Development and validation of future-robust strategies: A system for a continuous strategy development and strategy review process using the sports car development as an example

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Abstract

Strategic planning has a direct impact on various success factors of a company, including market position and competitive advantages in terms of supply and resources (Grünig & Kühn, 2015). However, in an increasingly volatile and complex environment, the classic, rather static approach to strategic planning is no longer appropriate (Mintzberg, 1994). New approaches to strategy development must therefore be able to create and realistically estimate the scope for future developments (Gausemeier & Plass, 2014; Fink & Siebe, 2016). On the basis of expert interviews and a quantitative study, various requirements were defined for different areas within a strategy development and strategy review process. From the current state of research, it can be inferred that methods exist which meet these requirements. However, the expert interviews conducted have shown that in current practice, a comprehensive and systematic approach using these methods is yet to be defined. This paper describes a fundamental system for a continuous strategy development and strategy review process, which enables the development of future-proof strategies by using foresight. The system is based on the approach of cross-generational product development and is modified for use in the context of corporate strategy development (Albers et al., 2018; Marthaler et al., 2019).

Keywords:
Strategy Development, Strategy Review Process, Strategic Analysis, Strategy Planning, Scenario Technique

1. Introduction and motivation

Studies show that innovation cycles within the automotive industry have shortened from 11 to less than six years in the last 30 years. This is the result of the increasingly volatile and complex environment, which represents one of the greatest challenges of today's strategic planning (Darkow, 2015; Wulf et al., 2012). With the help of suitable methods of strategic analysis, current and future success potentials can be identified and adapted strategies defined (Fink & Siebe, 2016; Gausemeier & Plass, 2014). Furthermore, the studies carried out within the scope of this work have shown that it is necessary to review and update strategies on a regular basis, particularly due to the continuously increasing changes in the environment and discontinuities. This paper describes an overall and systematic approach for a strategy development and strategy review process that uses foresight methods to evaluate the need for change and future robustness of strategy fields. This system is based on the process model of Albers et al. and Marthaler et al. and offers the possibility of developing strategies for a short-term, medium-term and long-term planning horizon (Albers et al., 2018; Marthaler et al., 2019).

2. Current state of research

2.1. Strategic analysis

According to Voigt, the strategic analysis can be divided into a time and a subject dimension. The former comprises the analysis of the company and its environment. The time-related dimension can be considered using methods of foresight (Voigt, 1993). The resulting interactions between company analysis and environment analysis can be investigated with the help of an integrated analysis. The relationships described between the various methods of analysis can be seen in Figure 1.
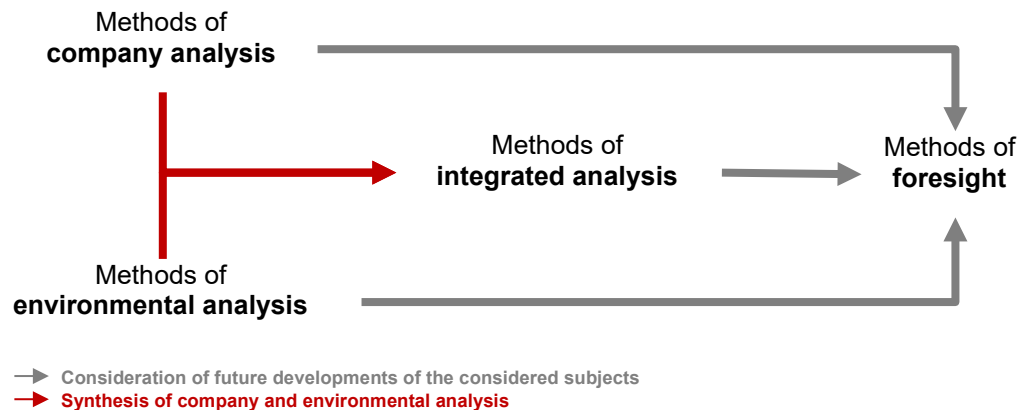

Figure 1: Elements of strategic analysis and their relationship to each other

The company analysis is used to identify strengths and weaknesses of the own company. In this context, Welge & Al-Laham divide company analysis into classical, value-oriented and resource- and competence-oriented approaches (Welge & Al-Laham, 2003). An overview of these methods, their objectives and the relevant literature for further information is presented in Table 1.

Table 1: Objectives of the methods of company analysis and relevant literature

Methods	Objectives of the method	Relevant literature
Classical approaches	Comparison of current and historical company data for the analysis of strengths and weaknesses as well as consideration of the requirements of the departments for the various life cycle phases of a product	Hofer & Schendel, 1978 King & Cleland, 1987 Pearce & Robinson, 2003 Ulrich, 1990 Welge & Al-Laham, 2003
Value-oriented approaches	Consideration and evaluation of value-adding processes of a company with regard to the organisational structure, the use of technology, the linkage and interdependence, the sources of differentiation as well as the costs	Aeberhard, 1996 Frese, 1993 Macharzina, 1993 Porter, 1998, 2000 Volck, 1997 Welge & Al-Laham, 2003
Resource- and competence-oriented approaches	Evaluation of the company-specific resources and competencies with regard to value, rarity, uniqueness and organizational support.	Knaese, 1996 Johnson et al., 2017 Welge & Al-Laham, 2003

In a next step, the strengths and weaknesses identified with the help of the company analysis must be compared with the opportunities and risks of the current and future environment (Pearce & Robinson, 2003). For this purpose, methods can be applied for the analysis of the general environment as well as the industry and competitive environment (Hitt et al., 2011). Table 2 provides an overview of the general methods of environmental analysis and the relevant literature.

