Enhanced Sales Management: Using Digital Forecasting

Methods and Uses of Automated Forecasts

Thorsten Lips

Abstract This contribution is concerned with sales management based on digital forecasts. Estimating complex developments in companies is often characterized as an elaborate task. But as a result of digitization, there are new approaches for compiling automated and precise forecasts. The described approach in this contribution focuses on "Big Data" and "Advanced Analytics." Outlined application examples underline the practicality of new algorithm forecasts with a higher quality, even though every company has specific requirements that must be considered.

Keywords Advanced Analytics · Algorithm forecast · Automated models · Big Data · Digital forecast · Digitization

1 Introduction

Not long ago, digitization was considered the world-transforming megatrend. Today, companies have concrete projects promoting the digital age. Digitization is not a new phenomenon: what is new is the quality and extent of the digital revolution, as shown in "The Digitization of Just Everything."[1]

On the one hand, digital visions are being developed to significantly increase turnover and, on the other, to reduce costs. Examples from the new economy demonstrate that, after a setup phase, the companies maximizing their use of digitization generate significantly higher returns on capital than those of the old economy. However, it is unclear how traditional companies should act in practice so as to benefit from digitization, or more specifically, how they can significantly increase both revenue and EBIT. To clarify this point, four fields for the application of digitization within existing companies must be identified:

[1] Brynjolfsson and McAfee (2014), p. 57.

T. Lips (✉)
Strategy, Innovation & Sales, Horváth & Partners, Düsseldorf, Germany

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- Digital business models
- Digital products
- Digital processes
- Digital corporate performance management

The potential carried by each field is enormous. However, considerable investments are usually necessary for their realization, and profitability is often unclear beforehand. Digital products are complex and require an electrical engineering know-how that is often lacking in many companies. Horváth & Partners has implemented various customer projects showing that generating fast advantages through digitization in this area is possible, but only if the right concepts are chosen and specific know-how is applied.

Our approach for the automated and precise forecasting of events and developments focuses on "Big Data" and "Advanced Analytics." As a first step, specialists and managers are given important information for their actions using these forecasts. In further steps, processes can be improved and ultimately automated, thus supporting processes in all functions. The greatest benefits can be achieved if the sales department is used as starting point.

The human ability to predict the consequences of decisions made and the resulting situation is a core element of human intelligence. We are experts at recognizing and predicting simple and social correlations: We push the brakes, and the vehicle is slowed. We smile at someone, and the other person usually smiles back.

Complex projections of developments in companies are considerably more difficult. Our brain is not designed for the analysis of enormous amounts of data within a short period of time and simultaneously also deriving forecasts from this analysis. We are, however, experts at transferring our knowledge and experiences to other areas. When forecasting, we attempt to simplify tasks. The strategies chosen and mistakes made are described in detail by Daniel Kahneman's *Thinking, Fast and Slow*.

Consequently, estimating complex developments in companies is an elaborate task. Additionally, the effort stands in no relation to the result. Different experiences and underlying conditions, such as incentives, can lead to different forecasts, although the same initial data was used. Furthermore, a great deal of coordination is required to consolidate a forecast across different levels. This has two consequences. Firstly, comprehensive forecasts are usually performed periodically, only a few times a year. Secondly, periodic forecasts are rarely synchronized with operational decisions that are made continuously. As a result, it is not always possible for management to make operational business decisions based on forecasts. Critical discrepancies and unused potential are the consequences. For quite some time now, it has been clear that corporate management is more powerful if and when automated models are applied, as these are more capable of forecasting future developments.

Specialists often design simulations and models using Microsoft Excel, in order to generate "Business Forecasts." However, results do not always meet management's expectations. Reality is much more complex and more dynamic than the

findings of static programs such as Microsoft Excel and other currently available simulation tools.

As a result of digitization, there are a few different new approaches for compiling accurate forecasts.

