of action programme. The structure of forecasts must follow the structure of customer characteristics — that is, a hierarchical system of products, time horizons, geographic regions, channels, and attributes. This enables planning based on a shared perspective across marketing, sales, finance, and the supply chain.

It is also necessary to clarify the responsibility hierarchy in the process of creating forecasts. Efforts should be made to embed this function within an organisational area that is relatively ‘interest-neutral’ (logistics – supply chain management). In our experience, any other placement results in the given department immediately subordinating the process to its own interests.

This is a change that requires intensive training, during which thinking in terms of probabilities and applying probabilistic techniques should replace relying on a single objective criterion.

The involvement of IT in the processes is unavoidable, as the regular analysis of large volumes of data and the optimisation of large systems are continuous tasks that require significant capacity. To select the appropriate technology, we must understand in detail the flow of sales demand and the causal relationships behind the demand. In addition to the causal links, it is important to take seasonality into account, as well as to incorporate both top-down and bottom-up forecasting and planning techniques.[3]

Introducing the new methodology requires careful and well-considered implementation. Among its key components, the alignment of optimisation engines must be emphasised first: as part of the thorough preparation of the test period, the system's 'soft' elements must be cleansed of bias and errors using real data from the previous two or three years.

The annual reviews following implementation provide opportunities for further fine-tuning of the forecasting tools. Experience shows that forecasting is not the field for beginner analysts, but for professionals with deep practical knowledge of key business areas.

Professionals with sufficiently broad perspectives, who understand the underlying causes of phenomena, are capable of achieving the necessary shift in perspective along the supply chain. These key employees can then also become the driving force behind the redesign of processes.[4]

The planning process of sales and demand forecasting is a classic control loop. Its main elements and steps are:[5]

1. **The preliminary sensing of expected sales/demand:** proactive sensors for detecting real market events and understanding changes.
2. **Shaping the expected sales/demand** in close cooperation with marketing (and sales) to consciously stimulate market demand in the desired direction.
3. **Interpreting the expected sales/demand** derived from the market and cascading it through all internal service units of the organisation.
4. **Supervising, controlling, and steering the expected sales/demand,** where the goal is not to shape expected demand itself, but to establish the right balance between opportunities and the risk associated with demand.

[3] S&OP Execution: Making Supply Chain Plans Work; White Paper: S&OP Execution

[4] Prokopets, Len - S&OP: What You Can Learn from the Top Performers; Supply Chain Management Review, May/June 2013 p 28-35

[5] Cecere, Lora – A Practitioner's Guide to Demand Planning; Supply Chain Management Review, March/April 2013 p 40-46

This forecasting process — striving for completeness and wholeness — depends on whether the organisation's maturity is oriented toward demand or toward the market.

With well-managed forecasting, we can reduce our inventory levels and improve cash flow. With poorly managed forecasts, we may even have to say goodbye to a third of our profit.

An important conclusion and insight from our research is the low level of attention paid to the performance and significance of forecasts. And in some cases, this may not be accidental.

Operational forecasting and its environment — closely linked to sales performance (and senior management bonuses) — is a particularly sensitive area.

1.2 Survey by MLBKT and Bonitat Ltd. (2017)

This survey accompanied the establishment of the MLBKT Forecasting Division, and its main goal was to record the first insights that could be uncovered about forecasting culture.
The initial survey was based primarily on responses from organisations gathered within the division—organisations sensitive to issues of forecast accuracy—where the underlying foundation was predominantly solid practical and professional judgement.

2017

forecast accuracy	standard deviation
75,6%	13,9%

We complemented Gartner's 2017 study — which targeted the main factors behind forecasting problems — with five additional aspects tailored to Hungarian conditions. The results showed several shifts in emphasis compared to the international sample.

The perspective arising from the differing importance of these factors can be traced back to the openness of the Hungarian economy and the predominantly supplier-oriented nature of its economic actors. This is also confirmed by the following research results:

	international best-in-class	the best performers in the Hungarian sample
customer service level (%)	98%+	96%
on-time delivery to customer request (%)	97%+	96%
cycle time (from order receipt to delivery) (days)	< 3 days	5,5
DIOH - Days Inventory on Hand	< 28 days	64
	Gartner 2017	*Hun. 2017*

We asked our respondents a question that later became mandatory in the surveys: if forecast accuracy improved by 5%, what impact would that have on the most important operational parameters?

	rate of change (%)	
inventory holding cost	**8-10%**	decreases
inventory value	**1,5%**	decreases
service level	**3,0%**	improves
shipping cost	**1,0%**	decreases
production cost	**1-3%**	decreases

At that time, this level still fell significantly short of the changes indicated in the publications (see Annex 1).

According to the assessments, forecasting practice holds significant potential, and its improvement is crucial for the quality of processes. The division structured its work programme according to the prioritised order of the identified problems.

1.3 Survey by MLBKT and Bonitat Ltd. (2022-23)

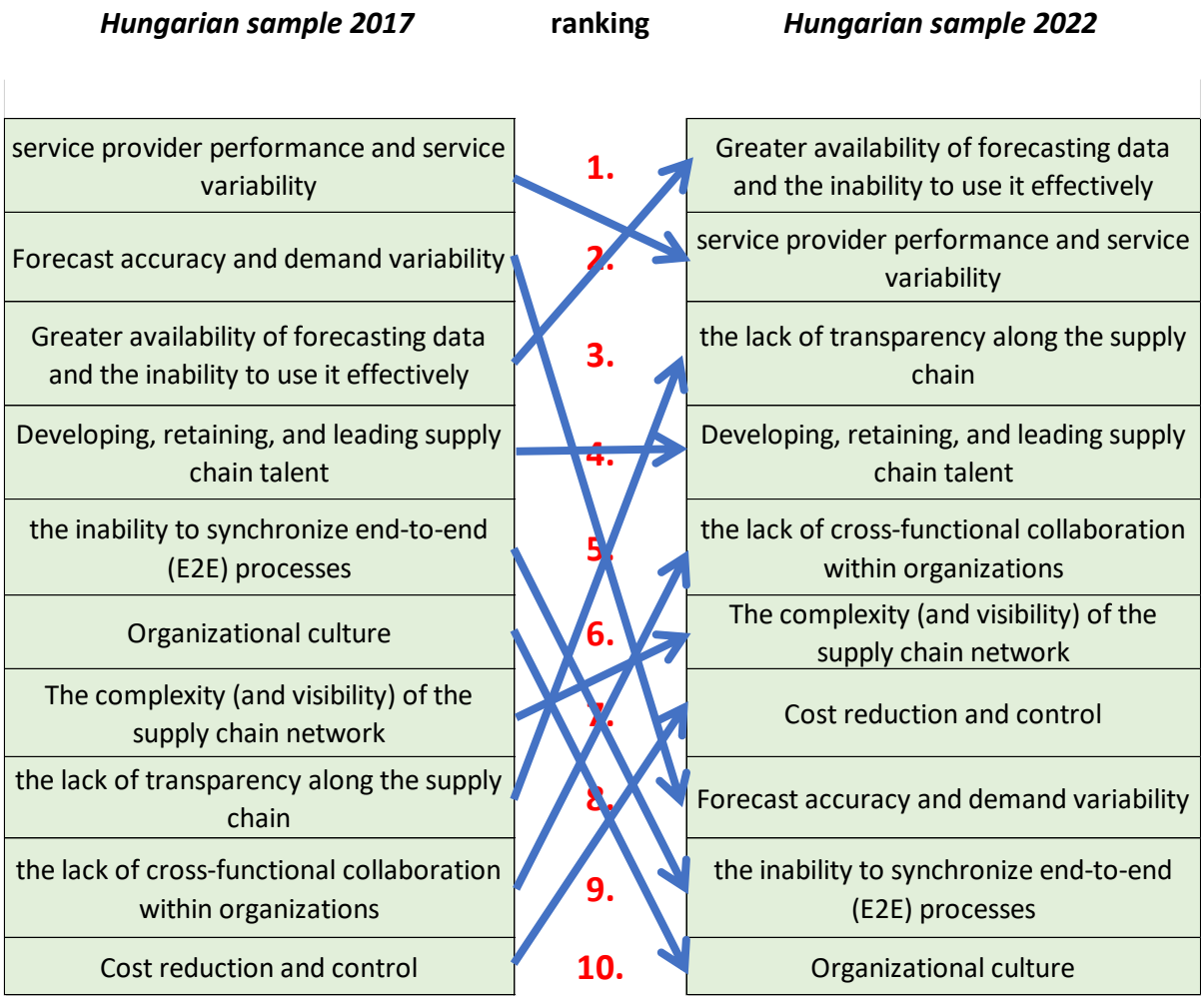
The next survey within the MLBKT Forecasting Division was conducted under the impact of the unfolding pandemic and the onset of the UA–RU war:

2022-23		
forecast accuracy	standard deviation	in retrospect
80,9%	10,9%	In the first 'peace year' (2019)
72,5%	16,3%	In the first year of the (COVID) pandemic (2020)
76,8%	10,1%	In the second year of the (COVID) pandemic (2021)
71,5%	21,1%	In the third year of the pandemic and the first year of the UA-RU war (2022)

The annual revenue of the survey participants:

the annual revenue of the survey participants (Mio Euro) in 2022	
average	**194,1**
min	**19,2**
max	**675,7**

The survey highlighting the root causes of forecasting problems showed a significant shift compared to the survey conducted five years earlier, in which the effects of the pandemic and the UA–RU war played a fundamental role:



A simple description of the problems:

Unexpected impacts, and inadequate estimation of the magnitude of expected impacts.
Sometimes inventory accumulates, but we still strive for the best and fastest
At pharmaceutical wholesalers, inventory management largely relies on historical sales data. At Bellis Egészségtár, due to dynamic growth, a transforming portfolio, and diverse pharmacy promotions, historical data is often not relevant, and in many cases we overshoot or undershoot the appropriate inventory level.

Due to the size of our warehouse and the fact that it also operates as an excise warehouse, our inventory levels are lower, and overstocking represents a significant additional cost for the company. For this reason, if a larger-volume order arrives outside working hours (late afternoon/evening), it must be picked and invoiced quickly to ensure the earliest possible dispatch, which increases the likelihood of errors. Furthermore, the pre-planned delivery route can easily be disrupted, as both the route and the vehicle assigned to the delivery may need to change due to capacity constraints.

As a subsidiary, we do not have direct sales activity; instead, we work together with the central organisation to improve the reliability of forecasts. The Chinese railway market is highly unpredictable, which causes problems partly because of the volume, and partly because if we fail to perform, we end up ‘pushing the cart of localisation’.

As a key player in the poultry industry, the Ltd. is engaged in chicken production, slaughtering, and sales. The fresh demand we receive from our partners operates with approximately 90% accuracy. A particular feature of our production is that the products we sell as fresh are later sold in frozen form. From our perspective, therefore, the importance of fresh demand lies in the utilisation of freezing capacity and the smooth organisation of subsequent sales. If fresh demand deviates from the forecast, the planned frozen sales also change accordingly.

The lack of joint planning with commercial partners and the absence of a shared mindset. Late notifications from commercial partners regarding the execution of promotions. The lack of follow-up related to promotional performance and the absence of related information sharing. The erratic fulfilment of items sold in small quantities, leading to inventory issues. Inadequate transmission of information from already established closer relationships to the planning organisation, and treating us not as an equal partner.

We supply meat industry products to all major retail chains. We are unable to accurately assess the impact of their promotions on volume, and the main problem is the promotions cancelled within the last two weeks, along with the resulting drop in volume demand. Due to the short shelf life of our products, this leads to overproduction, selling at discounted prices as the expiry date approaches, and—if we adjust our planning based on experience and plan production more cautiously—we are not always able to produce the required quantities for our partners on time.

With regard to the scope of information collection, a noticeable change occurred in the perception of information affecting the short term:

the scope of the information collection	the practical importance of the factor in one's own practice (%)	the effectiveness of the factor's implementation – its practical realisation (%)		
incorporating predefined requirements into the forecast (new products, promotions)	95,0	78,3	**74,4**	**1.**
collecting demand expectations based on the experience of the sales and marketing teams	77,5	86,7	**67,2**	**2.**
detecting real-time demand	68,3	95,0	**64,9**	**3.**
collecting demand signals from product managers	68,3	87,5	**59,8**	4.
in addition to the product quantity, forecasting the product mix as well	50,0	80,0	**40,0**	5.
consensus-based demand forecasting practice through the S&OP process	53,3	73,3	**39,1**	6.
collecting demand expectations based on customer experience	60,0	50,0	**30,0**	7.
collaborative forecasting practice with customers	90,0	20,0	**18,0**	8.
considering macro trends among the demand drivers (economic trends, demographic data)	45,0	20,0	**9,0**	9.

We evaluated the responses from two perspectives regarding the factors contributing to the scope of information collection:

a) their importance in one's own practice, and

b) the effectiveness of how the factor is applied (practical implementation).

The ranking indicated that the turbulent events had not yet reshaped the focus of the informational background of forecasting; the order was still driven by a very conservative perspective. Factors emphasising cooperation and the sensing of real-time demand still carried low weight.

The next question, based on sound professional judgement, asked how much potential for improvement (in absolute percentage terms) existed in the respondent's

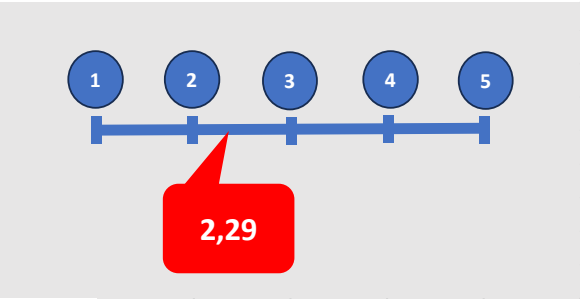
organisation/company's forecasting practice at the time of the survey. The response was surprising:

average	**9%**	min	1,5%
		max	30%

In other words, in 2022 the respondents saw an additional 9% potential improvement in sales forecasting compared to the average demand forecast accuracy of 71% (up to 80%). The more detailed picture by professional field developed as follows:

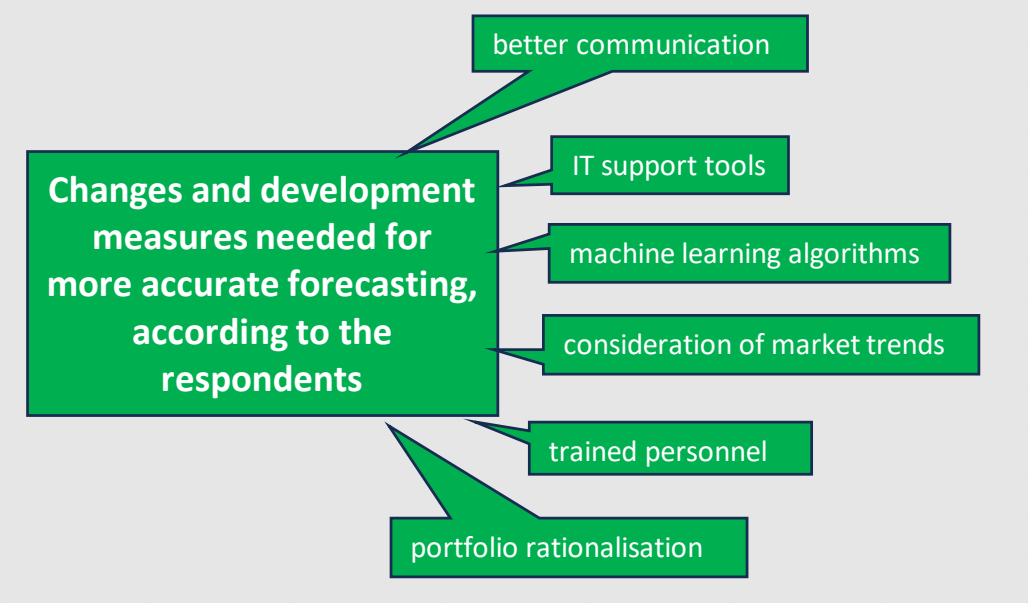
revenue	**2-5%**	improves
fulfilling customer requirements	**5%**	improves
marketing /effectiveness	**10%**	improves
productivity	**3%**	improves
production planning / capacity assurance	**15%**	improves
production costs	**5%**	decreases
procurement / supplier FC/order	**20%**	improves
supplier accuracy	**5%**	improves
inventory planning / stockout	**10%**	decreases
storage/material handling costs	**5%**	decreases
warehousing / capacity planning	**5%**	improves
finished goods warehouse / inventory level decrease	**15%**	decreases
finished goods warehouse / reduction in storage time	**10%**	decreases
logistics cost	**4%**	decreases
logistics / decrease in end-of-month sales concentration	**10%**	decreases
inventory management / DIO – the inventory turnover would improve	**10%**	improves
inventory management / less obsolete stock would need to be cleared	**10%**	decreases
distribution / negotiating position with carriers	**5%**	improves
logistics / time spent	**10%**	decreases
finance / required capital	**25%**	improves

Regarding how burdensome the current state of forecasting practice is, the following average picture emerged (5 = strongly; 1 = weakly):



Regarding how the additional potential hidden in forecasting could be utilised — through what methods and what types of changes — the following responses are highlighted:

- With better communication between the members of the supply chain
- In my opinion, only with IT support tools, e.g. SAP S4/HANA
- Additional (trained) personnel and advanced inventory management software
- The accuracy of forecasting is largely influenced by market conditions. Under stable economic conditions, forecasting accuracy improves naturally. Company management should take market characteristics and market trends more into account during planning, instead of trying to force their own products onto the market. At present, I see little chance of improvement in this area.
- I see a 5–7% improvement potential that could be achieved through portfolio rationalisation, which would reduce the burden of the wide product range on the supply chain.
- More sell-out data from partners and, based on this, the use of machine learning algorithms in forecasting



2. Results of the survey preparing the content of the projecT

2.1 The aim of the preparatory survey

In this chapter, GTE oversees the development, implementation, and analysis of a comprehensive survey focusing on the forecasting practices of the V4 countries. The activity consists of several stages and includes key contributions from the partners:

– Development of the questionnaire:

GTE designs detailed, context-appropriate questionnaires based on their expertise in forecasting and supply chain challenges. The content covers topics such as emerging forecasting needs, existing practices, and potential areas for improvement.

– Coordination of the survey:

GTE organises the implementation of the survey in cooperation with the Slovak University of Technology and the Czestochowa University of Technology. The two universities ensure representative access to market participants, relying on their existing networks and regional knowledge to collect diverse and highly useful data.