Table 2: Objectives of the methods of environmental analysis and relevant literature

Methods	Objectives of the method	Relevant literature
PESTEL-Analysis	Analysis of the general environment with regard to political, legal, socio-cultural, economic, ecological and technological factors in order to identify opportunities and risks for the company	Ginter & Duncan, 1990 Hitt et al., 2011 Yüksel, 2012
Industry structure analysis	Analysis of the industry with regard to the negotiating strength of suppliers and customers, the threat from new competitors and substitute goods as well as the rivalry between established competitors	Hahn & Taylor, 2006 Porter, 1998, 1999, 2000 Welge & Al-Laham, 2003
Analysis of the strategic group	Analysis and comparison of competitors with similar resources and strategic behaviour with regard to product range, regional presence, price, quality and extent of vertical integration	Dess et al., 2014 Hahn & Taylor, 2006 Porter, 1999 Welge & Al-Laham, 2003
Competitor analysis	Analysis of competition-relevant information from competitors to determine strengths and weaknesses, strategic developments and positions as well as a subsequent comparison with the company itself within the framework of industry requirements	Bogetoft, 2012 Hahn & Taylor, 2006 Pieske, 1994 Shetty, 1993 Stapenhurst, 2009 Watson, 2007 Welge & Al-Laham, 2003

The company and environment analysis are combined in an integrated analysis. This ensures that the results of both analyses are taken into account for strategy development and adaptation (Grünig & Kühn, 2015). A summary of the objectives and relevant literature of selected methods of integrated analysis is presented in Table 3.

Table 3: Objectives of the methods of integrated analysis and relevant literature

Methods	Objectives of the method	Relevant literature
SWOT-Analysis/ TOWS-Matrix	Combining the strengths and weaknesses of the business analysis as well as opportunities and risks from the environmental analysis/ Analysis and networking of strengths and opportunities, strengths and risks, weaknesses and opportunities, weaknesses and risks	Grünig & Kühn, 2015 Kay, 1996 Mussnig et al., 2013 Pearce & Robinson, 2009 Sternad, 2015 Weihrich, 1982
BCG-Matrix	Analysis of the business areas of a company with regard to the industry growth rate and the relative market share as well as a derivation of strategic recommendations for action based on this analysis	Dess et al., 2014 Grünig & Kühn, 2015 Johnson et al., 2017 Proctor & Hassard, 1990
General Electric/ McKinsey-Matrix	Analysis of the business areas of a company with regard to market attractiveness and competitive advantages as well as a derivation of optimization strategies based on this analysis	Grünig & Kühn, 2015 Pearce & Robinson, 2009 Proctor & Hassard, 1990 Welge & Al-Laham, 2003

In addition to current information about the company and its environment, possible future developments are also relevant for strategic planning. Therefore, these must be analysed within the context of foresight. Various methods can be used (see Table 4), but it is advisable to use a mix of methods to cover all aspects of the forecast (Hahn & Taylor, 2006).

Table 4: Objectives of the methods of foresight and relevant literature

Methods	Objectives of the method	Relevant literature
Forecasts	Estimation of future developments through modelling and use of economic techniques and historical values	Cuhls, 2008, 2012 Fink & Siebe, 2016 Siebe, 2018 Rohrbeck et al., 2007 Meyer-Schwickerath, 2014
Scenario technique	Development of future or rather option areas for a particular object of consideration by analysing various influencing factors and their interrelationship and using various quantitative and qualitative data and their future developments for evaluating current and future opportunities and risks	Berner & Popp, 2012 Bishop et al., 2007 Durance & Godet, 2010 Dönitz, 2009 Chermack, 2007 Fink et al., 2001 Meyer & Günther, 2011 Meyer-Schwickerath, 2014 Mietzner & Reger, 2005 Gausemeier et al., 1995, 2016 Gausemeier & Plass, 2014 Godet, 2000 Siebe, 2018
Trend analysis	Estimating future and alternative developments of trends by analysing complex societal contexts using data that have been used in past developments to measure certain variables	Acatech, 2012[1] Durst et al., 2010 Gausemeier et al., 2016 Gausemeier & Plass, 2014 Horx, 2006 Popp et al., 2009

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2.2.   Other elements of strategic planning

Further components of strategic planning are strategic analysis, strategy development, implementation and strategic controlling (Rapo, 2019). During strategy development, information from company, environment and integrated analysis are used to define decisions on long-term company goals to make optimal use of the company's resources and capabilities (Sternad, 2015). For the subsequent implementation of a strategy, the strategy must be operationalized with the help of implementation measures. This operationalization requires implementation planning and the final transformation building on it (Gausemeier & Plass, 2014). The last component of strategic planning, strategic controlling, is required for the subsequent implementation, planning and control of the strategy and its measures (Gausemeier & Plass, 2014; Langguth, 1994).