2 Using Digital Forecasts for Sales Management

2.1 General Statements to Digital Forecast

Digital forecasts are machine-calculated forecasts with improved accuracy that consider the increasing amount of internal and external information and use powerful statistical methods in order to predict a company's relevant developments. These are initially used to forecast the likelihood of events and, based on these, the performance of relevant sales ratios. As a further step, digital forecasts can connect prospective quantity and rating correlations in order to establish turnover and cost forecasts. As they are learning systems, which are increasingly more precise and reliable than traditional forecasts, digital forecasts can project up to five quarters. These are either calculated in real time or, as a minimum, on a daily basis. A distinction should be made between three forecast horizons:

- Horizon for operational decisions (sectoral, standard 1–30 days, very precise)
- Horizon for resource planning (sectoral, standard 31–90 days, precise)
- Horizon for corporate actions (sectoral, standard 91–450 days, reference values)

In order to avoid any misunderstanding, digital forecasts, as described hereinafter, are generated to predict developments that follow clearly recognizable trends or are foreseeable due to current trends. They are not designed to predict extraordinary developments like the Lehman breakdown or the VW emissions scandal.

2.2 Components of Digital Forecasts

The capacity of digital forecasts depends on three components: data, algorithms, and user interface.

Data

Digital forecasts are based on a huge amount of data that must first undergo "data cleansing." Data is the driving force of digital forecasts. In order to recognize the meaning of data, it is important to understand the change in paradigm, resulting from automatically computed forecasts. In conventional forecasts, complexity is reduced significantly by managers and specialists, and models are designed to select and aggregate information. In contrast, automatically calculated forecasts function

differently. The more comprehensive and detailed the existing data is, the more precise their forecast.

Algorithms
Powerful algorithms compute desired forecasts using cleansed data. Different methods of digital forecasts are used, depending on the respective constellation. Some of the most important methods are:

- Extrapolation of time series with moving averages. Usually in addition to the modeling of season profiles
- Component models by Holt-Winters, using exponential smoothing
- Bayesian structural time series
- Box-Jenkins models
- ARIMA and SARIMA models (seasonal autoregressive integrated moving average models)

In general, there are different approaches for evaluating these methods and their usability.[2] In practice, their performance key characteristic is not formal complexity; it is rather the optimal dimensioning in three categories:

- Predictive power: Specifies how accurately the target variables are projected by the model
- Explanatory power: Shows the applicability of the model to explain cause-and-effect relationships comprehensibly
- Control power: Shows the response opportunities for people in power to react to predictions computed by the model

To obtain the best results from algorithms within the above dimensions during customer projects, the close collaboration of data scientists and department specialists is indispensable. Data scientists generate ideas and code algorithms accordingly. In turn, department specialists know the importance of different target variables, evaluate the performance of the models, and can support the acceptance of the models.

User Interface
The third part of digital forecasts is the user interface. Here, forecasts are made available to users. Digital forecasts have added value, as they are generated in real time. To this end, projections must be available via different mobile devices. Furthermore, one task of an interface is to provide a simplified presentation of complex issues. A good example of this implementation is provided by weather forecasts, offered by different online portals.

[2]Mertens and Rässler (2012).

2.3 Procedure Model for Developing and Introducing Digital Forecasts

In order to quickly establish and introduce forecasts in sales departments, a seven-step process has proven successful. This process is characterized by the following performance features:

- Modeling and prototyping are created to be flexible, so as to solve a company's specific problems both optimally and in a predefined period.
- The process is designed in such a way that the constructed models can be implemented directly in productive IT environments.
- The projects for modeling and introduction should be handled competently by management (Fig. 1).