– Consolidation and analysis of data:

After the completion of the survey, GTE consolidates the collected information into a unified database. The data are analysed using advanced statistical tools and methodologies to identify relevant patterns and trends.

– Formulation of conclusions:

GTE analyses the results of the survey and formulates practical conclusions that provide insight into the current state of forecasting practices and reveal potential directions for innovation. These findings serve as a foundation for the further development of the project's educational materials.

The questionnaires developed rely partly on non–business-sensitive data and partly on professional experience. Although a precise research study could naturally delve deeply into the problems of forecasting, in this case our aim was to identify reference points for shaping the focus areas of the training materials. For this purpose, the content of the developed questionnaires proved sufficient, based on the experience of previous surveys.

2.2 Process of the preparatory survey

The following questionnaires were developed for the surveys:

– Hungarian-language questionnaire – Annex 2

– English-language questionnaire – Annex 3

– Polish-language questionnaire – Annex 4 (special questionnaire to accelerate the survey process)

– Slovak-language questionnaire – Annex 5 (special questionnaire to accelerate the survey process)

Survey period: 01 October 2025 – 28 November 2025.

Phases of the survey:

a, Designing and editing the questionnaire for the survey HU 2025.10.01.-2025.10.10.

The process and content of questionnaire design were coordinated among the GTE–CUT–SUT partners between 13 and 20 October 2025. As a result, in order to accelerate the survey, GTE developed Polish and Slovak versions in addition to the Hungarian and English ones.

Following the conclusion of the coordination process, the consortium used the questionnaire versions included in Annexes 2–5. To support the rapid conversion and consolidation of the different versions, GTE developed an evaluation template, which later facilitated the interpretation of the results and the preparation of various statistics.

b, Direct inquiry / contact and interview 2025.10.20.-205.11.19.

GTE organised the implementation of the survey in cooperation with SUT and CUT. The two universities ensured access to market participants, relying on their existing networks and regional knowledge to collect diverse and highly usable data.

Progress of completed questionnaires:

	célérték	teljesített	
GTE	**15**	**18**	120%
SUT	**15**	**17**	113%
CUT	**15**	**15**	100%

All members of the consortium fulfilled the project requirements.

Industry distribution of the respondents:

GTE:

- automotive and automotive parts manufacturing, vehicle and vehicle parts manufacturing
- electronics industry
- metal processing
- machine manufacturing
- paper and printing industry
- dairy industry
- mineral water and soft drink industry
- vegetable oil industry
- meat industry
- wholesaler / distributor
- retailer
- export
- OTHER

SUT:

- automotive and automotive parts manufacturing, vehicle and vehicle parts manufacturing
- electronics industry

- metal processing
- machine manufacturing
- pharmaceutical industry
- wholesaler / distributor
- retailer
- OTHER

  CUT:
- automotive and automotive parts manufacturing, vehicle and vehicle parts manufacturing
- metal processing
- rubber and plastics industry
- textile / apparel industry
- meat industry
- canning industry
- OTHER

Industry distribution covered by the surveys:

		GTE	SUT		CUT		
1	autó és autóalkatrész, jármű és járműalkatrész gyártás	1	1		1	3	10,7%
2	elektronikai ipar	1	1			2	7,1%
3	fémfeldolgozás	1	1		1	3	10,7%
4	gépgyártás	1	1			2	7,1%
5	papír- és nyomdaipar	1				1	3,6%
6	tejipar	1				1	3,6%
7	ásványvíz és üdítőital ipar	1				1	3,6%
8	növényolajipar	1				1	3,6%
9	húsipar	1			1	2	7,1%
10	nagykereskedő / disztribútor	1	1			2	7,1%
11	kiskereskedő	1	1			2	7,1%
12	export	1				1	3,6%
13	EGYÉB	1		1	1	3	10,7%
14	gyógyszeripar		1			1	3,6%
15	gumi és műanyag ipar				1	1	3,6%
16	ruhaipar				1	1	3,6%
17	konzervipar				1	1	3,6%
	összesen	13	8		7	**28**	
		46,4%	28,6%		25,0%		

Although the samples are not representative of the full population of companies (under Hungarian conditions, achieving a 95% confidence level with a ±5% margin of error would require approximately 400 fully completed questionnaires), the signals provided by the obtained sample can be considered adequate within this narrow activity range.

Regarding representativeness, the following limitations had to be applied:

- Which company size category is sensitive to forecasting accuracy–related issues?

- Can this group be regarded as a potential target user base for the training programme in the future?

In the survey, 90 organisations were contacted in Hungary online. Responses were received from the following positions:

-Sales Demand Planning Manager

-Sales Planning manager

-Planning manager

-General manager

-Managing director

-Finished Goods Supply Chain Manager

-Demand Planning Manager

-Regional Demand Planning and Supply Control

-Supply chain head

-Beszerzési és logisztikai igazgató

-Logistics manager

-Demand Planner

-Supply Chain Specialist

-Logistics Planning and Fullfilment

-Demand Planner & Key User

-Customer Supply Chain Manager

Response willingness of GTE's partners:

number of questionnaires sent out	**90**	
commitment to complete	1	1,1%
pending request	60	66,7%
declined request	11	12,2%
completed questionnaire	**18**	**20,0%**

The willingness to complete the electronically distributed questionnaires was low — around 20% — accompanied by a high rate of refusals.

The calculation in Annex 6 projected a medium-to-large enterprise size. This segment has always placed strong emphasis on process development, and their improvement programmes are forward-looking; therefore, they are appropriately motivated from the project's perspective, and the information they provide is detailed. Consequently, the group of respondents — along with a smaller portion of those who remain pending — can be regarded as potential users in the future.

The respondents in the Slovak sample interviewed had an average annual revenue of 19.46 million euros, representing the SME sector — specifically the lower third of medium-sized enterprises. The Polish sample interviewed covered a similar range (average 17.98 million euros).

Overall, the full sample represented the strong mid-segment of SMEs as well as the strong mid-segment of large enterprises. Based on the feedback from the survey, both groups show solid openness toward forecasting development (training) projects.

2.3 Consolidation, analysis of all data and report on forecast demand in V4 countries HU 2025.11.20.-2025.11.28

2.3.1 Processing of the sample data

We requested sound professional judgement based on everyday practice when answering the various question groups. Therefore, in the evaluation process we mostly worked with the simple statistical average of the data series. The topic would merit an in-depth, detailed survey, which, however, did not fit within the framework of this project.

The purpose of the compiled questions was to draw attention as clearly as possible to the weak points of forecasting practice, and this message determines the focus areas of the training programme.

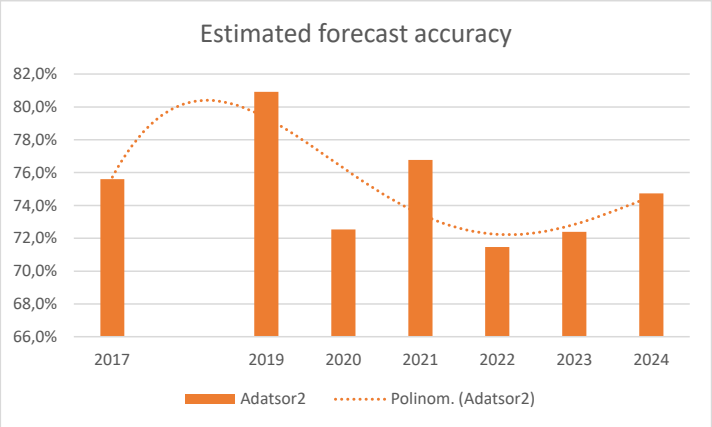
2.3.1.1 Aggregated estimate of forecast accuracy

a, the Hungarian sample

The Hungarian sample already had precedents, as discussed in earlier chapters. These were supplemented with the estimates from the years 2023–24:

	forecast accuracy	std. deviation	
Average	75,6%	13,9%	by 2017 ('year of peace')
Above average	80,9%	10,9%	by 2019 (the last 'year of peace')
Below average	72,5%	16,3%	by 2020 (the first pandemic year)
Average	76,8%	10,1%	by 2021 (the second pandemic year)
Below average	71,5%	21,1%	by 2022 (the third pandemic year and the first year of war)
Below average	72,4%	19,3%	by 2022 (the second year of war)
Average	74,7%	18,6%	by 2022 (the third year of war)

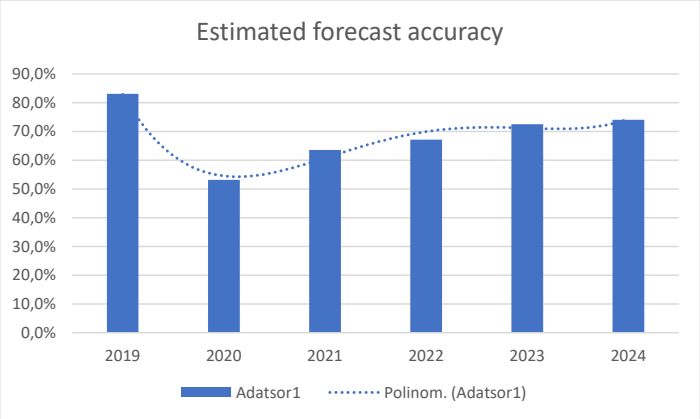
The following figure illustrates the trend (4th-degree polynomial) of the period extremely burdened by external conditions (2019–2024), which clearly reflects the fluctuations:



b, the Polish sample

The SMEs included in the Polish sample have been consolidating their situation more slowly, and forecast accuracy is still improving only gradually:

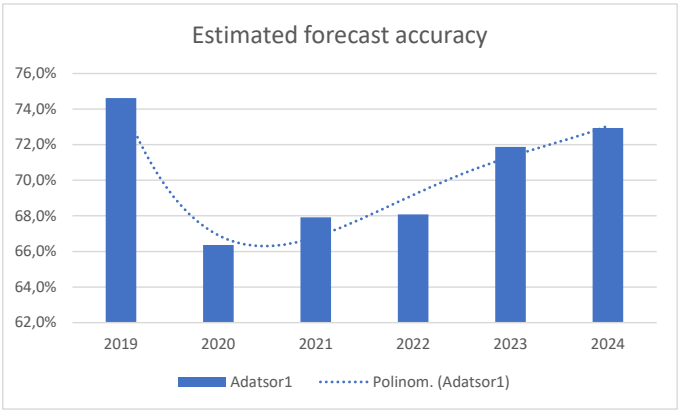
	forecast accuracy	std. deviation	
Good	83,1%	5,4%	by 2019 (the last 'year of peace')
Underperformer	53,1%	9,7%	by 2020 (the first pandemic year)
Underperformer	63,6%	10,0%	by 2021 (the second pandemic year)
Underperformer	67,1%	9,1%	by 2022 (the third pandemic year and the first year of war)
Below average	72,6%	12,6%	by 2022 (the second year of war)
Average	74,1%	12,3%	by 2022 (the third year of war)



b, the Slovak sample

The SMEs included in the Slovak sample showed a similar pattern to the respondents in the Polish sample, but the progression of the period reflected larger fluctuations:

	forecast accuracy	std. deviation	
Average	**74,6%**	**8,8%**	by 2019 (the last 'year of peace')
Underperformer	**66,4%**	**8,7%**	by 2020 (the first pandemic year)
Underperformer	**67,9%**	**9,2%**	by 2021 (the second pandemic year)
Below average	**68,1%**	**11,3%**	by 2022 (the third pandemic year and the first year of war)
Below average	**71,9%**	**8,7%**	by 2022 (the second year of war)
Below average	**72,9%**	**9,4%**	by 2022 (the third year of war)



2.3.1.2 Change in the importance of the forecasting horizon

In this chapter, the focus was on understanding how external challenges influenced the planning horizon — that is, what reactions the change in risk triggered (e.g., an increased frequency of 'firefighting' events). The following analyses illustrate how the importance of the planning horizon has changed (for example, due to external

circumstances, a respondent shifted their planning focus to the short term, and within that, narrowed the planning horizon from 5 weeks to 2 weeks).

a, the Hungarian sample

	SHORT TERM		
	DECREASES	UNCHANGED	INCREASES
2019		81,8%	18,2%
2020	15,4%	23,1%	61,5%
2021		46,7%	53,3%
2022		60,0%	40,0%
2023		41,2%	58,8%
2024		56,3%	43,8%

	MIDDLE TERM		
	DECREASES	UNCHANGED	INCREASES
2019		91,7%	8,3%
2020	15,4%	46,2%	38,5%
2021	13,3%	53,3%	33,3%
2022		68,8%	31,3%
2023		47,1%	52,9%
2024		50,0%	50,0%

	LONG TERM		
	DECREASES	UNCHANGED	INCREASES
2019		90,0%	10,0%
2020	27,3%	45,5%	27,3%
2021	21,4%	64,3%	14,3%
2022	7,1%	50,0%	42,9%
2023		75,0%	25,0%
2024		68,8%	31,3%

In the Hungarian sample, the focus shifted immediately towards short-term planning practices with the emergence of external conflicts (and essentially remained short-term focused in 2022 as well), while changes in medium-term planning only appeared at the end of the examined period. In long-term planning, respondents maintained a cautious stance of no change.

b, the Polish sample

In the Polish sample, the importance of short-term planning increased almost immediately, while attention to medium- and long-term planning declined significantly, and only recovered again at the end of the period.

	SHORT TERM		
	DECREASES	UNCHANGED	INCREASES
2019		62,5%	37,5%
2020		37,5%	62,5%
2021		37,5%	62,5%
2022		25,0%	75,0%
2023		21,4%	78,6%
2024		57,1%	42,9%

	MIDDLE TERM		
	DECREASES	UNCHANGED	INCREASES
2019		75,0%	25,0%
2020	100,0%		
2021	37,5%	37,5%	25,0%
2022	37,5%	37,5%	25,0%
2023		35,7%	64,3%
2024		35,7%	64,3%

	LONG TERM		
	DECREASES	UNCHANGED	INCREASES
2019		87,5%	12,5%
2020	100,0%		
2021	50,0%	37,5%	12,5%
2022	62,5%	25,0%	12,5%
2023		42,9%	57,1%
2024		35,7%	64,3%

c, the Slovak sample

In the Slovak sample, the importance of short-term planning increased only in the last two-thirds of the examined period, while the importance of medium- and long-term planning dropped almost immediately.

	SHORT TERM		
	DECREASES	UNCHANGED	INCREASES
2019		80,0%	20,0%
2020		55,6%	44,4%
2021		55,6%	44,4%
2022		33,3%	66,7%
2023		47,1%	52,9%
2024		41,2%	58,8%

	MIDDLE TERM		
	DECREASES	UNCHANGED	INCREASES
2019	22,2%	55,6%	22,2%
2020	55,6%	44,4%	0,0%
2021	50,0%	40,0%	10,0%
2022	22,2%	55,6%	22,2%
2023	5,9%	41,2%	52,9%
2024	23,5%	29,4%	47,1%

	LONG TERM		
	DECREASES	UNCHANGED	INCREASES
2019	22,2%	44,4%	33,3%
2020	55,6%	33,3%	11,1%
2021	44,4%	33,3%	22,2%
2022	33,3%	44,4%	22,2%
2023	23,5%	29,4%	47,1%
2024	23,5%	29,4%	47,1%

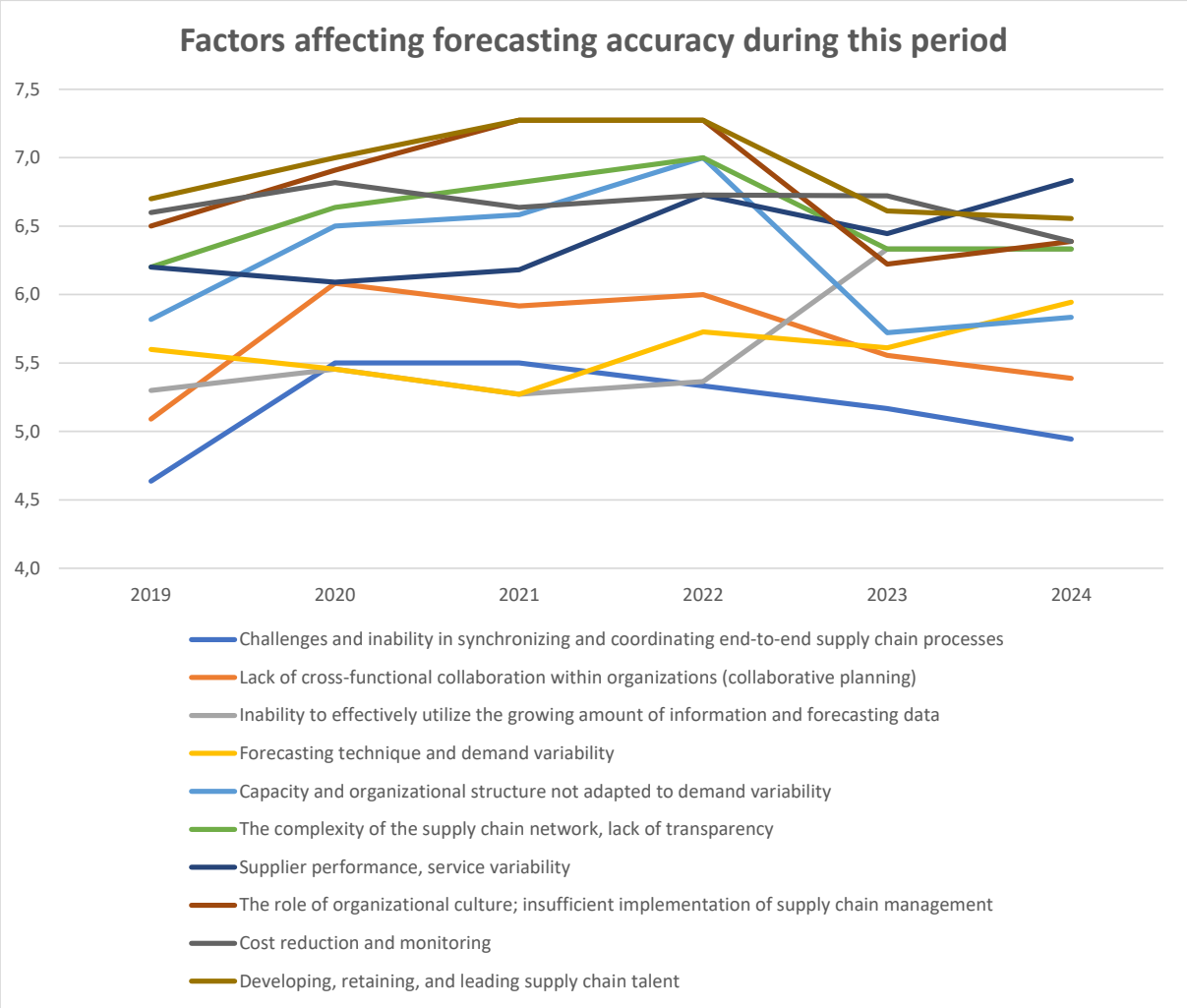
2.3.1.3 Factors influencing forecast accuracy during this period