3.   Research questions & methods

3.1.   Research questions

The current state of research shows that new approaches to strategic analysis must be able to better estimate future environmental developments (Gausemeier & Plass, 2014; Siebe, 2018). In addition, a suitable strategy development process is necessary to continuously take discontinuities into account (Warren, 1999). The studies carried out within this research project were carried out in cooperation with Porsche AG. Since there is close cooperation between company strategy and product strategy within this company, this work also examines which information should be exchanged here (Rapo, 2019). The following research questions are derived from this:

- *What are the requirements for the development of the company strategy in premium sports car development?*
- *Which methods and process steps meet the requirements of the strategy review process in premium sports car development?*
- *Considering the existing findings, how can a strategy development and strategy review process be designed within premium sports car development?*
- *Which information interfaces should there be between the corporate strategy and the product strategy?*

3.2.   Methods

In order to answer the research questions, two studies were conducted on the basis of a literature research. The literature research served to build up a knowledge base on the state of current research on the topic and to identify the first relevant success factors and methods of strategic planning. In addition, this should provide the first relevant points of orientation for the subsequent studies. Based on the literature research, 19 expert interviews were conducted to determine the quality of various practice-relevant requirements. The expertise resulted from the fields of employment of the interviewees, who were active in the automotive industry, in the consulting industry or in the university environment. (Rapo, 2019). In the next step, an online survey was carried out on a sample of 14 to quantify the results of the expert interviews. Based on the findings from the state of research and the studies carried out, a system for a continuous strategy development and strategy review process was developed to answer the third research question. The system was based on an approach for cross-generational product development, which has already proven itself in several studies in the product development context.

4.   Results

4.1.   Expert requirements for the strategy development and strategy review process

The online survey provided the relevance rating of various requirements identified within the expert interviews. These quantitative results were categorized according to their area of application and are shown graphically in Figures 2 to 6. On the ordinate, the expert rating was plotted with a range from 1 ("absolutely not relevant") to 5 ("extremely relevant"). The abscissa reflects the respective requirements.

a) Definition of the corporate strategy at high level (interdisciplinary barriers)
b) Communication of strategic objectives with all departments in advance
c) Central control and coordination of the strategic fields of action by the Executive Board
d) Practicability of the strategic objectives

e) Visualization of the target picture
f) Joint development of strategic fields of action in workshops
g) Decentralised definition of strategic fields of action by the departments
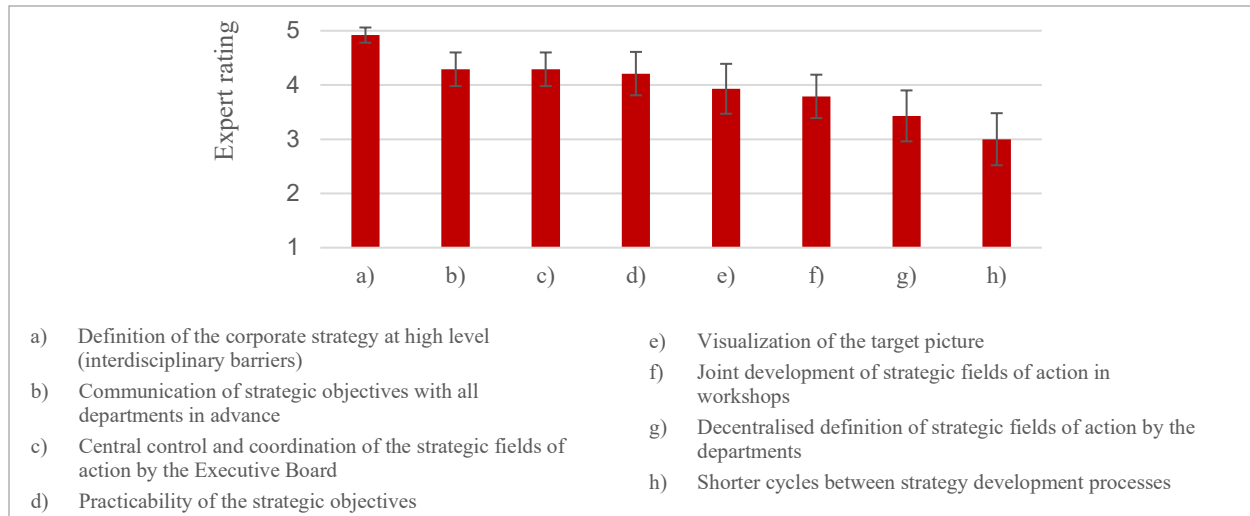h) Shorter cycles between strategy development processes