1. *Use-Case Scoping*: Sometimes constructing and implementing digital forecasts can be extremely complex. This is why the goals and target functions of the digital forecast must be defined before the project begins. Furthermore, the available data must be clarified.
2. *Model Scoping*: Within the framework dictated by the use-case scoping, statistical models are evaluated and tested for usability. A comparison between alternative useful models and the framework conditions is also included. The first step is to analyze the data situation.
3. *Data Preparation*: This phase begins with the selection of relevant data from internal and external sources. Generating a basic understanding of data structures is possible with the use of simple analysis tools. Consequently, essential decisions can be made. The connection between cleansed data and the basic understanding of data structures, as well as internal and external data sources, offers the possibility of generating additional data. This task, known as "data enrichment," significantly improves the forecast model.
4. *Proof of Concept*: Adjusting and enhancing different models to the available data are the central tasks of this step. The assessment of models is based on the abovementioned dimensions of "explanatory power," "predictive power," and "control power." Conflicting goals in these dimensions must be identified and

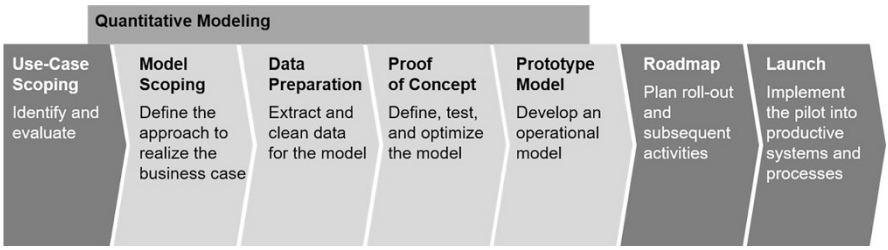

Fig. 1 Procedure model for developing and implementing digital forecasts

taken into consideration. Furthermore, an evaluation of prioritized models is included in this step, with former models serving as benchmarks.

5. *Prototype Model*: The development of an effective prototype model necessitates additional framework conditions, in order to reduce complexity. Model stability can be tested using data that was not taken into account during the setup of the model. Consequently, a smooth transition to live operation is ensured. A possible requirement could be an improvement in computing time. Simultaneously, an application is developed to enable the prototype model's results to be presented and illustrated to audience groups.
6. *Roadmap*: In general, many ideas for additional application possibilities and additional requirements concerning digital forecasting may be raised when compiling the roadmap. As a result, it is imperative to specify significant steps to achieve the business usage defined earlier in the process. Moreover, further development—after the transition to live operations—should be well planned and clear. The central elements of planning are:

   - Improvement of processes to realize defined usage (if necessary, changes in governance)
   - Technical implementation in product systems and their user interfaces
   - Instructions for users to use the computed forecasts productively
   - Generating and furnishing of know-how to enhance the algorithm

7. *Launch*: The smooth transition of algorithms to live operations is expected in cases of professional prototyping and planning during road mapping.

   The effort required for the management of alterations and adjustments, up until the previously defined (during the scoping phases) usage is achieved, should not be underestimated. Occasionally, serious resistance to automatically computed algorithms is offered. This has two causes. Firstly, automatically computed algorithms are able to create transparency, which results in reduced competences and less reporting freedom for managers and specialists, among other things. Secondly, digital forecasts are calculated in order to summarize the results of various events. This means that even an extremely good model could also fail in projecting individual cases. If managers or specialists were to repeatedly obtain inaccurate results, they could vehemently accuse the algorithm of being imprecise.

   Based on previous experience, professional change management is necessary for planned usage. In addition to supporting the management team, a learning curve should be planned for organization purposes.

3 Digital Forecasts: Application Examples

Application Example 1: Digital Forecast for Incoming Orders
Supported by Horváth & Partners—one of the leading consumer goods companies has developed a digital forecast for predicting incoming orders. Three goals were followed:

- Enhanced sales management (go/no decisions for supplies, depending on order probability)
- Better planning of incoming orders
- Effort reduction, by generating forecasts for incoming orders and implementing better management of the entire company

For rapid success, a first step was initially implemented in order to improve sales management. During the initial phase of the project, an analysis was conducted regarding the data that could be used in the forecast. It was found that very good forecasts could be generated by simply utilizing the available historical data from CRM and ERP. Even after 2 months, algorithms for the projection of incoming orders were available that were considerably more precise than previous models. The projecting capacity is shown in Fig. 2.