As a result of refreshing the previously used criteria, we examined the factors influencing forecast accuracy based on a total of 10 aspects (with 1 indicating the strongest and most impactful factor).

a, the Hungarian sample

	2019	2020	2021	2022	2023	2024
Challenges and inability in synchronizing and coordinating end-to-end supply chain processes	4,6	5,5	5,5	5,3	5,2	4,9
Lack of cross-functional collaboration within organizations (collaborative planning)	5,1	6,1	5,9	6,0	5,6	5,4
Inability to effectively utilize the growing amount of information and forecasting data	5,3	5,5	5,3	5,4	6,3	6,3
Forecasting technique and demand variability	5,6	5,5	5,3	5,7	5,6	5,9
Capacity and organizational structure not adapted to demand variability	5,8	6,5	6,6	7,0	5,7	5,8
The complexity of the supply chain network, lack of transparency	6,2	6,6	6,8	7,0	6,3	6,3
Supplier performance, service variability	6,2	6,1	6,2	6,7	6,4	6,8
The role of organizational culture; insufficient implementation of supply chain management	6,5	6,9	7,3	7,3	6,2	6,4
Cost reduction and monitoring	6,6	6,8	6,6	6,7	6,7	6,4
Developing, retaining, and leading supply chain talent	6,7	7,0	7,3	7,3	6,6	6,6

1 denotes the most characteristic and strongest case



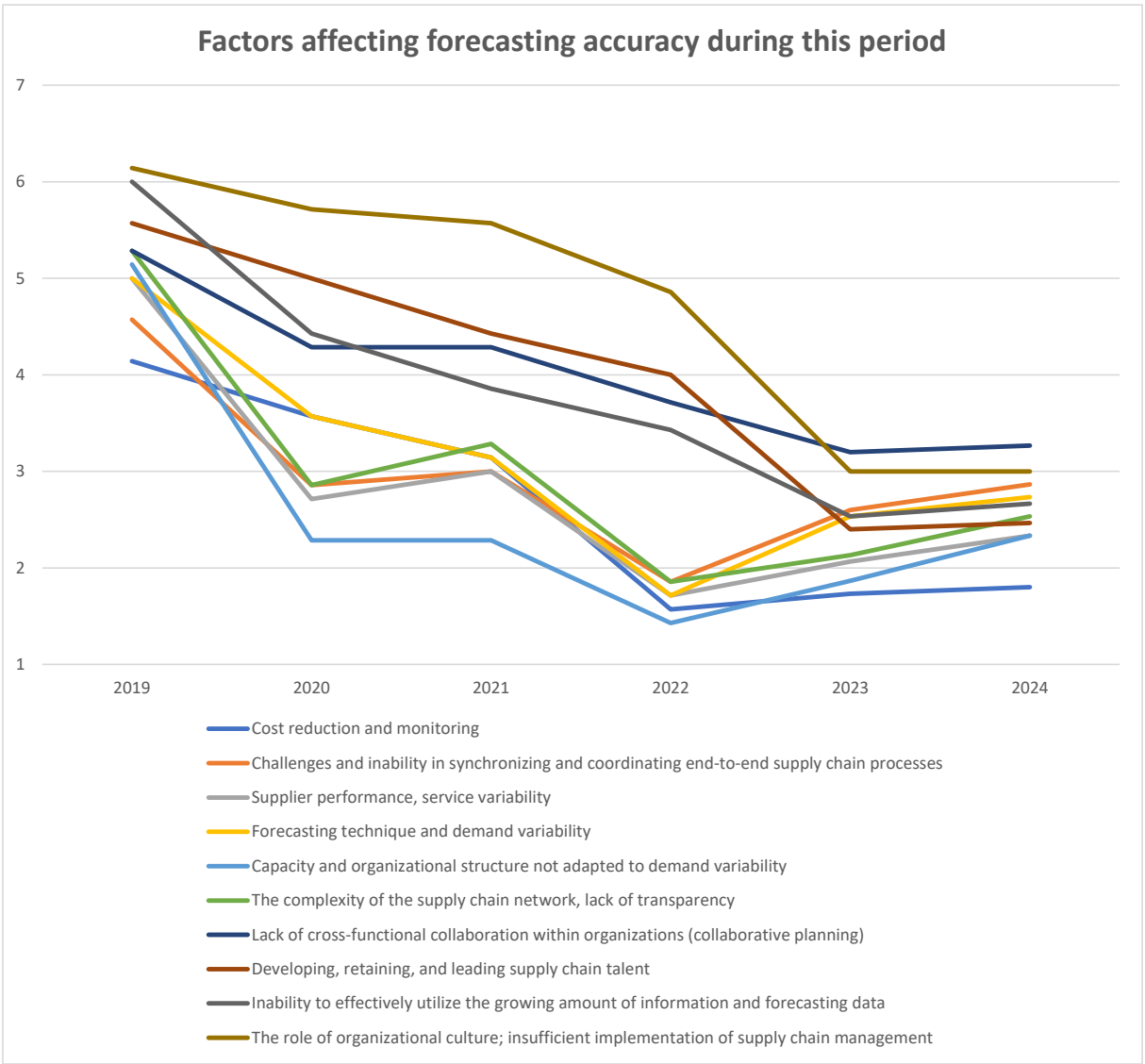
Factors most influencing forecast accuracy in the Hungarian sample at the end of the period:

- Challenges and inability in synchronizing and coordinating end-to-end supply chain processes
- Lack of cross-functional collaboration within organizations (collaborative planning)
- Capacity and organizational structure not adapted to demand variability
- Forecasting technique and demand variability
- Inability to effectively utilize the growing amount of information and forecasting data

b, the Polish sample

	2019	2020	2021	2022	2023	2024
Cost reduction and monitoring	4,1	3,6	3,1	1,6	1,7	1,8
Challenges and inability in synchronizing and coordinating end-to-end supply chain processes	4,6	2,9	3,0	1,9	2,6	2,9
Supplier performance, service variability	5,0	2,7	3,0	1,7	2,1	2,3
Forecasting technique and demand variability	5,0	3,6	3,1	1,7	2,5	2,7
Capacity and organizational structure not adapted to demand variability	5,1	2,3	2,3	1,4	1,9	2,3
The complexity of the supply chain network, lack of transparency	5,3	2,9	3,3	1,9	2,1	2,5
Lack of cross-functional collaboration within organizations (collaborative planning)	5,3	4,3	4,3	3,7	3,2	3,3
Developing, retaining, and leading supply chain talent	5,6	5,0	4,4	4,0	2,4	2,5
Inability to effectively utilize the growing amount of information and forecasting data	6,0	4,4	3,9	3,4	2,5	2,7
The role of organizational culture; insufficient implementation of supply chain management	6,1	5,7	5,6	4,9	3,0	3,0

1 denotes the most characteristic and strongest case



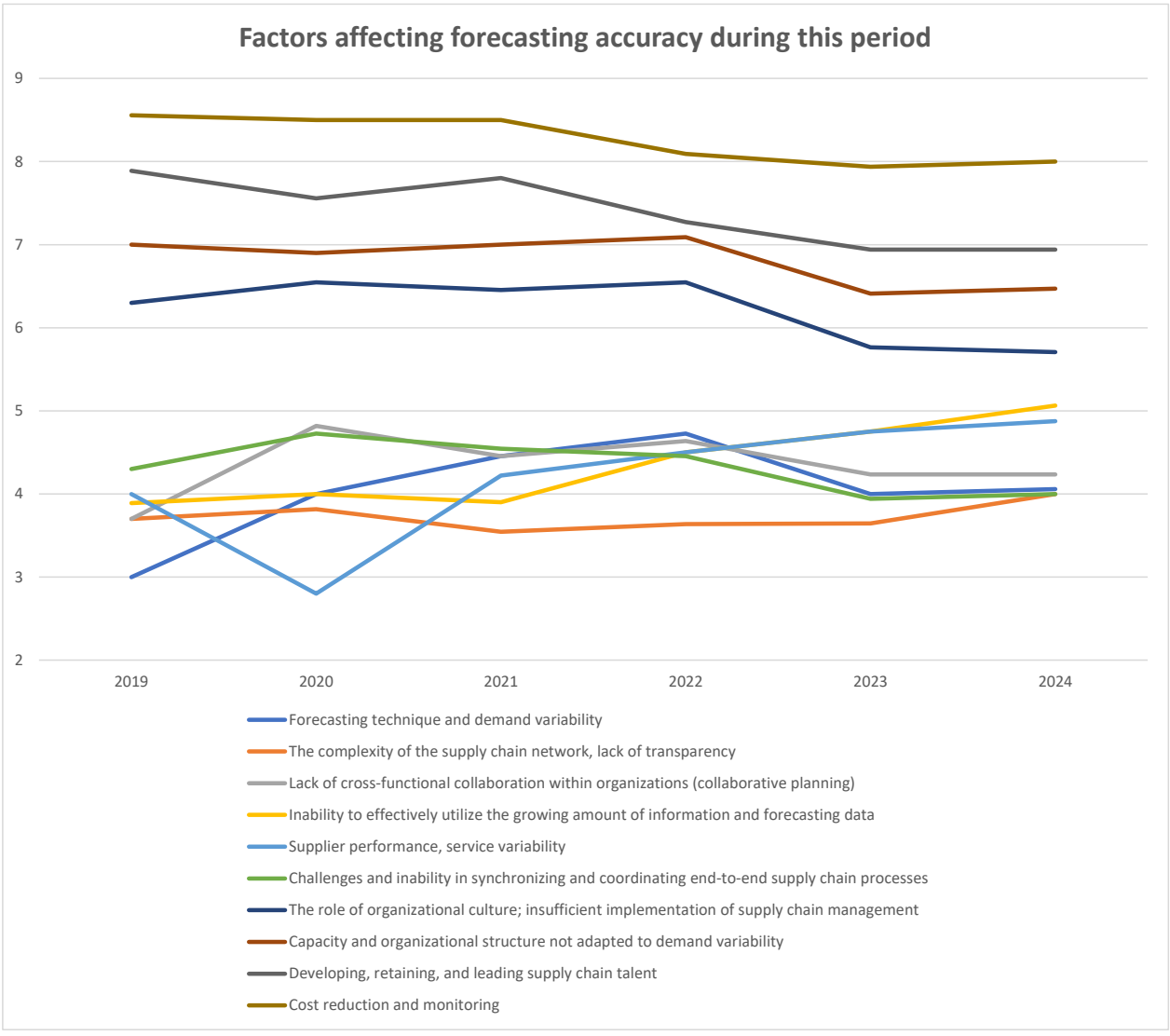
Factors most influencing forecast accuracy in the Polish sample at the end of the period, according to the respondents:

- Cost reduction and monitoring
- Supplier performance, service variability
- Capacity and organizational structure not adapted to demand variability
- Developing, retaining, and leading supply chain talent
- The complexity of the supply chain network, lack of transparency

c, the Slovak sample

	2019	2020	2021	2022	2023	2024
Forecasting technique and demand variability	3,0	4,0	4,5	4,7	4,0	4,1
The complexity of the supply chain network, lack of transparency	3,7	3,8	3,5	3,6	3,6	4,0
Lack of cross-functional collaboration within organizations (collaborative planning)	3,7	4,8	4,5	4,6	4,2	4,2
Inability to effectively utilize the growing amount of information and forecasting data	3,9	4,0	3,9	4,5	4,8	5,1
Supplier performance, service variability	4,0	2,8	4,2	4,5	4,8	4,9
Challenges and inability in synchronizing and coordinating end-to-end supply chain processes	4,3	4,7	4,5	4,5	3,9	4,0
The role of organizational culture; insufficient implementation of supply chain management	6,3	6,5	6,5	6,5	5,8	5,7
Capacity and organizational structure not adapted to demand variability	7,0	6,9	7,0	7,1	6,4	6,5
Developing, retaining, and leading supply chain talent	7,9	7,6	7,8	7,3	6,9	6,9
Cost reduction and monitoring	8,6	8,5	8,5	8,1	7,9	8,0

1 denotes the most characteristic and strongest case



Factors most influencing forecast accuracy in the Slovak sample at the end of the period, according to the respondents:

- The complexity of the supply chain network, lack of transparency
- Challenges and inability in synchronizing and coordinating end-to-end supply chain processes
- Forecasting technique and demand variability
- Lack of cross-functional collaboration within organizations (collaborative planning)
- Supplier performance, service variability

d, Comparison of the most impactful factors across the samples:

	Best scores in the samples		
	Hungarian	Polish	Slovakian
Challenges and inability in synchronizing and coordinating end-to-end supply chain processes	1		2
Lack of cross-functional collaboration within organizations (collaborative planning)	2		4
Capacity and organizational structure not adapted to demand variability	3	3	
Forecasting technique and demand variability	4		3
Inability to effectively utilize the growing amount of information and forecasting data	5		
The complexity of the supply chain network, lack of transparency		5	1
Supplier performance, service variability		2	5
Cost reduction and monitoring		1	
Developing, retaining, and leading supply chain talent		4	

There are few common intersections between the samples:

- at the same level: Capacity and organisational structure adapted to demand variability (Hungarian and Polish sample),
- closely related factors:

  -Challenges and inability in synchronizing and coordinating end-to-end supply chain processes (Hungarian and Slovak sample)

  -Forecasting technique and demand variability (Hungarian and Slovak sample)

2.3.1.4 The extent of collecting forecasting-related information in corporate practice

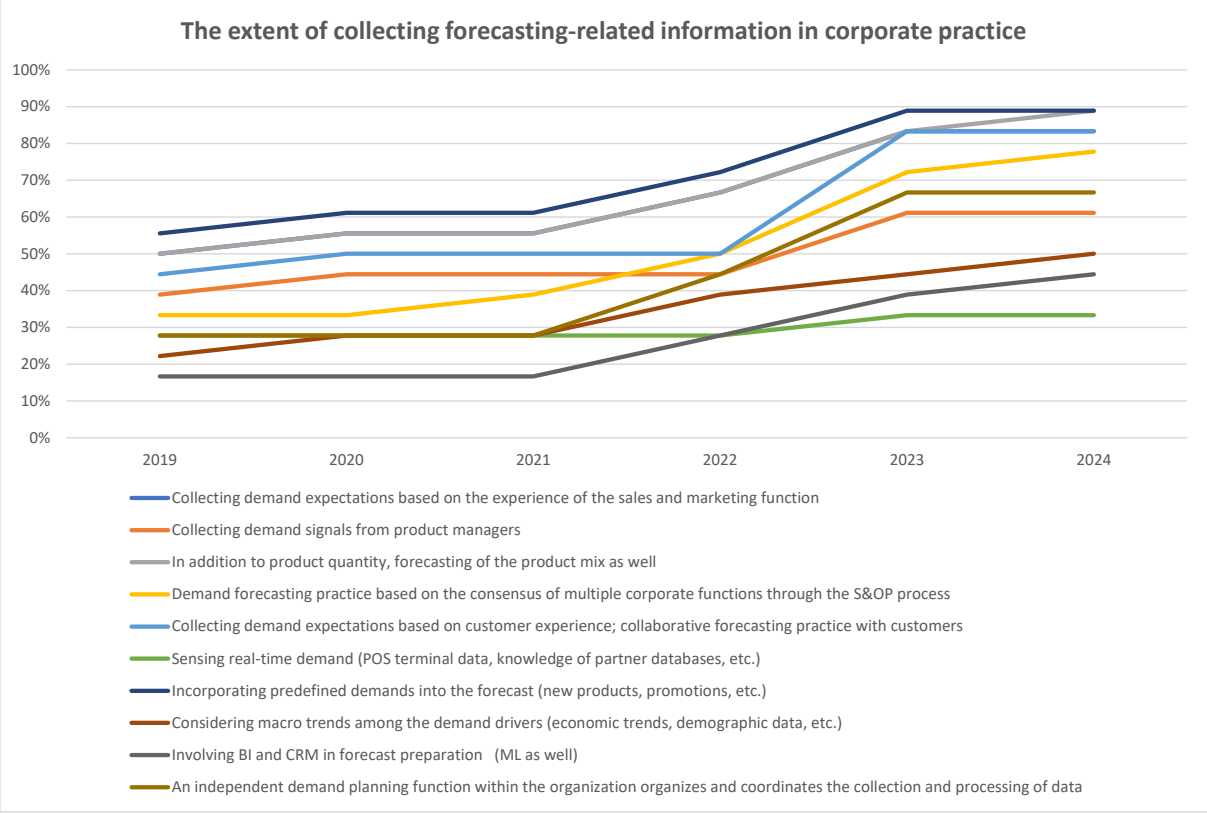
In the survey, the scope of information gathering related to forecasting in corporate practice reflects the need to explore both traditional and modern approaches:

Collecting demand expectations based on the experience of the sales and marketing function	TRADITIONAL
Collecting demand signals from product managers	TRADITIONAL
In addition to product quantity, forecasting of the product mix as well	TRADITIONAL
Demand forecasting practice based on the consensus of multiple corporate functions through the S&OP process	MODERN
Collecting demand expectations based on customer experience; collaborative forecasting practice with customers	MODERN
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	MODERN
Incorporating predefined demands into the forecast (new products, promotions, etc.)	TRADITIONAL
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	MODERN
Involving BI and CRM in forecast preparation (ML as well)	MODERN
An independent demand planning function within the organization organizes and coordinates the collection and processing of data	MODERN

The review of responses presents the proportion of respondents applying each type of information source year by year. From this, the dynamics of adoption can also be observed, as well as the development in the use of modern versus traditional methods..