Figure 1: Mean value and standard deviation of the relevance of different requirements to the strategy development process on a scale from 1 ("absolutely not relevant") to 5 ("extremely relevant")

a) Review of the target picture
b) Coordination of the strategy review process by the management board
c) Consultation and networking of departments
d) Continuous review of strategic fields of action using key performance indicators
e) Involvement of internal experts
f) Impartiality during the strategy review process

g) Compact strategy review process (only review of previous made assumptions)
h) Setting up an editorial network of experts
i) Involvement of external experts
j) Review of the target path (methodology)
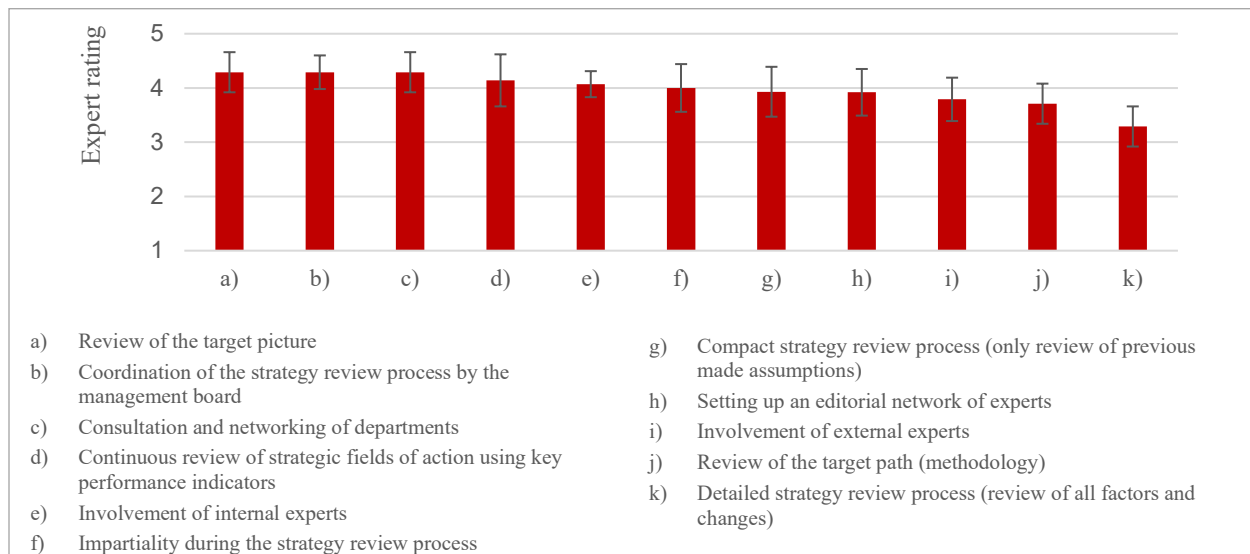k) Detailed strategy review process (review of all factors and changes)

Figure 2: Mean value and standard deviation of the relevance of different requirements to the strategy review process on a scale from 1 ("absolutely not relevant") to 5 ("highly relevant")
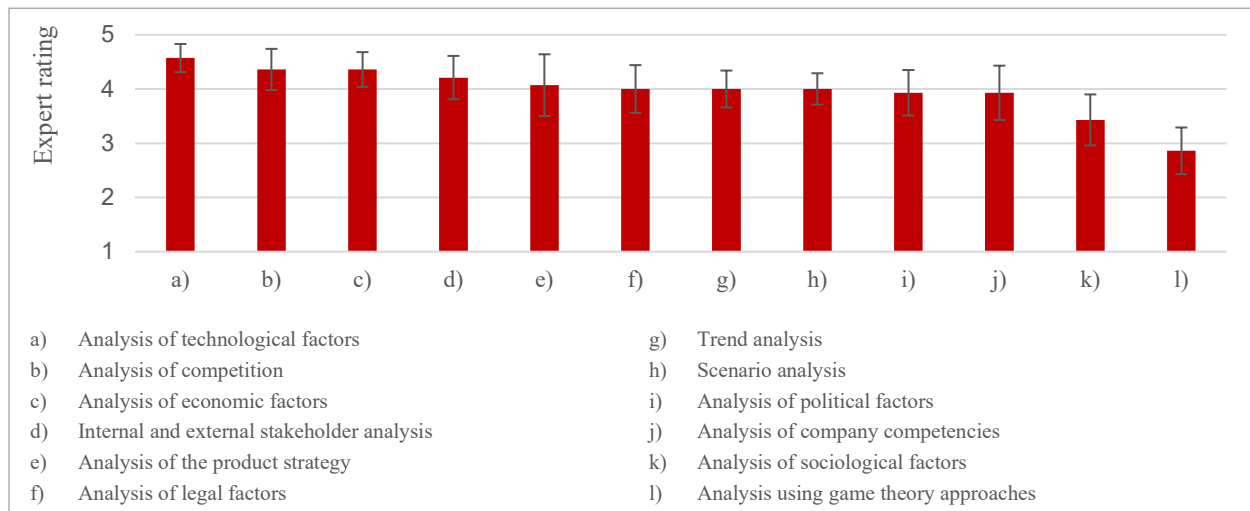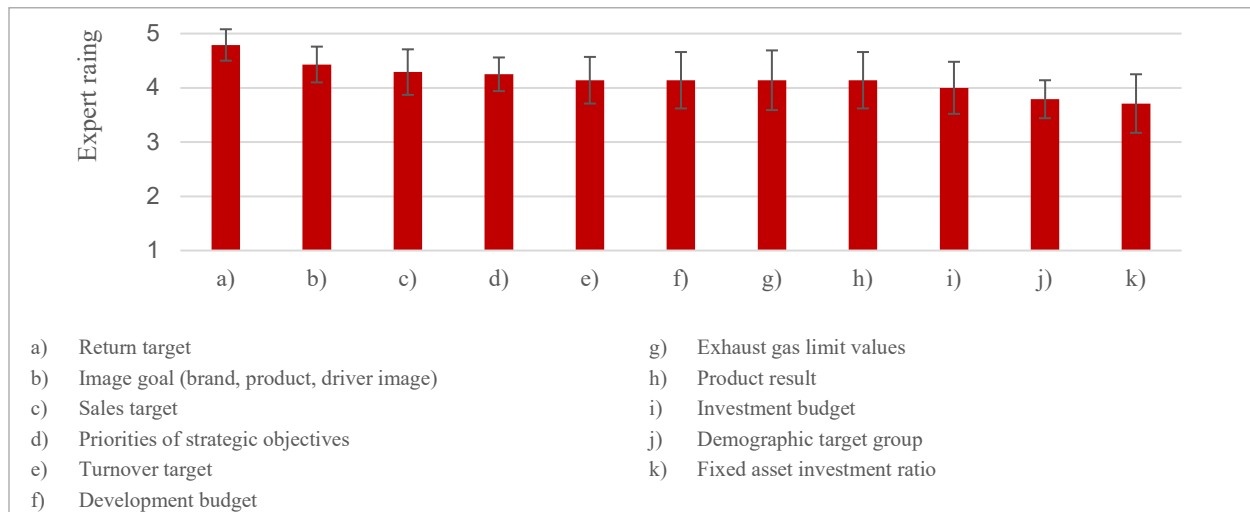
a) Analysis of technological factors	g) Trend analysis
b) Analysis of competition	h) Scenario analysis
c) Analysis of economic factors	i) Analysis of political factors
d) Internal and external stakeholder analysis	j) Analysis of company competencies
e) Analysis of the product strategy	k) Analysis of sociological factors
f) Analysis of legal factors	l) Analysis using game theory approaches