After the validation of this algorithm and to enable the productive utilization of the showcase "Digital forecasts for incoming orders," different modules were designed:

- A program set for automated data cleansing
- A program for the real-time computation and evaluation of incoming order probabilities in the event that sales opportunities are created or updated by salespersons

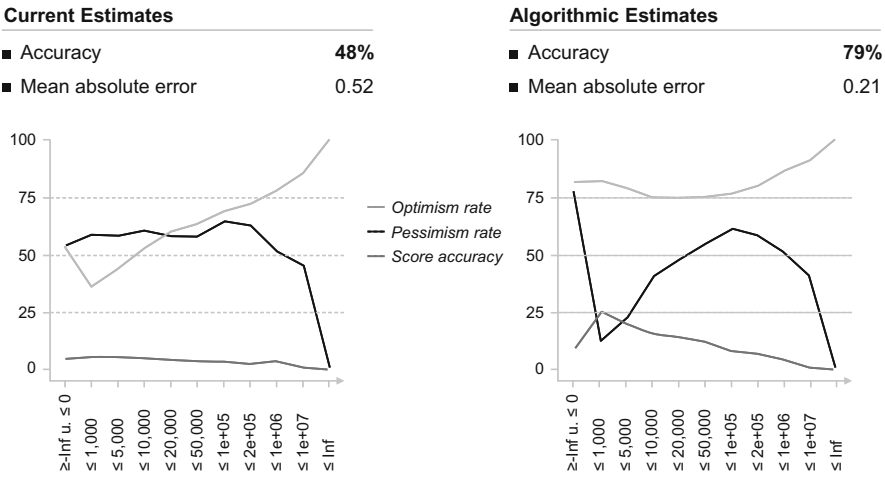

Fig. 2 Head-to-head comparison of prediction performances

- The optimized process and information model for the management of the sales processes with the additional data
- An analyzing concept, implemented in CRM, to support the decision process for sustainable management choices with calculated probabilities
- Assessments for sales coordinators to evaluate the quality of the algorithm (necessary for decision-making regarding optimization requirements)
- Technical concept for going live of the algorithm
- Schedule for going live
- Evaluation of additional expansion stages

On this basis, the model for calculating probabilities was implemented into the CRM model and went live. Salespersons were given help in evaluating the probabilities of opportunities. Consequently, decisions could be made concerning the generation of offers in sales. During this phase, integrating the computation of probabilities into the process model and the reporting in sales and FC was important. For this purpose, a communication model was applied, in order to motivate the relevant persons to use the calculated probabilities in their daily business as soon as possible. However, this did not result in a substantial reduction of manual forecasting.

In order to improve the algorithm, Horváth & Partners involved data scientists from the Steering Lab. After going live, in order to embed results and to rate both the quality and usage of the computed forecast, a structured learning phase was planned.

Application Example 2: Monthly Sales Forecasts and Predictive Forecasting
In the past, an international retailer had been required to manually generate a monthly sales forecast for the US market. Due to the complexity of the information, combined with special market features, it was often impossible to generate forecasts before the month end. In addition to this complexity, calculations were obstructed by the fact that a third of all products are sold within the last few days of a month. In cooperation with Horváth & Partners, the retailer strived to design a model that would enable the company to generate a daily prediction of the monthly results achieved by each product group. This included the following points:

- More accurate forecasts by taking account of nonlinear and unsecure coherences
- Faster available forecasts due to (partly) automated calculation
- Higher frequency, efficiency, and actuality of the forecast

To this end, a three-stage concept was introduced. The first stage included the definition of the pilot sector, the formulation of the conceptual framework, and the definition of different fallback scenarios. During the second stage, referred to as the implementation of the predictive forecast pilots, existing data was analyzed within an iterative process to enable the transformation of inconsistent and inconstant movements into fitting structures. The last stage was the definition of the forecasting goals and the roadmap, in order to integrate the pilot model into existing processes and systems.