a, the Hungarian sample

	2019	2020	2021	2022	2023	2024
Collecting demand expectations based on the experience of the sales and marketing function	50,0%	55,6%	55,6%	66,7%	83,3%	83,3%
Collecting demand signals from product managers	38,9%	44,4%	44,4%	44,4%	61,1%	61,1%
In addition to product quantity, forecasting of the product mix as well	50,0%	55,6%	55,6%	66,7%	83,3%	88,9%
Demand forecasting practice based on the consensus of multiple corporate functions through the S&OP process	33,3%	33,3%	38,9%	50,0%	72,2%	77,8%
Collecting demand expectations based on customer experience; collaborative forecasting practice with customers	44,4%	50,0%	50,0%	50,0%	83,3%	83,3%
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	27,8%	27,8%	27,8%	27,8%	33,3%	33,3%
Incorporating predefined demands into the forecast (new products, promotions, etc.)	55,6%	61,1%	61,1%	72,2%	88,9%	88,9%
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	22,2%	27,8%	27,8%	38,9%	44,4%	50,0%
Involving BI and CRM in forecast preparation (ML as well)	16,7%	16,7%	16,7%	27,8%	38,9%	44,4%
An independent demand planning function within the organization organizes and coordinates the collection and processing of data	27,8%	27,8%	27,8%	44,4%	66,7%	66,7%



At the beginning of the period:

	2019	
Incorporating predefined demands into the forecast (new products, promotions, etc.)	55,6%	TR
Collecting demand expectations based on the experience of the sales and marketing function	50,0%	TR
In addition to product quantity, forecasting of the product mix as well	50,0%	TR
Collecting demand expectations based on customer experience; collaborative forecasting practice with customers	44,4%	MO
Collecting demand signals from product managers	38,9%	TR
Demand forecasting practice based on the consensus of multiple corporate functions through the S&OP process	33,3%	MO
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	27,8%	MO
An independent demand planning function within the organization organizes and coordinates the collection and processing of data	27,8%	MO
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	22,2%	MO
Involving BI and CRM in forecast preparation (ML as well)	16,7%	MO

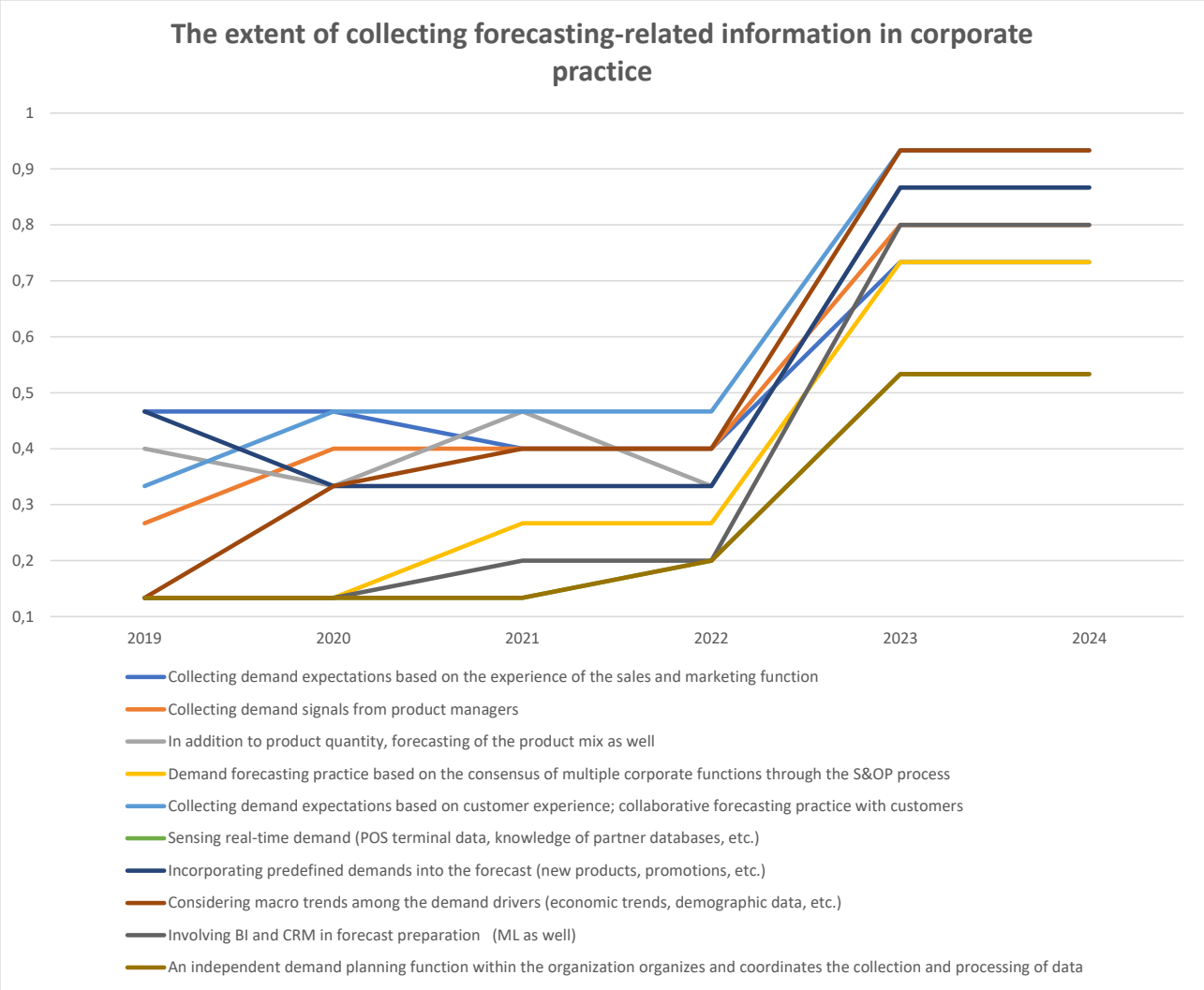
At the end of the period:

	2024	
In addition to product quantity, forecasting of the product mix as well	88,9%	TR
Incorporating predefined demands into the forecast (new products, promotions, etc.)	88,9%	TR
Collecting demand expectations based on the experience of the sales and marketing function	83,3%	TR
Collecting demand expectations based on customer experience; collaborative forecasting practice with customers	83,3%	MO
Demand forecasting practice based on the consensus of multiple corporate functions through the S&OP process	77,8%	MO
An independent demand planning function within the organization organizes and coordinates the collection and processing of data	66,7%	MO
Collecting demand signals from product managers	61,1%	TR
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	50,0%	MO
Involving BI and CRM in forecast preparation (ML as well)	44,4%	MO
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	33,3%	MO

By the end of the period, the use of modern tools had improved; however, traditional methods still remained dominant. In particular, greater adoption of real-time demand sensing and the involvement of BI/CRM systems (including Machine Learning) in forecast preparation would have been expected, given the increased emphasis on short-term forecasting practices.

b, the Polish sample

	2019	2020	2021	2022	2023	2024
Collecting demand expectations based on the experience of the sales and marketing function	46,7%	46,7%	40,0%	40,0%	73,3%	73,3%
Collecting demand signals from product managers	26,7%	40,0%	40,0%	40,0%	80,0%	80,0%
In addition to product quantity, forecasting of the product mix as well	40,0%	33,3%	46,7%	33,3%	86,7%	86,7%
Demand forecasting practice based on the consensus of multiple corporate functions through the	13,3%	13,3%	26,7%	26,7%	73,3%	73,3%
Collecting demand expectations based on customer experience; collaborative forecasting practice	33,3%	46,7%	46,7%	46,7%	93,3%	93,3%
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	13,3%	13,3%	13,3%	20,0%	53,3%	53,3%
Incorporating predefined demands into the forecast (new products, promotions, etc.)	46,7%	33,3%	33,3%	33,3%	86,7%	86,7%
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	13,3%	33,3%	40,0%	40,0%	93,3%	93,3%
Involving BI and CRM in forecast preparation (ML as well)	13,3%	13,3%	20,0%	20,0%	80,0%	80,0%
An independent demand planning function within the organization organizes and coordinates the	13,3%	13,3%	13,3%	20,0%	53,3%	53,3%



At the beginning of the period:

	2019	
Collecting demand expectations based on the experience of the sales and marketing function	46,7%	TR
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	46,7%	MO
In addition to product quantity, forecasting of the product mix as well	40,0%	TR
Collecting demand signals from product managers	33,3%	TR
Incorporating predefined demands into the forecast (new products, promotions, etc.)	26,7%	TR
Collecting demand expectations based on customer experience; collaborative forecasting practice	13,3%	MO
Demand forecasting practice based on the consensus of multiple corporate functions through the	13,3%	MO
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	13,3%	MO
Involving BI and CRM in forecast preparation (ML as well)	13,3%	MO
An independent demand planning function within the organization organizes and coordinates the	13,3%	MO

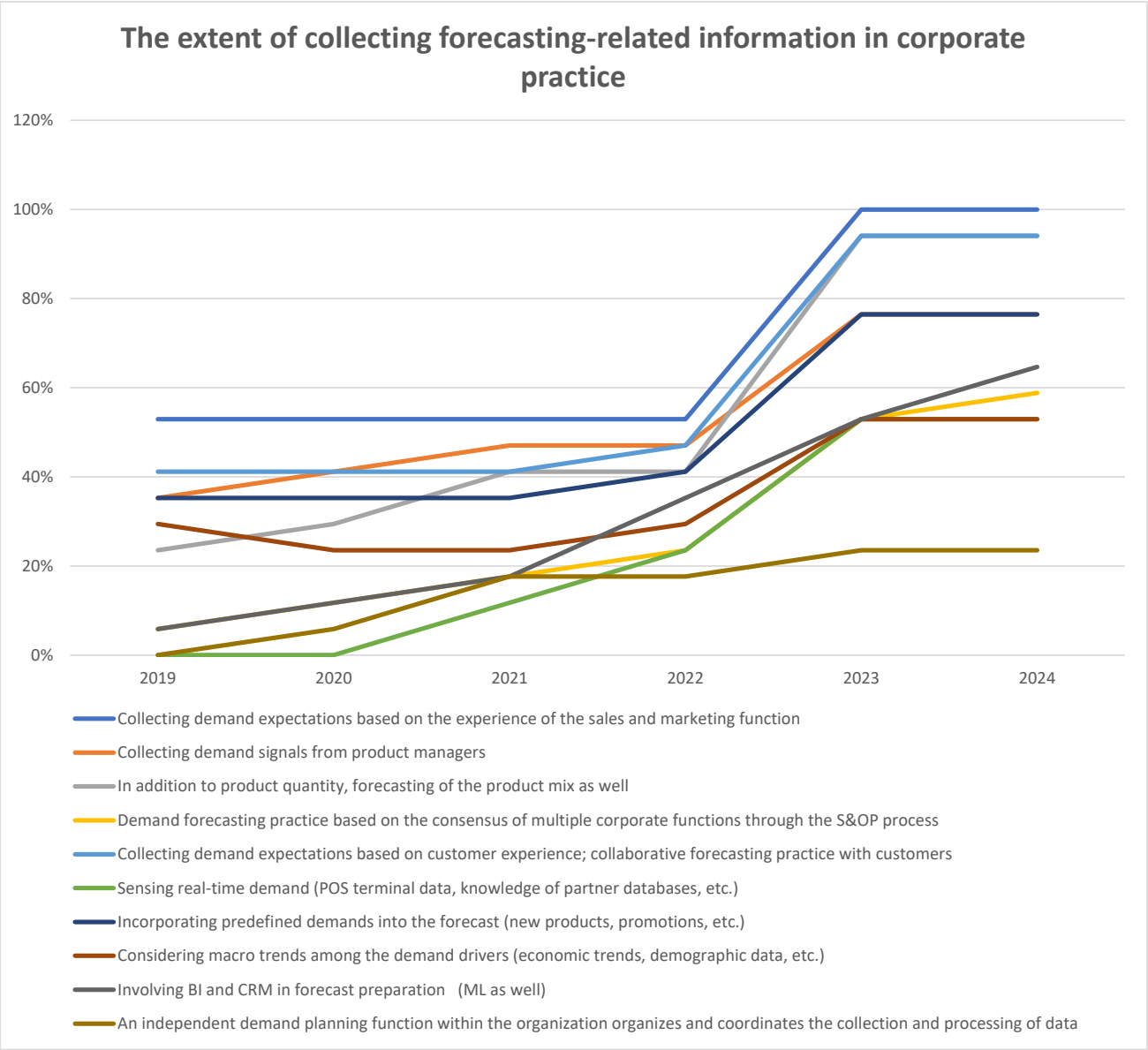
At the end of the period:

	2024	
Collecting demand expectations based on customer experience; collaborative forecasting practice	93,3%	TR
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	93,3%	MO
In addition to product quantity, forecasting of the product mix as well	86,7%	TR
Incorporating predefined demands into the forecast (new products, promotions, etc.)	86,7%	TR
Collecting demand signals from product managers	80,0%	TR
Involving BI and CRM in forecast preparation (ML as well)	80,0%	MO
Collecting demand expectations based on the experience of the sales and marketing function	73,3%	MO
Demand forecasting practice based on the consensus of multiple corporate functions through the	73,3%	MO
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	53,3%	MO
An independent demand planning function within the organization organizes and coordinates the	53,3%	MO

In the Polish sample, traditional forecasting tools remained dominant throughout the period. Among the modern approaches, consideration of macro-trends moved to a much more prominent position by the end of the period, while demand sensing was pushed into the background despite the increasing availability of data. The shift between the beginning and the end of the period was substantial.

c, the Slovak sample

	2019	2020	2021	2022	2023	2024
Collecting demand expectations based on the experience of the sales and marketing function	52,9%	52,9%	52,9%	52,9%	100,0%	100,0%
Collecting demand signals from product managers	35,3%	41,2%	47,1%	47,1%	76,5%	76,5%
In addition to product quantity, forecasting of the product mix as well	23,5%	29,4%	41,2%	41,2%	94,1%	94,1%
Demand forecasting practice based on the consensus of multiple corporate functions through th	5,9%	11,8%	17,6%	23,5%	52,9%	58,8%
Collecting demand expectations based on customer experience; collaborative forecasting practi	41,2%	41,2%	41,2%	47,1%	94,1%	94,1%
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	0,0%	0,0%	11,8%	23,5%	52,9%	52,9%
Incorporating predefined demands into the forecast (new products, promotions, etc.)	35,3%	35,3%	35,3%	41,2%	76,5%	76,5%
Considering macro trends among the demand drivers (economic trends, demographic data, etc.	29,4%	23,5%	23,5%	29,4%	52,9%	52,9%
Involving BI and CRM in forecast preparation (ML as well)	5,9%	11,8%	17,6%	35,3%	52,9%	64,7%
An independent demand planning function within the organization organizes and coordinates th	0,0%	5,9%	17,6%	17,6%	23,5%	23,5%



At the beginning of the period:

	2019	
Collecting demand expectations based on the experience of the sales and marketing function	52,9%	TR
Collecting demand expectations based on customer experience; collaborative forecasting practi	41,2%	MO
Collecting demand signals from product managers	35,3%	TR
Incorporating predefined demands into the forecast (new products, promotions, etc.)	35,3%	TR
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	29,4%	MO
In addition to product quantity, forecasting of the product mix as well	23,5%	TR
Demand forecasting practice based on the consensus of multiple corporate functions through th	5,9%	MO
Involving BI and CRM in forecast preparation (ML as well)	5,9%	MO
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	0,0%	MO
An independent demand planning function within the organization organizes and coordinates th	0,0%	MO

At the end of the period:

	2024	
Collecting demand expectations based on the experience of the sales and marketing function	100,0%	TR
In addition to product quantity, forecasting of the product mix as well	94,1%	TR
Collecting demand expectations based on customer experience; collaborative forecasting practi	94,1%	MO
Collecting demand signals from product managers	76,5%	TR
Incorporating predefined demands into the forecast (new products, promotions, etc.)	76,5%	TR
Involving BI and CRM in forecast preparation (ML as well)	64,7%	MO
Demand forecasting practice based on the consensus of multiple corporate functions through th	58,8%	MO
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	52,9%	MO
Considering macro trends among the demand drivers (economic trends, demographic data, etc.	52,9%	MO
An independent demand planning function within the organization organizes and coordinates th	23,5%	MO

In the Slovak sample, traditional forecasting tools gained further strength by the end of the period, while modern solutions — despite a growing overall adoption of forecasting practices — moved to a less prominent position.

d, An aggregated view of the scope of information gathering related to forecasting across the three countries:

In this overview, application frequencies by country were used as the basis, and the ranking of the tools was also determined according to their usage frequency.

Collecting demand expectations based on customer experience; collaborative forecasting practice with customers	MO
In addition to product quantity, forecasting of the product mix as well	TR
Collecting demand expectations based on the experience of the sales and marketing function	TR
Incorporating predefined demands into the forecast (new products, promotions, etc.)	TR
Collecting demand signals from product managers	TR
Demand forecasting practice based on the consensus of multiple corporate functions through the S&OP process	MO
Considering macro trends among the demand drivers (economic trends, demographic data, etc.)	MO
Involving BI and CRM in forecast preparation (ML as well)	MO
An independent demand planning function within the organization organizes and coordinates the collection and processing of data	MO
Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)	MO

Among the modern tools, collaborative forecasting is strongly represented in practice, while the other advanced methods have not developed to the extent that the current environment would require.

2.3.1.5 Capacity for Improvement in Forecasting Practices

Based on expert estimation, the magnitude of the improvement potential in forecasting practices is represented by the following averages:

	HU	POL	SLO	average
Estimated potential improvement in forecast accuracy compared to the current performance in the sample (%)	7,67	5,87	9,41	**7,65**

Regarding how this improvement potential could be leveraged — through what methods and types of changes — the following responses were provided:

HU

Forecasting weather impacts and planning regional crop security.

There is clearly potential if partners could provide more accurate and longer-term forecasts, which is particularly difficult in the FMCG sector.

In my estimation, around 7–8% improvement could come from more accurate forecasts, and an additional 2–3% from collaboration with currently non-cooperative partners.

There is clearly potential for improvement in forecasting. The conditions required for progress include the involvement of additional human resources and the implementation of an IT planning module.

Pontosabb értékesítési előrejelzéssel

Due to the characteristics of production and sales, the current forecast accuracy reaches at most around 60–65%.

The potential for improvement is moderate; an estimated 1–2% gain could be achieved primarily through better information flow, consistent recording of demand data, and more accurate consideration of early signals from export markets.

A larger improvement would only be realistic if the company were working with a stable, recurring customer base over the longer term.

Monitoring macro trends and evaluating them using AI.

If forecast accuracy were incorporated into the bonuses of the managers submitting the sales forecast.

A further 1% increase would be the target, meaning 80% monthly M-1 accuracy.

Due to the large number of customers and products, the cultural differences across various regions, and the long lead times, more detailed analysis of the data can bring some improvement, but even with much more data, only a slight enhancement would be achievable.

Through better, longer-term promotional volume planning in collaboration with customers.