Figure 3: Mean value and standard deviation of the relevance of different analytical priorities during the strategy review process on a scale from 1 ("absolutely not relevant") to 5 ("highly relevant")

a) Return target	g) Exhaust gas limit values
b) Image goal (brand, product, driver image)	h) Product result
c) Sales target	i) Investment budget
d) Priorities of strategic objectives	j) Demographic target group
e) Turnover target	k) Fixed asset investment ratio
f) Development budget	

Figure 4: Mean value and standard deviation of the relevance of various key performance indicators for the development of the product strategy on a scale from 1 ("absolutely not relevant") to 5 ("extremely relevant")

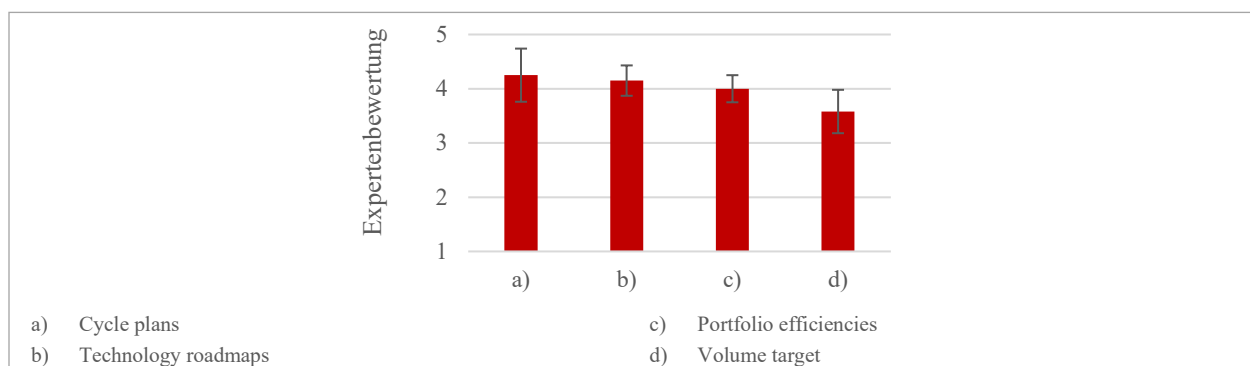|	
a) Cycle plans	c) Portfolio efficiencies
b) Technology roadmaps	d) Volume target

Figure 5: Mean value and standard deviation of the relevance of various key performance indicators for the development of the corporate strategy on a scale from 1 ("absolutely not relevant") to 5 ("extremely relevant")