A large number of different forecasting models were evaluated, and their results showed that a combination of two models was the optimal path. Traditional time

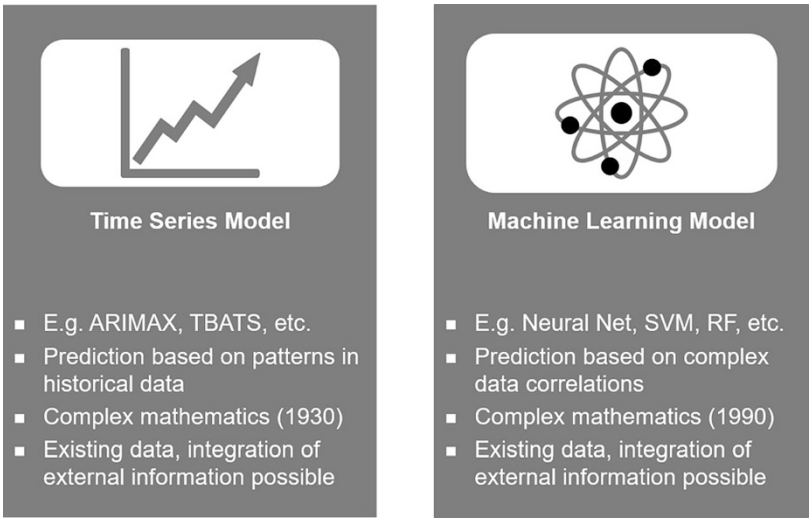

Fig. 3 Two possible approaches for modeling digital forecasts within sales

series models and machine learning approaches performed best for the forecasting of sales figures for different car models. Data patterns from the past form the basis of time series models, as patterns are found in historical data and then used to predict future patterns. The time series model performed significantly better when macroeconomic factors were taken into account (Fig. 3).

Machine learning models were developed within complex mathematics during the 1990s. The algorithm focuses on complex data coherences and searches for the strongest similarities within the group. These are then used as classification rules, varied slightly using an iterative procedure, and tested using the elements within the group. A rule's quality is represented by a score, which is higher if multiple group elements verify the rule. To avoid false classifications, rules must be unusable for other groups. Rules rated with the highest scores should be run with test numbers.

Both methods were used separately to predict weekly sales and weekly sales structures. The forecast itself was generated using a weighted combination of separately calculated results.

A simple user interface for end users shows the major and most important information for an analysis of the projections and ensures transparency of the current and estimated sales situation. In this context, dashboards were implemented in order to show automatically generated overviews daily, a flexible breakdown according to different steering variables (e.g., sales regions), an interactive input, and flexible sales simulations.

The intuitive handling and the option to simulate the consequences of any additional adjustment resulted in high acceptance for the model.

4 Conclusion

The previously outlined application examples, as well as further projects by Horváth & Partners, underline the practicality of new algorithm forecasts. They meet demands that manually calculated forecasts cannot meet. The quality of their results is significantly higher (better, faster, and more precise). For the optimization of sales management, it is usually sufficient to base projections on the data yielded by well-curated CRM and ERP systems.

Furthermore, it is possible to expand and detail the forecast horizon with additional data from internal and external sources, thereby improving sales and operations planning processes as a whole.

Naturally, each and every company has specific requirements that must be considered during the implementation and introduction of digital forecasts. Nonetheless, experience proves that many companies within retail and the consumer goods industry would benefit immensely from the outlined approaches.

References

Brynjolfsson E, McAfee A (2014) The Second Machine Age: Wie die nächste digitale Revolution unser aller Leben verändern wird. Plassen, Kulmbach

Mertens P, Rässler S (2012) Prognoserechnung. Physica-Verlag, Heidelberg

Thorsten Lips operates as a Partner with Horváth & Partners Management Consultants, is responsible for the business segment sales, and has centered his client work on sales performance excellence approaches. His consulting experience spans multiple national and international sales optimization projects across all industries.