POL

This opportunity could be utilized by implementing targeted training programs for staff, adopting advanced forecasting software, and reorganizing the planning processes to improve efficiency and accuracy

Improving the quality of input data, including the standardisation of sales and inventory records as well as the inclusion of promotional campaign data, would allow for more accurate forecasts.

Training employees in statistical methods and forecasting will enable better use of available tools and data, which should improve forecast accuracy.

Implementation of an advanced demand forecasting tool
– based on the analysis of historical sales data, seasonality, and external factors (inflation, raw material prices, consumer trends),
– the use of machine learning algorithms (AI/ML) will enable automatic forecast updates in case of demand changes.
Integration of real-time data
– connecting the ERP system with POS and EDI data from retail chains,
– continuous monitoring of promotional sales and market response to new products.
Expanding the S&OP process with predictive analytics
– incorporating data from marketing, logistics, and production into a single integrated planning cycle,
– aligning sales plans with production and procurement plans.
Development of team competencies
– training in data analysis and interpretation of forecasting models,
– increased involvement of sales and marketing departments in the demand planning process.
Automation of reporting and data visualisation (BI)
– implementation of BI dashboards with forecasts, deviations, and trends,
– reducing reaction time to market changes and improving communication transparency

Implementing a forecasting tool based on historical data analysis and machine learning would enable the automation of calculations and faster forecast updates in the event of demand changes.

Organised spreadsheets, seasonal summaries, month-to-month and trend comparisons, creating short quarterly plans that take fabric and accessory inventories into account, along with simple planning tools and the interpretation of sales data, would help reduce errors in production decisions.

In the ceramics sector, it is crucial that the demand forecast is continuously verified against the marginal cost of production. We need more accurate correlation of macroeconomic data (interest rates, investments) with raw material and energy prices, which is currently our biggest operational challenge.

For more efficient planning

We need to improve efficiency and accuracy of forecasting

Purchase additional forecasting software

We see the key reserve (the mentioned 10%) precisely in the implementation of predictive analytics tools.

Establishing regular S&OP meetings involving the sales, marketing, and logistics departments would make it possible to better incorporate sales forecasts and promotions, which should increase forecast accuracy by several percentage points.

SLO

Further training for sales staff.

The automation of production

Simplifying the supply chain and improving communication

Better data collection and data processing,

Training employees; organisational changes; automating data collection and processing; implementing MES and ERP systems in the company.

A closely related question addressed the expected improvement in operational efficiency, assuming that forecast accuracy could be improved by 5%:

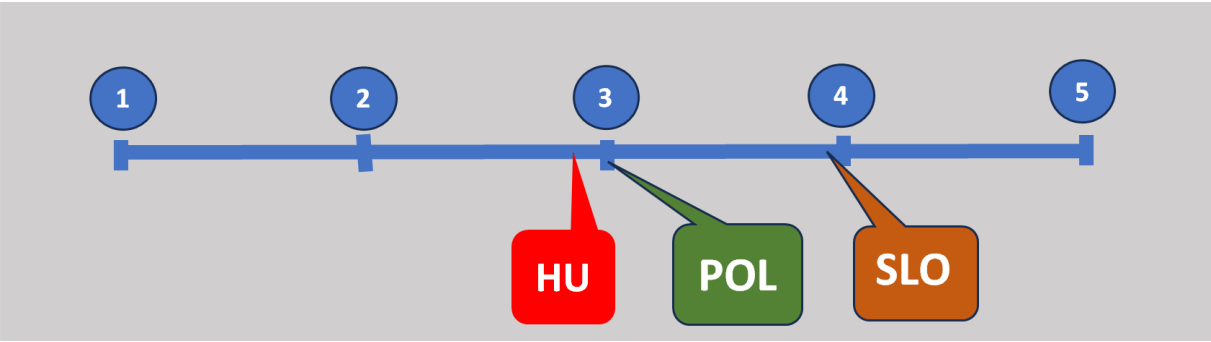
		Average rate of change in the samples (%)				
		HU	POL	SLO	Average	Score
Fulfillment of customer needs and improvement of service level		8,38	4,60	7,35	6,78	3.
Revenue growth		4,41	3,73	9,59	5,91	7.
Profit growth		3,74	4,47	9,50	5,90	8.
Improvement in cash flow		5,50	4,73	9,33	6,52	5.
Improvement in procurement and supplier accuracy		7,20	4,00	9,00	6,73	4.
Better planning accuracy and improved forward visibility		10,18	5,00	11,53	8,90	1.
Reduction in production costs		5,14	3,73	7,03	5,30	12.
Improvement in inventory management (inventory turnover)		7,25	5,27	8,13	6,88	2.
Reduction in logistics costs		5,08	4,00	10,31	6,46	6.
Within this	-Reduction of capital invested in inventories	5,37	4,93	5,17	5,16	13.
	-Reduction in stockouts	4,94	4,40	7,11	5,48	11.
	-Reduction in transportation-related costs	4,96	3,93	7,72	5,54	10.
	-Improvement in lead time	6,31	4,27	6,78	5,78	9.

The partial results correlate with the average, and similar focal points emerge as in the literature references.

2.3.1.6 The current state of forecasting practice is perceived as “burdensome” *(a subjective assessment of how the disorder in the forecasting process affects organizational stakeholders)*

5-Strongly; 1-Weakly

	HU	POL	SLO
average	2,86	3,00	3,94
std dev	1,17	1,13	0,85



(See also the subjective elements of the online survey in Appendix 1 for comparison!)

2.3.1.7 Typical adaptation scenarios during the period *(responses to the challenges — or the lack thereof)*

HU

	Scenario 1
2019	The forecasting practice was based on estimates derived from previous years' experience, without any dedicated system or software.
2020	During the COVID pandemic, forecasts were prepared for shorter time horizons, on an ad-hoc basis, relying on the current order backlog.
2021	No significant development took place; the sales and production data were consolidated in Excel.
2022	The forecasting methodology remained unchanged, and due to the war situation, the annual plans were frequently revised.
2023	The previous practice continued, with minor internal consultations held to refine the demand outlook.
2024	No new measures or system implementations were introduced; the forecasting process remains manual and based on managerial estimation.

	Scenario 2
2019	Organisational changes and the implementation of a new enterprise management system
2020	Training and the introduction of forecasting based on historical data.
2021	
2022	
2023	Organisational changes and the implementation of a new enterprise management system
2024	Organisational change: forecasting elevated to group level.

	Scenario 3
2019	
2020	
2021	
2022	Weekly/monthly measurement of forecast accuracy (MAPE) and BIAS reports.
2023	The introduction of methodological trainings.
2024	Establishing freeze zones

	Scenario 4
2019	
2020	
2021	Establishing a demand planning organisational unit in October.
2022	Ensuring the creation of commercial volume plans in the short, medium, and long term at product level. Introducing back-measurements (M-1, M-3, w-1, w-2 accuracy and BIAS indicators).
2023	Ensuring the weekly updating of detailed volume plans (promo–baseline, weekly–monthly, network level, item level). Ensuring the ability to upload forecasts into SAP.
2024	Examining which products experienced shelf-life issues and leftover inventory, and identifying the underlying reasons (commercial forecast issue or production/stock management problem). Based on the findings, adjusting the forecast, optimising production, and regulating the portfolio.

	Scenario 5
2019	
2020	
2021	Establishing a demand planning organisational unit in October.
2022	Ensuring the creation of commercial volume plans in the short, medium, and long term at product level. Introducing back-measurements (M-1, M-3, w-1, w-2 accuracy and BIAS indicators).
2023	Ensuring the weekly updating of detailed volume plans (promo–baseline, weekly–monthly, network level, item level). Ensuring the ability to upload forecasts into SAP. Establishing a milk balance based on MRP (commercial demand vs. incoming raw material and production scheduling), making visible the surplus or additional raw material requirements.
2024	Examining which products experienced shelf-life issues and leftover inventory, and identifying the underlying reasons (commercial forecast issue or production/stock management problem). Based on the findings, adjusting the forecast, optimising production, and regulating the portfolio.

	Scenario 6
2019	Establishing a central statistics and forecasting team, and implementing a new system that supports S&OP, forecast building-block–based planning, and scenario-based planning.
2020	Training on the new system
2021	Continuous improvement, trainings, and building a forecasting community.
2022	Continuous improvement, trainings, and building a forecasting community.
2023	Continuous improvement, trainings, building a forecasting community, and prioritising statistical forecasting (Zero Touch forecast – we do not modify the statistical forecast).
2024	Continuous improvement, trainings, and building a forecasting community.

	Scenario 7
2019	
2020	More frequent internal follow-ups regarding demand changes and increased communication with customers in case of demand fluctuations. Communication with customers was especially emphasised, as it was difficult to keep up with and serve all increases in demand due to the container delays that occurred in 2020 (the reduction in shipping capacity, followed by the rise in residential and online purchases, caused a container shortage primarily between Asia and Europe, and ports became congested).
2021	The shortage of semiconductors also had a significant impact on demand, and during COVID the forecasting habits of customers changed considerably — they typically started forecasting higher volumes than what they eventually purchased. It became more important to rely on customer behaviour patterns, expected automotive production, and market trends rather than on the direct forecasts provided by customers. Actual forecasts became particularly important due to the global container delays.
2022	Among our customers we have partners from many different countries, and the sudden changes in demand from Ukrainian and Russian customers, as well as the shutdown of Russian car factories due to sanctions, had a direct impact on demand and forecasts. These developments could only be tracked through closer communication and continuous monitoring of industry portals. Increasingly, the emphasis shifted toward gathering more information rather than relying on system-level forecasts. The container delays that occurred during COVID eventually normalised, and the pressure from suppliers eased.
2023	The market shift caused by the Russian sanctions was already visible, which eased the pressure and improved the accuracy of our forecasts, so there was no need to introduce further actions or tools.
2024	

	Scenario 8
2019	Establishing a dedicated demand planner role/position (instead of the previous combined demand & supply planner role).
2020	
2021	
2022	
2023	
2024	Developing planning software to support long-term planning.

POL

	Scenario 1
2019	Additional training
2020	
2021	
2022	Additional training
2023	Automation of reporting
2024	Change in the structure of the planning department

	Scenario 2
2019	
2020	
2021	
2022	
2023	organisational changes
2024	training, software purchase

	Scenario 3
2019	new software
2020	
2021	
2022	Improving communication, establishing KPIs.
2023	Training and competence development.
2024	Expanding the scope of analyses.

	Scenario 4
2019	Modernisation of the ERP system and integration of sales data with production.
2020	stablishing a crisis planning team.
2021	Expanding the S&OP planning system and implementing BI reports.
2022	Optimisation activities without new investments.
2023	Nothing new (maintaining existing solutions).
2024	Additional training in data analysis and demand forecasting.

	Scenario 5
2019	Forecasts based on the owner's experience, sales data, and seasonality.
2020	Ad-hoc reactions, no formal actions.
2021	Introducing simple Excel sheets for material and production planning.
2022	No new actions – focus on maintaining liquidity.
2023	Forecasting based on regular customers and sales history.
2024	The team creates seasonal forecasts.

	Scenario 6
2019	Standard improvements in the sales department (CRM).
2020	Urgent renegotiation of contracts with key suppliers of clay and pigments.
2021	Implementation of a CRM module.
2022	Establishing an Energy Risk Management Team and implementing crisis-related changes in production planning.
2023	Initiation of an energy audit.
2024	Starting training for the management staff in forward pricing.

	Scenario 7
2019	Organisational measures – improving the reporting of production and inventory data, which formed the basis for more accurate planning.
2020	During the pandemic, a system for daily monitoring of orders and deliveries was implemented, without investment in new tools – the focus was on operational response.
2021	The company began comparing planned and actual data in shorter cycles (monthly), increasing control over production and procurement forecasts.
2022	In the face of the war and fluctuations in metal prices, inventory control and market trend analysis were introduced – mainly internal measures, without new technological investments.
2023	A year of stabilisation — the company relied on previously developed solutions and historical data. The focus was on maintaining liquidity and optimising costs, without introducing new tools or processes.
2024	Training for sales and production employees in the use of data for demand forecasting and production planning. The goal was to increase analytical competencies and decision-making flexibility.

SLO

	Scenario 1
2019	Review of the portfolio and expiry dates; compliance and forecasting training; standardisation of ordering cycles.
2020	Demand scenarios (pandemic); cooperation with distributors; increasing the stock levels of critical medicines.
2021	Introduction of S&OP; incorporating regulatory changes into the plan; strengthening cooperation with hospitals/pharmacies.
2022	Integrating CRM with forecasting; forecasting promotions/auctions; MAPE KPI by ATC groups.
2023	Connecting to distributor data (sell-out); automatic data uploads; auditing data quality.
2024	Pilot of ML models for the seasonal and hospital portfolios; optimisation of safety stocks; BIAS rules at ±3%.

	Scenario 2
2019	A fundamental review of the planning cycle; training for planners; standardisation of sales reporting.
2020	Crisis replanning and the introduction of rolling (weekly) forecasting; increasing safety stocks; short training courses for adopting remote work.
2021	Introduction of S&OP (on a monthly basis); tightening the approval of promotions; extending the planning of the SKU mix.
2022	Integrating BI/CRM into forecasting; defining the owner of the sales forecast; training in advanced methods.
2023	Demand sensing from POS/EDI data; automated imports of sales data; MAPE and BIAS KPIs as standards.
2024	ABC/XYZ segmentation; pilot of ML models for the top categories; adaptive inventory parameters.

	Scenario 3
2019	Standardisation of master data; demand planning training; initial risk scenarios (long lead times)
2020	Crisis forecasting by component; cooperation with suppliers to strengthen allocations; weekly rolling forecast.
2021	Formalisation of S&OP/S&OE; introduction of variant-based planning; strengthening the procurement team.
2022	Linking PLM/ERP with forecasting; configuring forecast parameters for EOL/NPI; dashboards in BI
2023	Enhancing POS/channel-based signals; automated EDI; BIAS/MAPE standards at product-family level.
2024	Introducing an AI/ML pilot for priority SKUs; dynamic segmentation based on volatility; transition to consensus forecasting.

2.4 Conclusions

In this chapter, we summarize the key directions important for the development of the training materials, based on the survey findings. Consequently, the aim of the training material is to present comprehensive correlations related to the overall forecasting practice rather than to deliver deep technical knowledge. The focus is on highlighting the importance of certain technical elements so that participants — recognizing their practical significance in their own application context — may later seek more detailed academic knowledge or further training opportunities.

Simply put: the goal is to help identify the missing or restricting factors that hinder forecasting efficiency and to encourage the design of a well-balanced forecasting system.

In this project, according to our terminology, forecasting refers to **demand** (sales) **forecasting** embedded in economic processes, aiming to identify the partner's most likely practical decision. We seek to estimate as accurately as possible the demand that will later materialize in concrete orders (call-offs).

Key messages considered in the training program regarding the factors influencing forecasting accuracy:

- Difficulties and inability in synchronizing and coordinating end-to-end supply chain processes (**the leading cause in the Hungarian sample**)
  here, the primary issue is the lack of external cooperation, which results in insufficient information flow along the supply chain
- Lack of cross-functional collaboration (collaborative planning) within organizations

lack of internal cooperation in forecasting and misalignment in demand forecast development (organizational "silos")

- Capacity and organizational structure not adapted to demand variability
  internal cooperation issues between different planning functions (demand planning, production planning, controlling, etc.)
- Forecasting techniques and demand variability
  challenges arising from the use of forecasting techniques that are not suited to increasingly rapid market dynamics
- Increasing availability of data and the inability to effectively utilize growing forecasting information
  misalignment of modern forecasting techniques with the rapidly increasing amount of information available from the external environment
- Complexity of the supply chain network and lack of transparency (**the leading cause in the Slovak sample**)
  typical supply chain transformation challenges (fragmentation, establishing new relationships, etc.)
- Organizational culture and insufficient application of supply chain management principles
  requirements and challenges related to establishing and implementing a demand planning function; lack of consensus-based forecasting
- Cost reduction and control (**the leading cause in the Polish sample**)
  the harsh cost implications of poor forecasting quality; the consequences of failing to fully leverage forecasting capabilities
- Development, retention, and leadership of supply chain talent
  supply chain management is a performance-maximizing tool in the hands of those who can effectively leverage it and who recognize that the quality of human capital ("brainpower") is of strategic importance.
- Service performance and variability in service levels
  maintaining and supporting high service capabilities is a key factor in sustaining performance.

The structure of the training program based on the identified key causes:

- Issues in the forecasting process
- Forecasting techniques and their interdependencies
- Organizational aspects and consequences
- Technical support and future tools

Key focus areas in the training program on information gathering for forecasting:

- collecting demand expectations based on the experience of the sales and marketing functions
  both are strategically critical areas — they must sense and respond to changes in market opportunities; ***traditional tool***
- collecting demand signals from product managers
  they rely on the product managers' up-to-date market information and directly follow changes as they occur; ***traditional tool***
- in addition to forecasting product volumes, forecasting the product mix as well
  through capturing the complex needs of key partners; ***traditional tool***
- demand forecasting practice based on cross-functional consensus through the S&OP process
  an internal cooperation process that aligns interests and provides support; ***modern toool***
- collecting demand expectations based on customer experience; collaborative forecasting with customers
  e*xternal cooperation and direct customer connection, which shortens the path of this essential primary information;* ***modern tool***
- sensing real-time demand (e.g., POS terminal data, knowledge of partner databases, etc.)
  the enabling system for flexible (adaptive) rapid response; ***modern tool***
- incorporating predefined demand drivers into the forecast (e.g., new products, promotions, etc.)
  strategic information for the medium and long term; ***traditional tool***
- Considering macro-trends as demand-driving factors (e.g., economic trends, demographic data, etc.)
  typically AI-related information; ***modern tool***
- involving BI and CRM in forecast preparation (including the use of ML technologies)
  the key toolkit supporting demand forecasting; ***modern tool***
- an independent demand planning function within the organization coordinates and harmonizes the collection and processing of information
- *an internal organization striving for overall system optimization;* ***modern tool***

In all three surveyed areas, the application of modern tools falls short of the desired level; therefore, the training material must adequately represent their use to demonstrate improved market adaptability.

The impact of demand forecast quality on costs must be strongly emphasized. One of the most illustrative parts of the survey is the estimation of how a 5% improvement in forecast accuracy can transform key operational processes.

The projected improvement ranged from 5.16% to 8.9% across 13 key business processes.