4.2. System for a continuous strategy development and strategy review process

Based on the expert requirements presented and on the system for cross-generational product development according to Albers et al. and Marthaler et al., a system for a continuous strategy development and strategy review process was designed (Albers et al., 2018; Marthaler et al., 2019). The system recommends eight consecutive process steps and offers the choice between three different planning horizons: 0-2 years, 2-5 years and >5 years (see Figure 7, **first step**) (Kück, 2019; Lang, 2019; Sickinger, 2019).
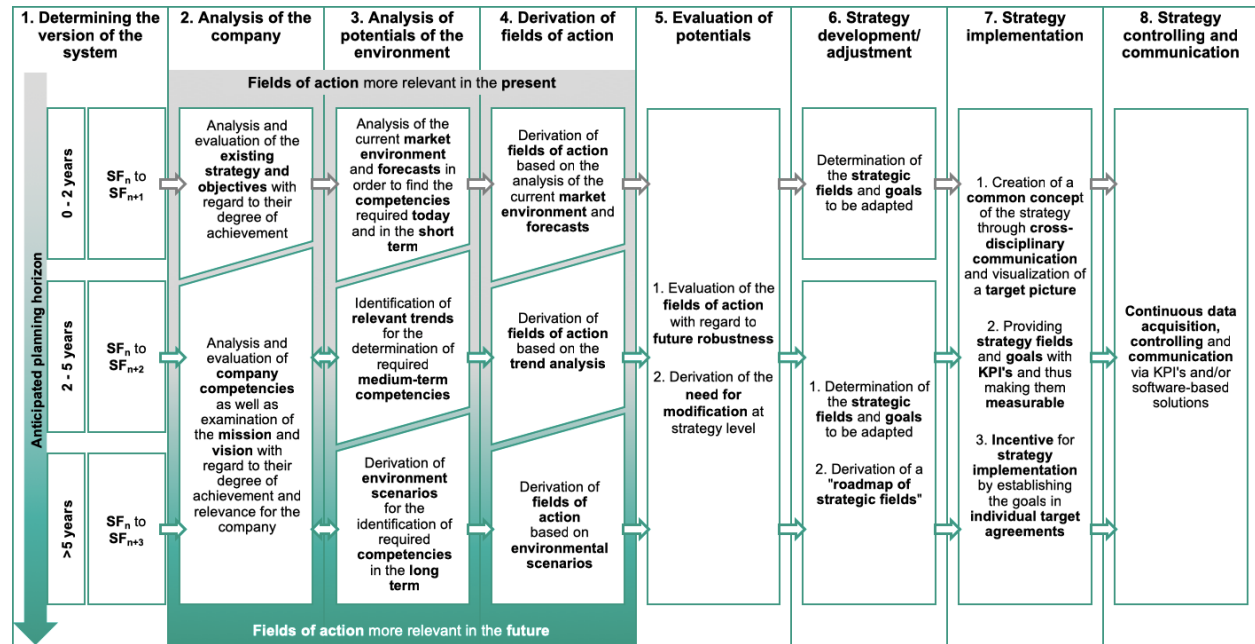
Figure 6: System for a continuous strategy development and strategy review process

In the context of this work, the planning horizon of 2-5 years is to be explained as an example, since it has the most interfaces with the other planning horizons mentioned. The **second step** comprises the analysis of the company. In the case of the 2-5-year planning horizon, corporate competencies are evaluated and the mission and vision are examined with regard to the degree of achievement and relevance for the company. Furthermore, the existing strategies and objectives with regard to the degree of achievement can also be reviewed here (interface to the planning horizon 0-2 years). As an example, an automotive manufacturer XY could be taken here, who with the help of this step has recognized that the corporate competencies as well as mission and vision are strongly oriented towards combustion engines and that the existing goals in this respect have a high degree of achievement. The **third step** comprises the analysis of environmental potentials, which, with the help of the identification of relevant trends, aims to find necessary competencies mainly in the medium-term in the planning horizon mentioned. Here, too, the interfaces to the other planning horizons can be used to find the competencies required in the short-term with the help of market environment analyses and forecasts, or the competencies required in the long-term with the help of environment scenarios. In this step, conclusions can also be drawn about the analysis in the second step. In relation to the exemplary automotive manufacturer XY, this would mean that it recognizes that the relevance of combustion engines is declining and that other drive technologies and digitization are becoming more relevant, but that no strategies and goals have been defined for this. Based on steps two and three, certain fields of action are derived in the **fourth step**. The automobile manufacturer XY listed here could therefore derive the following fields of action: 1. research and testing of alternative drive technologies for the existing product portfolio, 2. expansion of the share of electric vehicles by X%, 3. definition and expansion of digital business models in the finance department and in the after-sales department. The **fifth step** deals with the potential evaluation of the defined fields of action with the parameters of future robustness and need for change. Equation (1) represents the formula for future robustness $\delta(H_k)$. This results from the future robustness of the field of action in the different scenarios $H_{k,Szy}$. The respective scenario is represented by the y index. In principle, future robustness can reach values from 0 (low future robustness) to 4 (high future robustness).

$$\delta(H_k) = 4 - (\max\{H_{k,Sz1}, H_{k,Sz2},..., H_{k,Szy}\} - \min\{H_{k,Sz1}, H_{k,Sz2},..., H_{k,Szy}\}) \tag{1}$$

Equation (2) represents the formula of the need for change of a field of action $\gamma(H_k)$, which can reach a value from -4 (low need for change) to 4 (high need for change). $H_{k,n-1}$ represents the future robustness of the company competencies or the existing strategy and goals.

$$\gamma(H_k) = (\tfrac{1}{\gamma}\textstyle\sum_{y=1}^{Y} H_{k,Szy}) - H_{k,n-1} \tag{2}$$