At the same time, according to respondents' estimates, there is on average a 7.65% improvement potential in demand forecasting accuracy (5.87%–7.67%–9.41% across the three surveyed countries). To express the business impact of this improvement, LOKAD, a U.S.-based consulting company, has developed a model showing that in a typical case (annual revenue of €110 million), fully leveraging the 7.65% forecast accuracy improvement potential could generate the following results:

Accuracy gains (inventory)

Quantify the financial benefits brought a more accurate forecast

Yearly sales (D)	Gross margin (m)	Stockout to margin (α)	Service Level (p)	Old MAPE (σ)	New MAPE (σ_n)	Yearly benefits
1 000 000 000 €	20,0%	2	97%	20%	18%	1 200 000 €
	Input data					
110 000 000	20,0%	2	97%	29%	21%	348 207

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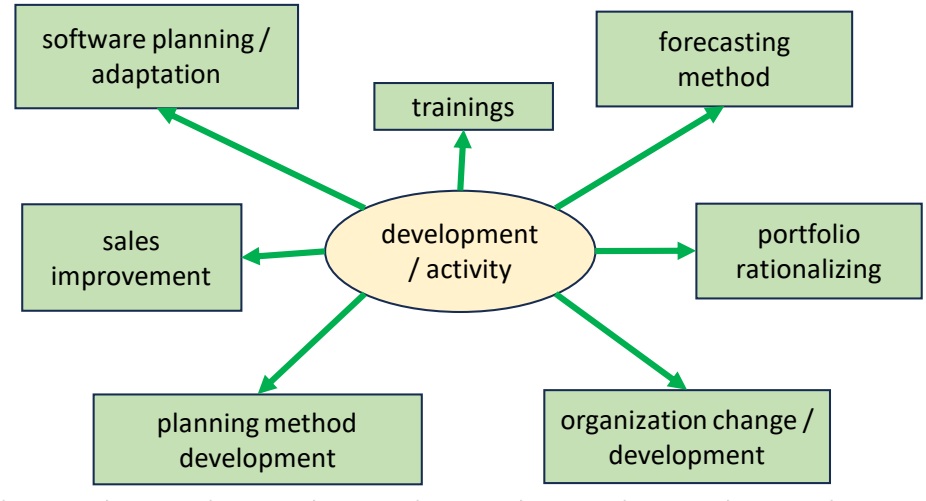
FCA	71% →	78,7%

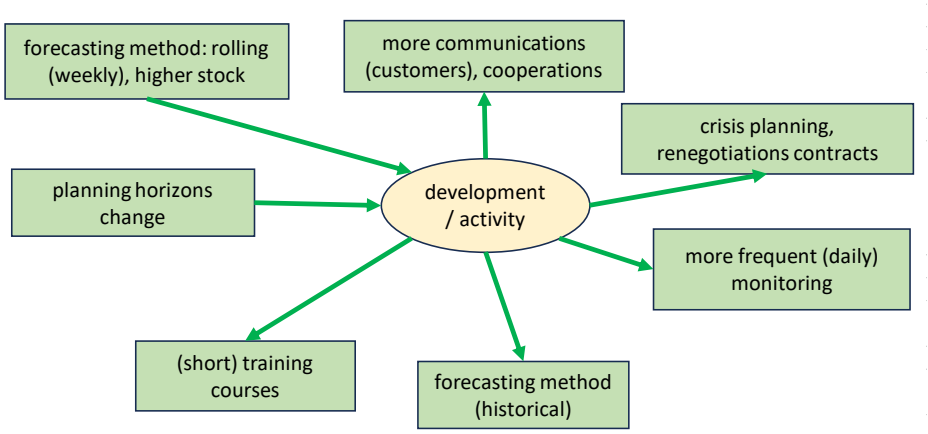
It is likely that a management team of an organization with €110 million in annual revenue would feel motivated to pursue an advantage of €348,000.

The respondents' reports on their development activities and practices implemented in each year — in alignment with changing external conditions — were diverse, informative, and at the same time inspiring..

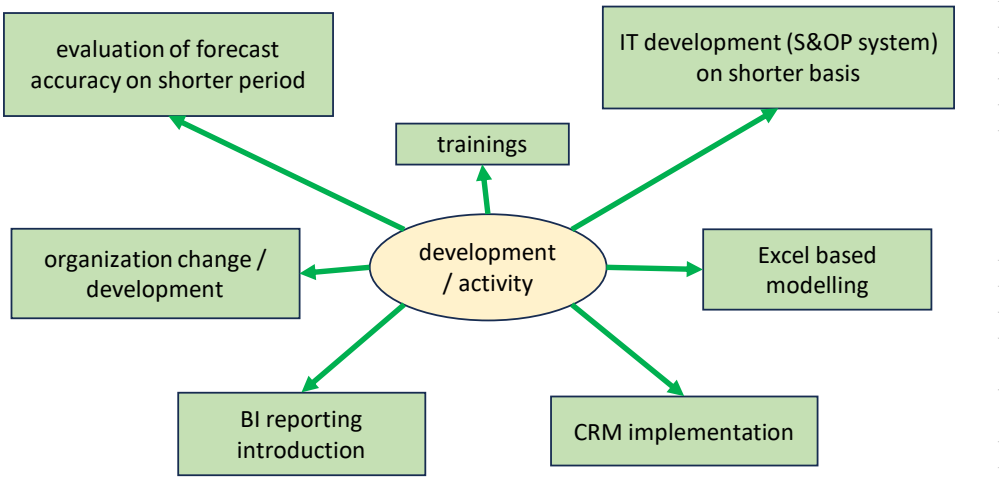
2019	The forecasting practice was based on estimates derived from previous years' experience, without any dedicated system or software.
	Organisational changes and the implementation of a new enterprise management system
	Establishing a central statistics and forecasting team, and implementing a new system that supports S&OP, forecast building-block–based planning, and scenario-based planning.
	Establishing a dedicated demand planner role/position (instead of the previous combined demand & supply planner role).
	New software
	Modernisation of the ERP system and integration of sales data with production.
	Forecasts based on the owner's experience, sales data, and seasonality.
	Standard improvements in the sales department (CRM).
	Organisational measures – improving the reporting of production and inventory data, which formed the basis for more accurate planning.
	Review of the portfolio and expiry dates; compliance and forecasting training; standardisation of ordering cycles.
	A fundamental review of the planning cycle; training for planners; standardisation of sales reporting.
	Standardisation of master data; demand planning training; initial risk scenarios (long lead times)



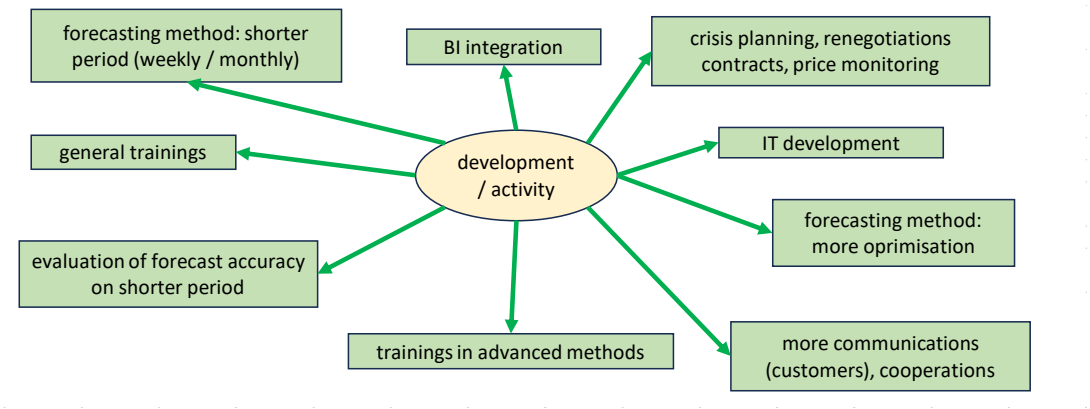
2020	During the COVID pandemic, forecasts were prepared for shorter time horizons, on an ad-hoc basis, relying on the current order backlog.
	Training and the introduction of forecasting based on historical data.
	More frequent internal follow-ups regarding demand changes and increased communication with customers in case of demand fluctuations. Communication with customers was especially emphasised, as it was difficult to keep up with and serve all increases in demand due to the container delays that occurred in 2020 (the reduction in shipping capacity, followed by the rise in residential and online purchases, caused a container shortage primarily between Asia and Europe, and ports became congested).
	Establishing a crisis planning team.
	Urgent renegotiation of contracts with key suppliers of clay and pigments.
	During the pandemic, a system for daily monitoring of orders and deliveries was implemented, without investment in new tools – the focus was on operational response.
	Demand scenarios (pandemic); cooperation with distributors; increasing the stock levels of critical medicines.
	Crisis replanning and the introduction of rolling (weekly) forecasting; increasing safety stocks; short training courses for adopting remote work.
	Crisis forecasting by component; cooperation with suppliers to strengthen allocations; weekly rolling forecast.



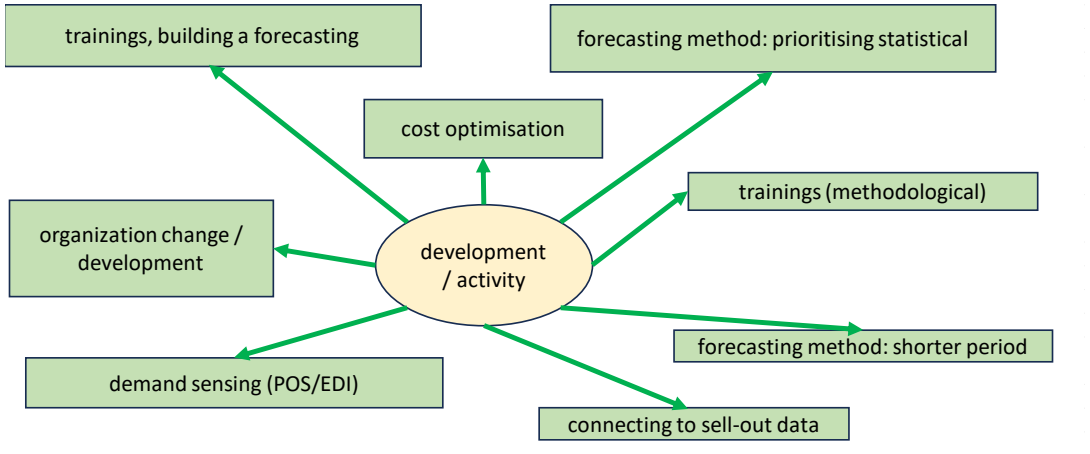
2021	Establishing a demand planning organisational unit in October.
	The shortage of semiconductors also had a significant impact on demand, and during COVID the forecasting habits of customers changed considerably — they typically started forecasting higher volumes than what they eventually purchased. It became more important to rely on customer behaviour patterns, expected automotive production, and market trends rather than on the direct forecasts provided by customers. Actual forecasts became particularly important due to the global container delays.
	Expanding the S&OP planning system and implementing BI reports.
	Introducing simple Excel sheets for material and production planning.
	Implementation of a CRM module.
	The company began comparing planned and actual data in shorter cycles (monthly), increasing control over production and procurement forecasts. Training
	Introduction of S&OP; incorporating regulatory changes into the plan; strengthening cooperation with hospitals/pharmacies.
	Introduction of S&OP (on a monthly basis); tightening the approval of promotions; extending the planning of the SKU mix.
	Formalisation of S&OP/S&OE; introduction of variant-based planning; strengthening the procurement team.



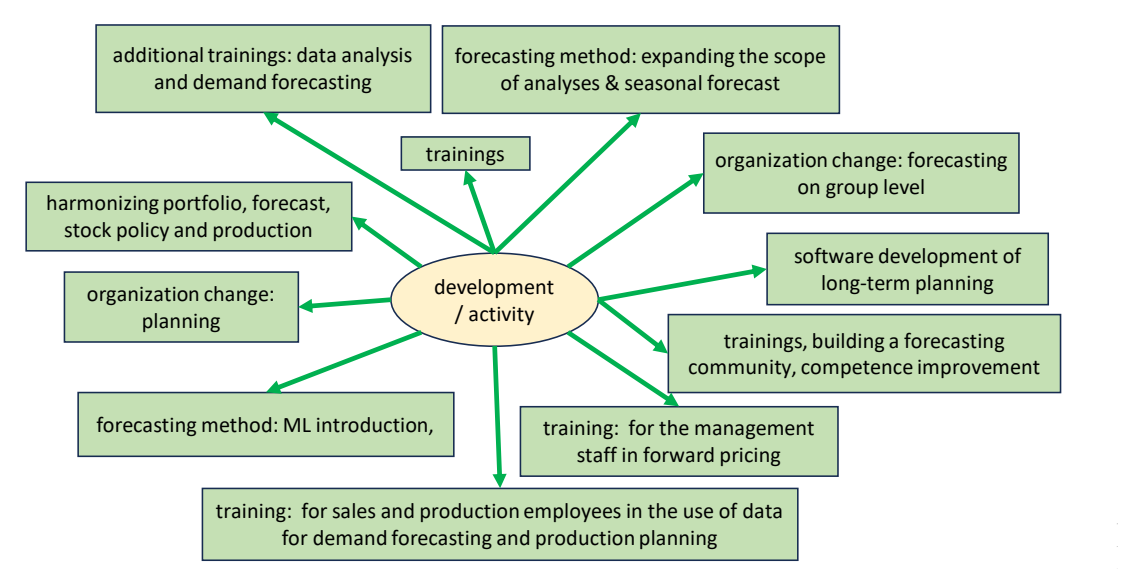
2022	The forecasting methodology remained unchanged, and due to the war situation, the annual plans were frequently revised.
	Weekly/monthly measurement of forecast accuracy (MAPE) and BIAS reports.
	Ensuring the creation of commercial volume plans in the short, medium, and long term at product level. Introducing back-measurements (M-1, M-3, w-1, w-2 accuracy and BIAS indicators).
	Among our customers we have partners from many different countries, and the sudden changes in demand from Ukrainian and Russian customers, as well as the shutdown of Russian car factories due to sanctions, had a direct impact on demand and forecasts. These developments could only be tracked through closer communication and continuous monitoring of industry portals. Increasingly, the emphasis shifted toward gathering more information rather than relying on system-level forecasts. The container delays that occurred during COVID eventually normalised, and the pressure from suppliers eased.
	Additional training
	Improving communication, establishing KPIs.
	Optimisation activities without new investments.
	No new actions – focus on maintaining liquidity.
	Establishing an Energy Risk Management Team and implementing crisis-related changes in production planning.
	In the face of the war and fluctuations in metal prices, inventory control and market trend analysis were introduced – mainly internal measures, without new technological investments.
	Integrating BI/CRM into forecasting; defining the owner of the sales forecast; training in advanced methods.
	Linking PLM/ERP with forecasting; configuring forecast parameters for EOL/NPI; dashboards in BI



2023	The previous practice continued, with minor internal consultations held to refine the demand outlook.
	Organisational changes and the implementation of a new enterprise management system
	The introduction of methodological trainings.
	Ensuring the weekly updating of detailed volume plans (promo–baseline, weekly–monthly, network level, item level). Ensuring the ability to upload forecasts into SAP.
	Continuous improvement, trainings, building a forecasting community, and prioritising statistical forecasting (Zero Touch forecast – we do not modify the statistical forecast).
	The market shift caused by the Russian sanctions was already visible, which eased the pressure and improved the accuracy of our forecasts, so there was no need to introduce further actions or tools.
	Automation of reporting
	Organisational changes
	Training and competence development.
	Forecasting based on regular customers and sales history.
	A year of stabilisation — the company relied on previously developed solutions and historical data. The focus was on maintaining liquidity and optimising costs, without introducing new tools or processes.
	Connecting to distributor data (sell-out); automatic data uploads; auditing data quality.
	Demand sensing from POS/EDI data; automated imports of sales data; MAPE and BIAS KPIs as standards.
	Enhancing POS/channel-based signals; automated EDI; BIAS/MAPE standards at product-family level.



2024	No new measures or system implementations were introduced; the forecasting process remains manual and based on managerial estimation.
	Organisational change: forecasting elevated to group level.
	Examining which products experienced shelf-life issues and leftover inventory, and identifying the underlying reasons (commercial forecast issue or production/stock management problem). Based on the findings, adjusting the forecast, optimising production, and regulating the portfolio.
	Continuous improvement, trainings, and building a forecasting community.
	Developing planning software to support long-term planning.
	Change in the structure of the planning department
	Training, software purchase
	Expanding the scope of analyses.
	Additional training in data analysis and demand forecasting.
	The team creates seasonal forecasts.
	Starting training for the management staff in forward pricing.
	Training for sales and production employees in the use of data for demand forecasting and production planning. The goal was to increase analytical competencies and decision-making flexibility.
	Pilot of ML models for the seasonal and hospital portfolios; optimisation of safety stocks; BIAS rules at ±3%.
	ABC/XYZ segmentation; pilot of ML models for the top categories; adaptive inventory parameters.
	Introducing an AI/ML pilot for priority SKUs; dynamic segmentation based on volatility; transition to consensus forecasting.



Annex 1

https://www.certitrek.com/nlpa/news/purchasing-articles/stockout-cost/

"Most experts agree that inventory holding costs — meaning the disadvantage of carrying excess stock — can account for 18–35% of an item's annual cost. This can also be translated to 0.05–0.1% per day."

http://www.brighthub.com/office/entrepreneurs/articles/109618.aspx

Business benefits of forecasting:
- -Improved forward-looking capability
- -Better customer relationships
- -Insights learned from past performance
- -A more future-oriented organizational perspective
- -Savings in personnel costs
- -Maintaining competitiveness
- -Easier access to financing
- -Reduced inventory costs
- -Helps prepare for declines in sales
- -Preparedness for new business opportunities

https://www.bcgperspectives.com/content/articles/supply_chain_consumer_retail_demand_forecasting_key_better_supply_chain_performance/

Results of improved forecasting
- -Less lost sales
- -Higher customer service levels
- -Lower working capital requirements
- -More efficient production
- -Reduced scrap and waste
- -Lower resource needs

http://yourbusiness.azcentral.com/advantages-accurate-forecasting-15746.html

Benefits of improved forecasting:
- -More stable financial position
- -Better operational efficiency
- -Increased investor confidence
- -Improved compliance with financial obligations
- -Reduced conflicts within management teams

http://smallbusiness.chron.com/advantages-accurate-forecasting-60830.html

Benefits of improved forecasting:
- -Better financial planning
- -Improved personnel training
- -More targeted marketing
- -More accurate production control

https://www.terratechnology.com/the-benefits-of-accurate-demand-and-inventory-forecasting/

Benefits of accurate demand and inventory planning
- -Better return on capital
- -Improved cash flow
- -Higher revenue
- -Higher profitability

http://eai.ittoolbox.com/groups/strategy-planning/enterprise-architecture-sp/how-can-i-quantify-benefits-that-come-with-sales-forecast-accuracy-improvement-3361169

1. **AMR Research**: as a result of improved forecasting, the surveyed partners observed on average that
   - Customer service improved by 17%
   - Inventory levels decreased by 15%
   - The cash-to-cash cycle time became 35% shorter

2. According to **CSO Insights,** competitiveness improved by 25% among partner companies as a result of best-in-class forecasting.

3. Among **Right'90**'s partners, improving sales forecasting resulted in 5% higher revenue and a 20–30% reduction in inventory levels.

Online workshop surveys in 2024:

Streamline

Best Practises for Demand Forecasting and Inventory Planning
European Challenges for 2024

What is your biggest supply chain planning challenge?

Low forecast accuracy	72%
Overstock	28%
Low-efficiency collaboration among the participants of the S&OP (Sales and Operations Planning) process.	26%
It is difficult to plan effectively with a wide assortment.	23%
Time-consuming data modelling, with little time left for analysis and actions.	19%
Stockouts and lost sales.	14%

abcSupplyChain - amazon

Generate More Accurate Forecasts

What is your main challenge in achieving more accurate forecasting?	
The high level of demand uncertainty.	45%
The appropriate formula or model is not known.	24%
There is no adequate data or system (ERP, tools).	21%
There is insufficient time.	6%
We cannot agree on a single forecast within our team.	4%

How do you track your forecast accuracy?	
I do not track it, or I do not have a forecast.	37%
By product, using MAPE.	23%
By product, using MAE.	23%
Only at a macro level (BIAS).	12%
By product, using RMSE.	5%

Who is responsible for the forecast?	
Supply chain team	50%
Sales team	30%
Finance team	11%
Marketing team	6%
Production team	3%

What forecasting method do you use?	
Double exponential smoothing (trend, seasonality).	32%
Moving average	28%
Traditional or intuitive forecasting.	22%
Single exponential smoothing	9%
Machine learning	9%

What tool do you use for forecasting?	
Excel	62%
Forecasting software	18%
ERP	12%
Python / R	5%
Machine learning	3%

Do you work like a firefighter?	
Yes, I do	53%
No, I'm calm.	27%
I am close to burnout.	19%

Annex 2

"Az előrejelzés nagyon nehéz, különösen ami a jövőt illeti" Niels Bohr

Gyors felmérés az értékesítés / igény előrejelzés elmúlt éveinek történetéről (a kitöltéshez hívja segítségül az igény előrejelző, logisztikai, ellátási lánc szakembereket)

(a priorizált adatoknál törekedjen teljességre, az opcionális adatoknál próbálja felderíteni az összes adatot!) **A kitöltés mintegy 25-35 percet vehet igénybe maximum.**

Visegrad Fund
Visegrad Grant No. 22520048

A szervezet iparági besorolása

Éves árbevétel Mio EURO (1 EURO cca 400 HUF)

			Sorszám
-IPAR		- autó és autóalkatrész, jármű és járműalkatrész gyártás	1
		- elektronikai ipar	2
		- fémfeldolgozás	3
		- gépgyártás	4
	- vegyipar	- gyógyszeripar	5
		- gumi és műanyag ipar	6
		- kozmetikai ipar	7
	- könnyűipar	- ruhaipar	8
		- papír- és nyomdaipar	9
	- élelmiszeripar	- malomipar	10
		- sütő- és tésztaipar	11
		- tejipar	12
		- ásványvíz és üdítőital ipar	13
		- söripar	14
		- szeszipar (bor, égetett szesz)	15
		- cukoripar	16
		- édesipar	17
		- növényolajipar	18
		- húsipar	19
		- konzervipar	20
		- hűtőipar	21
-KERESKEDELEM		- nagykereskedő / disztribútor	22
		- kiskereskedő	23
		- export	24
		- import	25
EGYÉB		EGYÉB	26

Az előrejelzési pontosság becsült "átlaga" a szervezet gazdálkodásában (%)

- az első "békeévben" (2019)		
- a járvány (COVID) első évében (2020)		opcionális
- a járvány (COVID) második évében (2021)		
- a járvány harmadik, az UA-RU háború első évében (2022)		
- az UA-RU háború második évében (2023)		priorizált
- az UA-RU háború harmadik évében (2024)		

Az előrejelzési időtáv fontosságának változása

	időtáv rövid	közép	hosszú	
- az első "békeévben" (2019)				
- a járvány (COVID) első évében (2020)				opcionális
- a járvány (COVID) második évében (2021)				
- a járvány harmadik, az UA-RU háború első évében (2022)				
- az UA-RU háború második évében (2023)				priorizált
- az UA-RU háború harmadik évében (2024)				

NŐ-nőtt; NV-nem változott; CS-csökkent

Az előrejelzés javítására tervezett, valamint végrehajtott intézkedések (szervezeti változtatás, szoftver beszerzés, képzés, stb.)

- az első "békeévben" (2019)		
- a járvány (COVID) első évében (2020)		opcionális
- a járvány (COVID) második évében (2021)		
- a járvány harmadik, az UA-RU háború első évében (2022)		
- az UA-RU háború második évében (2023)		priorizált
- az UA-RU háború harmadik évében (2024)		

Az előrejelzési pontosságot befolyásoló tényezők e periódusban (adja meg **évente** a probléma fontosságának súlyát! **1 jelenti itt a legjellemzőbb, legerősebb esetet!**)

(pl. end-to-end 2023: 1, 2024: 2, azaz fontossága csökkenő, stb.) ***A súlyok 1-10 között.***

		2019	2020	2021	2022	2023	2024	megjegyzés
1.	Az ellátási lánc hálózat összetettsége, az átláthatóság hiánya							
2.	Az ellátási lánc (end-to-end) folyamatok szinkronizálásának és koordinálásának nehézségei, képtelensége							
3.	A kiszolgáló teljesítménye, kiszolgálási változékonysága							
4.	A jól informáltság és előrejelzés adatainak növekedése és hatékony kihasználása képtelensége							
5.	A szervezetek kereszt-funkcionális együttműködésének (kollaboratív tervezés) hiánya							
6.	A szervezeti kultúra; az ellátási lánc menedzsment hiányos alkalmazása							
7.	Előrejelzési technika és igény változékonysága							
8.	Az igény változékonyságához nem alkalmazkodó kapacitás és szervezeti struktúra							
9.	Az ellátási lánc tehetségek fejlesztése, megtartása és vezetése							
10.	Költségek csökkentése és ellenőrzése							
11.	Egyéb, ügymint							
				opcionális		priorizált		

Az előrejelzéssel összefüggő információk gyűjtésének kiterjedése a vállalati gyakorlatban (**I/N**) és azok változása e periódusban

		2019	2020	2021	2022	2023	2024	megjegyzés
1.	az értékesítési és marketing terület tapasztalatán nyugvó igény-várakozások összegyűjtése							
2.	igény jelzések összegyűjtése a termék menedzserektől							
3.	a termék mennyisége mellett, termék mix előrejelzése is							
4.	több vállalati terület egyetértésén alapuló igény előrejelzési gyakorlat S&OP folyamaton keresztül							
5.	a vevői tapasztalatokon nyugvó igény-várakozások összegyűjtése, vevőkkel együttműködő előrejelzési gyakorlat							
6.	a valós idejű igények érzékelése (POS terminál adatok, partner adatbázis ismerete, stb.)							
7.	előzetesen meghatározott igények érvényesítése az előrejelzésben (új termékek, promóciók, stb.)							
8.	a makrotrendek figyelembe vétele az igény serkentő tényezői között (gazdasági trendek, népesedési adatok, stb.)							
9.	a BI és CRM bevonása az előrejelzések előkészítésébe							
10.	a szervezeten belül független igény tervezési funkció szervezi és hangolja az adatok gyűjtését és feldolgozását							
11.	egyéb, ügymint							
				opcionális		priorizált		

Ön szerint mennyi **tartalék** van gazdasági szervezeténél / vállalatánál az **előrejelzési gyakorlatban** jelenleg? (abszolút %)

(például ha az átlagos pontosság eddig 85%-os volt és a ***becsült tartalék 5%****, akkor a lehetséges cél 90%-os)*

Véleménye szerint miként, milyen módon, milyen változtatásokkal lehetne ezt a lehetőséget **kihasználni**?

Ön szerint az előrejelzési pontosság elképzelt és lehetséges **5%-os javítása** a vállalati gazdálkodás **mely területeire** és **milyen mértékben** hatna?

	a változás aránya (%)
Vevői igények teljesítése, kiszolgálási színvonal javulása	
Árbevétel növekedése	
Nyereség növekedése	
Cash-flow javulása	
Beszerzési, beszállítói pontosság javulása	
A tervezés pontosságának javulása, előre tekintés javulása	
Termelési költségek csökkenése	
Készletgazdálkodás (készletforgási sebesség) javulása	
Logisztikai költségek csökkenése	
ezen belül -a készletekben lekötött tőke csökkenése	
-a készlethiányok csökkenése	
-a szállítással összefüggő költségek mérséklődése	
-az átfutási idő javulása	
Egyéb:	

Ön szerint mennyire **gyötrő** az előrejelzési gyakorlat jelen állapota (szubjektív vélemény)?

(5-erősen; 1-gyengén)

Amennyiben érdekli a kialakult kép, nyitott az eredményeket feldolgozó workshopra és szívesen megadja a meghívásához is az elérhetőségét, kérjük tegye meg:

Amennyiben szívesen támogatná az előrejelzési kultúrát mélyebben feltáró felmérést is kérjük jelezze (**X**)

Saját fontos kiegészítések az igény előrejelzés gyakorlatával összefüggésben:

Kérem, hogy a kitöltött kérdőívet a következő email címre küldje meg: mondovics1950@gmail.com vagy janos.mondovics@gteportal.eu

Visegrad Fund

"Forecasting is very difficult, especially when it concerns the future." Niels Bohr

Visegrad Fund
Visegrad Grant No. 22520049

A quick overview of the history of sales/demand forecasting over the past years.

(For completing it, seek the assistance of demand forecasting, logistics, and supply chain professionals!)

(For prioritized data , strive for completeness; for optional data , try to identify all available information!)

The organization's industry classification

Annual revenue Mio EURO

Number			
1	-INDUSTRY		- Motor vehicles and parts manufacturing
2			- Electronics industry
3			- Metal processing
4			- Machinery manufacturing
5		- Chemical industry	- Pharmaceutical industry
6			- Rubber and plastics industry
7			- Cosmetics industry
8		- Light manufacturing industry	- Textile industry
9			- Paper and printing industry
10		- Food industry	- Milling industry
11			- Bakery and pasta industry
12			- Dairy industry
13			- Mineral water and soft drinks industry
14			- Brewing industry
15			- Alcoholic beverages industry (wine and spirits)
16			- Sugar industry
17			- Candy and confectionery industry
18			- Vegetable oil industry.
19			- Meat production industry
20			-Canning industry.
21			- Cold storage industry
22	-TRADE		- Wholesaler / Distributor
23			- Retailer
24			- export
25			- import
26	-OTHER	OTHER	

Estimated 'average' forecasting accuracy in the organization's operations (%)

- In the first 'peace year' (2019)		optional
- In the first year of the (COVID) pandemic (2020)		
- In the second year of the (COVID) pandemic (2021)		
- In the third year of the pandemic and the first year of the UA-RU war (2022)		
- In the second year of the UA-RU war (2023)		prioritized
- In the third year of the UA-RU war (2024)		

Change in the importance of the forecasting horizon

Time horizon	short	middle	long	
- In the first 'peace year' (2019)				optional
- In the first year of the (COVID) pandemic (2020)				
- In the second year of the (COVID) pandemic (2021)				
- In the third year of the pandemic and the first year of the UA-RU war (2022)				
- In the second year of the UA-RU war (2023)				prioritized
- In the third year of the UA-RU war (2024)				

IN-increased; NC-not changed; DC-decreased

Planned and implemented measures to improve forecasting (organizational changes, software acquisition, training, etc.)

- In the first 'peace year' (2019)	optional
- In the first year of the (COVID) pandemic (2020)	
- In the second year of the (COVID) pandemic (2021)	
- In the third year of the pandemic and the first year of the UA-RU war (2022)	
- In the second year of the UA-RU war (2023)	prioritized
- In the third year of the UA-RU war (2024)	

Factors affecting forecasting accuracy during this period (please indicate the weight/importance of the problem for each year! Here, 1 denotes the most characteristic and strongest case).

(e.g., end-to-end 2023: 1, 2024: 2, i.e., decreasing importance, etc.) ***The weights are on a scale of 1 to 10.***

		2019	2020	2021	2022	2023	2024	Comment
1.	The complexity of the supply chain network, lack of transparency							
2.	Challenges and inability in synchronizing and coordinating end-to-end supply chain processes							
3.	Supplier performance, service variability							
4.	Inability to effectively utilize the growing amount of information and forecasting data							
5.	Lack of cross-functional collaboration within organizations (collaborative planning)							
6.	The role of organizational culture; insufficient implementation of supply chain management							
7.	Forecasting technique and demand variability							
8.	Capacity and organizational structure not adapted to demand variability							
9.	Developing, retaining, and leading supply chain talent							
10.	Cost reduction and monitoring							
11.	Other, e.g.							
			optional				prioritized	

The extent of collecting forecasting-related information in corporate practice (**Y/N**) and its changes during this period

		2019	2020	2021	2022	2023	2024	Comment
1.	Collecting demand expectations based on the experience of the sales and marketing function							
2.	Collecting demand signals from product managers							
3.	In addition to product quantity, forecasting of the product mix as well							
4.	Demand forecasting practice based on the consensus of multiple corporate functions through the S&OP process							
5.	Collecting demand expectations based on customer experience; collaborative forecasting practice with customers							
6.	Sensing real-time demand (POS terminal data, knowledge of partner databases, etc.)							
7.	Incorporating predefined demands into the forecast (new products, promotions, etc.)							
8.	Considering macro trends among the demand drivers (economic trends, demographic data, etc.)							
9.	Involving BI and CRM in forecast preparation							
10.	An independent demand planning function within the organization organizes and coordinates the collection and processing of data							
11.	Other, e.g.							
			optional				prioritized	

In your opinion, how much **potential** remains in your organization's/company's current **forecasting practice**? (absolute %)

(For example, if the average accuracy has been 85% so far and the ***potential is 5%****, then the achievable target is 90%).*

In your opinion, how and by what changes could this opportunity be **utilized**?

In your opinion, **which areas** of corporate management would be affected, and to **what extent**, by a hypothetical and feasible **5% improvement** in forecasting accuracy?

	Rate of change (%)
Fulfillment of customer needs and improvement of service level	
Revenue growth	
Profit growth	
Improvement in cash flow	
Improvement in procurement and supplier accuracy	
Better planning accuracy and improved forward visibility	
Reduction in production costs	
Improvement in inventory management (inventory turnover)	
Reduction in logistics costs	
Within this -Reduction of capital invested in inventories	
-Reduction in stockouts	
-Reduction in transportation-related costs	
-Improvement in lead time	
Other, e.g.	

In your opinion, how **painful** is the current state of forecasting practice? (subjective view)

(5-Strongly; 1-Weakly)

If you are interested in the overall picture, open to a workshop discussing the results, and willing to provide your contact details for the invitation, please do so:

If you would be willing to support a survey that explores the forecasting culture in greater depth, please let us know (X).

Your important additions regarding demand forecasting practice at your organization:

Kérem, hogy a kitöltött kérdőívet a következő email címre küldje meg: mondovics1950@gmail.com or janos.mondovics@gteportal.eu

Annex 3

Annex 4

"Prognozowanie jest bardzo trudne, zwłaszcza jeśli dotyczy przyszłości." Niels Bohr

Szybka ocena historii sprzedaży / prognozowania popytu z ostatnich lat

(Do wypełnienia proszę zaangażować specjalistów ds. prognozowania popytu, logistyki i zarządzani

(W przypadku danych priorytetowych należy dążyć do ich pełności, a w przypadku danych opcjonalnych – spróbować zidentyfikować wszystkie dostępne informa **Wypełnienie ankiety może zająć od 25 do 35 minut**

Visegrad Fund
Visegrad Grant No. 21520049

Klasyfikacja branżowa organizacji

Roczny przychód Mio EURO

		Sorszám
-PRZEMYSŁ	- Produkcja samochodów i części samochodowych, pojaz	1
	- Przemysł elektroniczny	2
	- Obróbka metali	3
	- Produkcja maszyn	4
- Przemysł chemic	- Przemysł farmaceutyczny	5
	- Przemysł gumowy i tworzyw sztucznych	6
	- Przemysł kosmetyczny	7
- Przemysł lekki	- Przemysł odzieżowy	8
	-Przemysł papierniczy i poligraficzny	9
- Przemysł spożyw	- Przemysł młynarski	10
	- Przemysł piekarniczy i makaronowy	11
	- Przemysł mleczarski	12
	- Przemysł wód mineralnych i napojów bezalkoholowych	13
	- Przemysł piwowarski	14
	- Przemysł spirytusowy i winiarski	15
	- Przemysł cukrowniczy	16
	- Przemysł cukierniczy	17
	- Przemysł olejarski	18
	-Przemysł mięsny	19
	- Przemysł konserwowy	20
	- Przemysł chłodniczy	21
-HANDEL	- Hurtownik / dystrybutor	22
	- Detalista	23
	- export	24
	- import	25
INNE	INNE	26

Szacunkowa „średnia" dokładność prognoz w działalności organizacji (%)

- w pierwszym „roku pokoju" (2019)	opcjonalny
- w pierwszym roku pandemii COVID (2020)	
- w drugim roku pandemii COVID (2021)	
- w trzecim roku pandemii, w pierwszym roku wojny UA-RU (2022)	
- w drugim roku wojny UA-RU (2023)	
- w trzecim roku wojny UA-RU (2024)	priorytetow

Zmiana znaczenia horyzontu prognozowania

horyzont czasow	krótki	średni	długi	
- w pierwszym „roku pokoju" (2019)				opcjonalny
- w pierwszym roku pandemii COVID (2020)				
- w drugim roku pandemii COVID (2021)				
- w trzecim roku pandemii, w pierwszym roku wojny UA-RU (2022)				
- w drugim roku wojny UA-RU (2023)				
- w trzecim roku wojny UA-RU (2024)				priorytetow

WZR – wzrosło; BZ – bez zmian; SP – spadło

Planowane i zrealizowane działania mające na celu poprawę prognozowania (zmiany organizacyjne, zakup oprogramowania, szkolenia itp.)