The **sixth step** involves identifying and modifying the strategic fields and goals to be adapted. With the help of the previously calculated future robustness and the need for change, variation rules can be determined for the identified strategy fields and goals (see Figure 8). Future robustness and the need for change can be divided into two value areas: low [0;2] and high (2; 4] future robustness as well as low [-4;0) and high [0; 4] need for change. If we refer to the example with the car manufacturer XY, a possible characteristic for the fields of action 1, 2, 3 would be "3", "4" and "2" in relation to future robustness. With regard to the need for change at strategy level, a possible characteristic would be "2", "-2" and 0. From this, an early variation would be recommended for the 1st field of action, no variation for the 2nd field of action, and a late variation of the strategy fields and goals for the 3rd field of action.
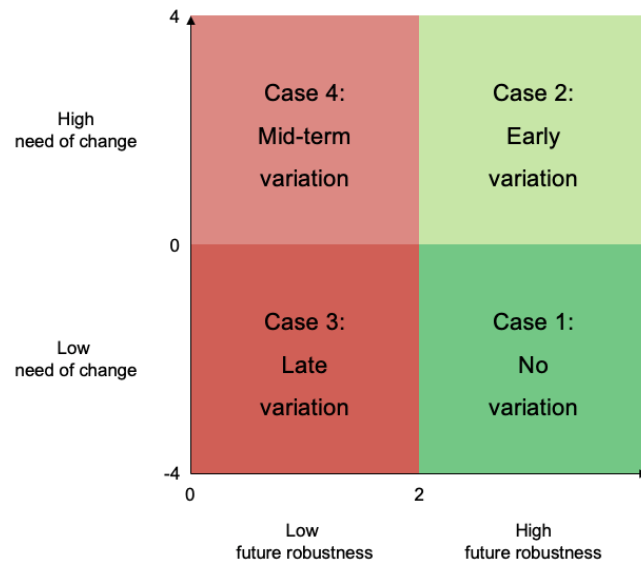

Figure 7: Rules of variation depending on future robustness and the need for change

In the **seventh step**, strategy implementation is achieved through a uniform understanding and interdisciplinary communication of the target picture, the determination of KPIs for strategy fields and targets, and the anchoring of the strategy and targets in the individual target agreement. The **eighth step** comprises strategic controlling with continuous data collection and communication using KPIs and/or software-based solutions.

5. Conclusion and outlook

The relevant literature and the study results of this work indicate that an overarching and systematic approach to the strategy development and review process is needed. The systematics developed within the scope of this work will initially be applied within Porsche AG and thus validated. In the next step, the validity of the system can be checked within other automobile manufacturers. It would also be important to examine the long-term usefulness of the system within the context of long-term studies. Furthermore, the studies carried out within the scope of this work were able to show that the lack of a group-wide system and communication leads to additional costs within the strategic analysis. An examination of the presented system for cross-company relevant aspects can contribute to the fact that such additional expenditures can be avoided in the future. Since this represents a major challenge due to the different strategic focuses, it would open up a large area for future research.

References

Aeberhard, K. (1996). *Strategische Analyse: Empfehlungen zum Vorgehen und zu sinnvollen Methodenkombinationen*. Bern ; New York: P. Lang.

Albers, A., Dumitrescu, R., Marthaler, F., Albers, A., Kuehfuss, D., Strauch, M., … Bursac, N. (2018). PGE-Produktgenerationsentwicklung und Zukunftsvorausschau: Eine systematische Betrachtung zur Ermittlung der Zusammenhänge. *14. Symposium Für Vorausschau Und Technologieplanung, Berlin, 8.-9.11.2018*, 23.

Berner, H., & Popp, R. (2012). *Zukunft und Wissenschaft: Wege und Irrwege der Zukunftsforschung*. Berlin: Springer.

Bishop, P., Hines, A., & Collins, T. (2007). The current state of scenario development: an overview of techniques. *Foresight*, *9*(1), 5–25. https://doi.org/10.1108/14636680710727516

Bogetoft, P. (2012). *Performance benchmarking: measuring and managing performance*. New York: Springer.

Chermack, T. J. (2007). Disciplined imagination: Building scenarios and building theories. *Futures*, *39*(1), 1–15. https://doi.org/10.1016/j.futures.2006.03.002

Cuhls, K. (2008). *Methoden der Technikvorausschau - eine internationale Übersicht*. Stuttgart: IRB.

Cuhls, K. (2012). Zukunftsforschung und Vorausschau. In W. J. Koschnick (Ed.), *FOCUS-Jahrbuch 2012. Prognosen, Trend- und Zukunftsforschung* (pp. 319–339). München: Focus Magazin Verlag GmbH.

Darkow, I.-L. (2015). The involvement of middle management in strategy development —Development and implementation of a foresight-based approach. *Technological Forecasting and Social Change*, *101*, 10–24. https://doi.org/10.1016/j.techfore.2013.12.002

Dess, G. G., Lumpkin, G. T., & Eisner, A. B. (2014). *Strategic management: text and cases* (7th ed.). New York, NY: McGraw-Hill Education.

Deutsche Akademie der Technikwissenschaften (Ed.). (2012). *Technikzukünfte: Vorausdenken - Erstellen - Bewerten*. Berlin: Springer Vieweg.

Dönitz, E. J. (2009). *Effizientere Szenariotechnik durch teilautomatische Generierung von Konsistenzmatrizen: Empirie, Konzeption, Fuzzy- und Neuro-Fuzzy-Ansätze* (1st ed.). Wiesbaden: Gabler.