- w pierwszym „roku pokoju" (2019)	opcjonalny
- w pierwszym roku pandemii COVID (2020)	
- w drugim roku pandemii COVID (2021)	
- w trzecim roku pandemii, w pierwszym roku wojny UA-RU (2022)	
- w drugim roku wojny UA-RU (2023)	
- w trzecim roku wojny UA-RU (2024)	priorytetow

Czynniki wpływające na dokładność prognoz w danym okresie (proszę określić corocznie wagę znaczenia problemu! **1 oznacza tutaj przypadek najbardziej charakterystyczny i najsilniejszy!**)

(np. end-to-end 2023: 1, 2024: 2, czyli znaczenie maleje itd. ***Wagi w przedziale od 1 do 10.***

		2019	2020	2021	2022	2023	2024	uwaga
1.	Złożoność sieci łańcucha dostaw i brak przejrzystości							
2.	Trudności lub niemożność synchronizacji i koordynacji procesów end-to-end w łańcuchu dostaw							
3.	Wydajność dostawcy i zmienność poziomu obsługi							
4.	Niemożność zwiększenia i efektywnego wykorzystania rosnącej ilości danych informacyjnych i prognostycznych							
5.	Brak współpracy międzyfunkcyjnej w organizacji (planowanie kolaboracyjne)							
6.	Kultura organizacyjna; niepełne stosowanie zarządzania łańcuchem dostaw							
7.	Techniki prognozowania i zmienność popytu							
8.	Inności adaptacyjnych i elastyczności w strukturze organizacyjnej oraz zdolnościach produkcyjnych w odniesieniu do zmienność							
9.	Rozwój, utrzymanie i zarządzanie talentami w łańcuchu dostaw							
10.	Redukcja i kontrola kosztów							
11.	Inne, takie jak							
			opcjonalny			priorytetowy		

Zakres gromadzenia informacji związanych z prognozowaniem w praktyce przedsiębiorstwa (T/N) oraz ich zmiany w danym okresie

		2019	2020	2021	2022	2023	2024	uwaga
1.	Gromadzenie oczekiwań dotyczących popytu opartych na doświadczeniu działów sprzedaży i marketingu							
2.	Zbieranie sygnałów popytowych od menedżerów produktów							
3.	Prognozowanie nie tylko ilości produktów, lecz także ich miksu produktowego							
4.	Praktyka prognozowania popytu oparta na konsensusie wielu obszarów firmy poprzez proces S&OP							
5.	romadzenie oczekiwań popytowych opartych na doświadczeniach klientów, współpraca z klientami w procesie prognozowani							
6.	Wykorzystywanie danych w czasie rzeczywistym (dane z terminali POS, znajomość baz danych partnerów itp.)							
7.	Uwzględnianie wcześniej określonych potrzeb w prognozowaniu (nowe produkty, promocje itp.)							
8.	Uwzględnianie makrotrendów wśród czynników stymulujących popyt (trendy gospodarcze, dane demograficzne itp.)							
9.	Wykorzystanie systemów BI i CRM w przygotowywaniu prognoz							
10.	zależna funkcja planowania popytu w strukturze organizacyjnej, odpowiedzialna za koordynację zbierania i przetwarzania dan							
11.	Inne, takie jak							
			opcjonalny			priorytetowy		

Jak duży potencjał usprawnień (rezerwy) w zakresie prognozowania istnieje obecnie w Państwa organizacji / przedsiębiorstwie? (wartość w % absolutnych)

(Na przykład, jeśli dotychczasowa średnia dokładność wynosiła 85%, a szacowany potencjał poprawy 5%, to możliwy do osiągnięcia cel wynosi 90%)

Państwa zdaniem, w jaki sposób i za pomocą jakich zmian można by wykorzystać tę możliwość?

Państwa zdaniem, w jakim stopniu i na które obszary działalności przedsiębiorstwa wpłynęłaby hipotetyczna i możliwa do osiągnięcia 5-procentowa poprawa dokładności prognoz?

	procentowa zmiana (%
Zaspokajanie potrzeb klientów, poprawa poziomu obsługi	
Wzrost przychodów	
Wzrost zysków	
Poprawa przepływów pieniężnych (cash flow)	
Poprawa dokładności zakupów i dostaw ze strony dostawców	
Poprawa dokładności planowania i zdolności przewidywania	
Spadek kosztów produkcji	
Poprawa gospodarki magazynowej (szybkości rotacji zapasów)	
Spadek kosztów logistyki	
w tym -Spadek kapitału zamrożonego w zapasach	
-Zmniejszenie niedoborów zapasów	
-Obniżenie kosztów związanych z transportem	
-Poprawa czasu realizacji (lead time)	
Inne:	

Jak bardzo, Państwa zdaniem, uciążliwy jest obecny stan praktyki prognozowania? (opinia subiektywna)
(5 – silnie; 1 – słabo)

Jeśli są Państwo zainteresowani uzyskanym obrazem, otwarci na warsztat omawiający wyniki i chcieliby Państwo otrzymać zaproszenie – prosimy o podanie danych kontaktowych.:

Jeśli chcieliby Państwo wesprzeć również badanie pogłębiające kulturę prognozowania, prosimy to zaznaczyć (X).

Własne istotne uwagi dotyczące praktyki prognozowania popytu:

Proszę o przesłanie wypełnionej ankiety na następujący adres e-mail: mondovics1950@gmail.com lub janos.mondovics@gteportal.eu

Visegrad Fund

Annex 5

"Predpovedanie je veľmi ťažké, najmä pokiaľ ide o budúcnosť." Niels Bohr

Visegrad Fund
Visegrad Grant No. 22520049

Rýchly prieskum o vývoji predaja / predpovedania dopytu v uplynulých rokoch

(Pri vypĺňaní požiadajte o pomoc odborníkov na predpovedanie dopytu, logistiku a riadenie dodáv

(Pri prioritných údajoch sa usilujte o úplnosť, pri voliteľných údajoch sa snažte získať všetky dostupné informácie!)

Odhadovaný čas na vyplnenie: 25 – 35 minút

Odvetvová klasifikácia organizácie

Ročný obrat Mio EURO

Sorszám		
1	- Výroba automobilov a autodielov, výroba vozidiel a ich	-PRIEMYSEL
2	- Elektronický priemysel	
3	- Spracovanie kovov	
4	-Strojárstvo	
5	- Farmaceutický priemysel	- Chemický priemy
6	-Gumárenský a plastový priemysel	
7	-Kozmetický priemysel	
8	- Odevný priemysel	- ľahký priemysel
9	-Papierenský a polygrafický priemysel	
10	- Mlynársky priemysel	-Potravinársky prie
11	- Pekárenský a cestovinársky priemysel	
12	- Mliekarenský priemysel	
13	-Priemysel minerálnych vôd a nealkoholických nápojov	
14	-Pivovarnícky priemysel	
15	-Liehovarnícky a vinársky priemysel	
16	- Cukrovarnícky priemysel	
17	-Cukrovinkársky priemysel	
18	-Rastlinnooljárenský priemysel	
19	- Mäsopriemysel	
20	- Konzervárenský priemysel	
21	- Chladiarenský priemysel	
22	- Veľkoobchodník / distribútor	-OBCHOD
23	- Maloobchodník	
24	- export	
25	- import	
26	INÉ	INÉ

Odhadovaný „priemer" presnosti prognózovania v hospodárení organizácie (%)

- v prvom „mierovom roku" (2019)		voliteľný
- v prvom roku pandémie (COVID) (2020)		
- v druhom roku pandémie (COVID) (2021)		
- v treťom roku pandémie a v prvom roku vojny UA–RU (2022)		
- v druhom roku vojny UA–RU (2023)		prioritný
- v treťom roku vojny UA–RU (2024)		

Zmena dôležitosti časového horizontu prognózovania

časový horizont	krátky	stredný	dlhý	
- v prvom „mierovom roku" (2019)				voliteľný
- v prvom roku pandémie (COVID) (2020)				
- v druhom roku pandémie (COVID) (2021)				
- v treťom roku pandémie a v prvom roku vojny UA–RU (2022)				
- v druhom roku vojny UA–RU (2023)				prioritný
- v treťom roku vojny UA–RU (2024)				

- zvýšilo sa; NB – nezmenilo sa; ZN – znížilo sa

Opatrenia plánované a realizované na zlepšenie prognózovania (organizačné zmeny, nákup softvéru, školenie a pod.)

- v prvom „mierovom roku" (2019)		voliteľný
- v prvom roku pandémie (COVID) (2020)		
- v druhom roku pandémie (COVID) (2021)		
- v treťom roku pandémie a v prvom roku vojny UA–RU (2022)		
- v druhom roku vojny UA–RU (2023)		prioritný
- v treťom roku vojny UA–RU (2024)		

Faktory ovplyvňujúce presnosť prognózovania v danom období (uveďte každoročne váhu dôležitosti problému! **1 znamená najtypickejší, najsilnejší prípad!**)

(napr. end-to-end 2023: 1, 2024: 2, t. j. jeho dôležitosť klesá atď.) Váhy v rozsahu od 1 do 10 .

		2019	2020	2021	2022	2023	2024	poznámka
1.	Zložitosť siete dodávateľského reťazca, nedostatok transparentnosti							
2.	Ťažkosti alebo neschopnosť synchronizovať a koordinovať procesy dodávateľského reťazca (end-to-end)							
3.	Výkonnosť dodávateľa, variabilita dodávok							
4.	Neschopnosť efektívne využívať rastúce množstvo informácií a údajov z prognózovania							
5.	Nedostatok medzi-funkčnej spolupráce organizácií (kolaboratívne plánovanie)							
6.	Organizačná kultúra; nedostatočné uplatňovanie riadenia dodávateľského reťazca							
7.	Prognostická technika a variabilita dopytu							
8.	Kapacita a organizačná štruktúra neprispôsobená variabilite dopytu							
9.	Rozvoj, udržanie a vedenie talentov v dodávateľskom reťazci							
10.	Znižovanie a kontrola nákladov							
11.	Iné, ako napríklad							
			voliteľný			prioritný		

Rozsah zhromažďovania informácií súvisiacich s prognózovaním v podnikovej praxi (A/N) a ich zmeny v danom období

		2019	2020	2021	2022	2023	2024	megjegyzés
1.	zhromažďovanie očakávaní dopytu založených na skúsenostiach predaja a marketingu							
2.	zhromažďovanie signálov dopytu od produktových manažérov							
3.	okrem množstva produktu aj prognózovanie produktového mixu							
4.	praxe prognózovania dopytu založená na zhode viacerých podnikových oblastí prostredníctvom procesu S&OP							
5.	zhromažďovanie očakávaní dopytu založených na skúsenostiach zákazníkov, prognostická prax v spolupráci so zákazníkmi							
6.	vnímanie dopytu v reálnom čase (údaje z POS terminálov, znalosť databáz partnerov a pod.)							
7.	zohľadnenie vopred stanovených požiadaviek v prognóze (nové produkty, promočné akcie a pod.)							
8.	zohľadnenie makrotrendov medzi faktormi stimulujúcimi dopyt (hospodárske trendy, demografické údaje a pod.)							
9.	zapojenie BI a CRM do prípravy prognóz							
10.	nezávislá funkcia plánovania dopytu v rámci organizácie organizuje a koordinuje zber a spracovanie údajov							
11.	Iné, ako napríklad							
			voliteľný			prioritný		

Aké sú podľa vás v súčasnosti rezervy vo vašej hospodárskej organizácii / podniku v oblasti prognostickej praxe? (absolútne %)

(napríklad ak bola doterajšia priemerná presnosť 85 % a odhadovaná rezerva 5 %, potom je možný cieľ 90 %)

Ako sa podľa vášho názoru dá táto možnosť využiť – akým spôsobom, akými zmenami?

Podľa vás by sa zlepšenie presnosti prognózovania o predpokladaných 5 % prejavilo v ktorých oblastiach podnikového hospodárenia a v akej miere?

	podiel zmeny (%)
Plnenie požiadaviek zákazníkov, zlepšenie úrovne služieb	
Zvýšenie obratu	
Zvýšenie zisku	
Zlepšenie cash flow	
Zlepšenie presnosti nákupu a dodávateľov	
Zlepšenie presnosti plánovania, zlepšenie schopnosti predvídania	
Zníženie výrobných nákladov	
Zlepšenie riadenia zásob (rýchlosti obratu zásob)	
Zníženie logistických nákladov	
v rámci toho -zníženie kapitálu viazaného v zásobách	
-zníženie nedostatkov zásob	
-zníženie nákladov spojených s dopravou	
-zlepšenie priebežného času	
Iné:	

Ako náročný alebo frustrujúci je podľa vás súčasný stav prognostickej praxe (subjektívny názor)?
(5 – silno; 1 – slabo)

Ak vás zaujíma vzniknutý obraz, ste otvorený workshopu spracovávajúcemu výsledky a radi poskytnete aj svoje kontaktné údaje na pozvanie, prosíme, urobte tak:

Ak by ste radi podporili aj prieskum hlbšie skúmajúci prognostickú kultúru, prosíme, označte (X)

Vlastné dôležité doplnenia v súvislosti s praxou prognózovania dopytu:

Prosím, pošlite vyplnený dotazník na nasledujúcu e-mailovú adresu: mondovics1950@gmail.com alebo janos.mondovics@gteportal.eu

Visegrad Fund

Annex 6

The average annual revenue of respondents in the Hungarian sample was €272.2 million in 2024.

To approximate the representativeness of the survey, we first estimate a full revenue–company count curve, which allows us to calculate the number of Hungarian companies exceeding the threshold.:
Thresholds:

- ≥ 50 M€
- ≥ 100 M€
- ≥ 250 M€
- ≥ 500 M€
- ≥ 1 billion €

Starting poin: According to statistics, approximately **15,400 companies** reach **HUF 1 billion in annual revenue (≈ €2.5 million)** — this will be used as the baseline (N_0).

Pareto Model for Hungarian Company Revenues

Expected number of companies above a given threshold according to the Pareto model:

$$N(X \geq T) = N_0 \left(\frac{T_0}{T} \right)^{\alpha}$$

, where

- N_0=15400 (companies with revenue above HUF 1 billion)

- T_0=2,5 M€

- α=1,15 (conservative tail parameter for Hungarian companies) (tail – how thick or thin the tail of a distribution is in terms of the frequency of large values)

Based on this, the estimated number of companies by threshold:

A, ≥ 50 M€

$$N \approx 15\,400 \left(\frac{2,5}{50}\right)^{1,15} \approx 15\,400 \cdot (0,05)^{1,15} \approx 580–720$$

that is, this represents approximately 600–700 companies

B, ≥ 100 M€

$$N \approx 15\,400 \left(\frac{2,5}{100}\right)^{1,15} \approx 15\,400 \cdot (0,025)^{1,15} \approx 250–330$$

that is, this represents approximately 250–300 companies

C, ≥ 250 M€

$$N \approx 15\,400 \left(\frac{2,5}{250}\right)^{1,15} \approx 15\,400 \cdot (0,01)^{1,15} \approx 90–130$$

that is, this represents approximately 90–130 companies

D, ≥ 500 M€

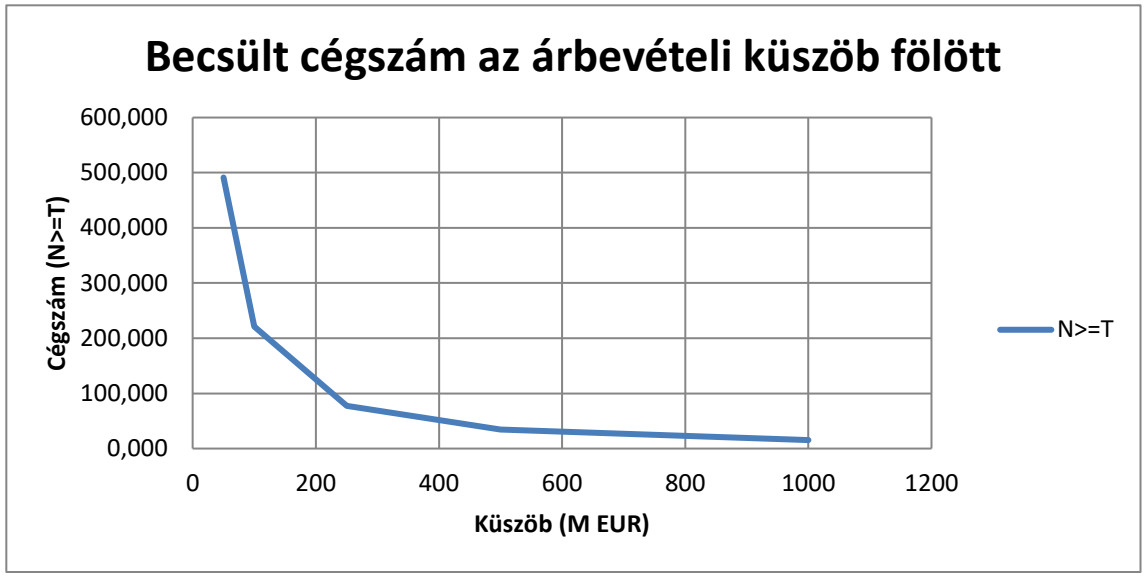
$$N \approx 15\,400 \left(\frac{2,5}{500} \right)^{1,15} \approx 40–60$$

that is, this represents approximately 40–60 companies

E, ≥ 1 billion €

$$N \approx 15\,400 \left(\frac{2,5}{1000} \right)^{1,15} \approx 18–25$$

that is, this represents approximately 18–25 companies



277 M€ éves árbevétel körüli sávok

±20% sáv:

Tartomány: ~221,6 – 332,4 M€

Becsült összes cég ebben a sávban: ≈ 33 cég

egy ~33 elemű sokaságból vennénk 18-as mintát

±30% sáv:

Tartomány: ~193,9 – 360,1 M€

Becsült összes cég ebben a sávban: ≈ 53 cég

a 18 egy ~53 elemű sokaságra lenne reprezentatív minta

±40% sáv:

Tartomány: ~166,2 – 387,8 M€

Becsült összes cég ebben a sávban: ≈ 77 cég

a 18 egy ~77 elemű sokaság „reprezentatív” mintájának felel meg.

Vagyis: a 18 cég egy tényleg **nagyon szűk, kis elemszámú szegmens** elég nagy hányadát lefedi (**a 277 M€ körüli, nagyságrendileg 30–80 vállalatot tartalmazó szegmensből 18 cég válaszolt)**.

1. melléklet
2. melléklet