Durance, P., & Godet, M. (2010). Scenario building: Uses and abuses. *Technological Forecasting and Social Change*, *77*(9), 1488–1492. https://doi.org/10.1016/j.techfore.2010.06.007

Durst, M., Stang, S., Stößer, L., & Edelmann, F. (2010). Kollaboratives Trendmanagement. *HMD Praxis der Wirtschaftsinformatik*, *47*(3), 78–86. https://doi.org/10.1007/BF03340476

Fink, A., Schlake, O., & Siebe, A. (2001). *Erfolg durch Szenario-Management: Prinzip und Werkzeuge der strategischen Vorausschau*. Frankfurt am Main: Campus-Verl.

Fink, A., & Siebe, A. (2016). *Szenario-Management: von strategischem Vorausdenken zu zukunftsrobusten Entscheidungen*. Frankfurt am Main: Campus-Verl.

Frese, E. (1993). *Grundlagen der Organisation Konzept - Prinzipien - Strukturen*. Retrieved from http://nbn-resolving.de/urn:nbn:de:1111-20111230756

Gausemeier, J., Fink, A., & Schlake, O. (1995). *Szenario-Management: Planen und führen mit Szenarien*. München: Hanser.

Gausemeier, J., Ovtcharova, J., Amshoff, B., Eckelt, D., Elstermann, M., Placzek, M., & Wiederkehr, O. (2016). *Strategische Produktplanung : adaptierbare Methoden, Prozesse und IT-Werkzeuge für die Planung der Marktleistungen von morgen*. https://doi.org/10.2314/GBV:870185012

Gausemeier, J., & Plass, C. (2014). *Zukunftsorientierte Unternehmensgestaltung: Strategien, Geschäftsprozesse und IT-Systeme für die Produktion von morgen* (2nd ed.). München: Hanser.

Ginter, P. M., & Duncan, W. J. (1990). Macroenvironmental analysis for strategic management. *Long Range Planning*, *23*(6), 91–100. https://doi.org/10.1016/0024-6301(90)90106-E

Godet, M. (2000). The Art of Scenarios and Strategic Planning. *Technological Forecasting and Social Change*, *65*(1), 3–22. https://doi.org/10.1016/S0040-1625(99)00120-1

Grünig, R., & Kühn, R. (2015). *The strategy planning process: analyses, options, projects*. Berlin: Springer.

Hahn, D., & Taylor, B. (Eds.). (2006). *Strategische Unternehmungsplanung - strategische Unternehmungsführung: Stand und Entwicklungstendenzen* (9th ed.). Berlin: Springer.

Hitt, M. A., Ireland, R. D., & Hoskisson, R. E. (2011). *Strategic management: competitiveness & globalization: concepts* (9th ed.). Australia ; Mason, OH: South-Western Cengage Learning.

Hofer, C. W., & Schendel, D. (1978). *Strategy formulation: analytical concepts*. St. Paul: West Pub. Co.

Horx, M. (2006). Das kleine Wörterbuch der Trendforschung. In *Trendforschung – Die Märkte von morgen entdecken* (pp. 91–102). Solingen.

Johnson, G., Whittington, R., & Scholes, K. (2017). *Exploring strategy* (11th ed.). New York: Pearson.

Kay, J. A. (1996). *Foundations of corporate success: how business strategies add value* (Paperback ed., reprinted). Oxford: Oxford Univ. Press.

King, W. I., & Cleland, D. I. (1987). Strategie Strength - Weakness Analysis. In W. I. King & D. I. Cleland (Eds.), *Strategie Planning and Management Handbook* (pp. 374–385). New York.

Knaese, B. (1996). *Kernkompetenzen im strategischen Management von Banken: Der 'Resource-based-view' in Kreditinstituten*. Retrieved from http://link.springer.com/openurl?genre=book&isbn=978-3-8244-6405-0

Langguth, H. (1994). *Strategisches Controlling*. Ludwigsburg: Verlag Wissenschaft & Praxis.

Macharzina, K. (1993). *Unternehmensführung: das internationale Managementwissen ; Konzepte, Methoden, Praxis*. Wiesbaden: Gabler.

Marthaler, F., Uhlig, E. O., Marthaler, P., Kühfuss, D., Siebe, A., Bursac, N., & Albers, A. (2019). Strategische Potentialfindung zur generationsübergreifenden Produktentwicklung mit langfristigem Zeithorizont: Eine qualitative Studie im Live-Lab IP – Integrierte Produktentwicklung. *5. Stuttgarter Symposium Für Produktentwicklung, Stuttgart, 15.-16.05.2019.*

Meyer, J., & Günther, E. (2011). Denken in Zukünften – Möglichkeiten der Szenariotechnik. In A. Karczmarzyk & R. Pfriem (Eds.), *Klimaanpassungsstrategien von Unternehmen* (pp. 202–221). Marburg: Metropolis-Verlag.

Meyer-Schwickerath, B. (2014). Vorausschau im Produktentstehungsprozess - Das integrierte Produktentstehungs-Modell (iPeM) als Bezugsrahmen für Vorausschau am Beispiel von Szenariotechnik und strategischer Frühaufklärung = Foresight for Product Engineering Processes - Using the Integrated Product Engineering Model (iPeM) to align foresight - the example of scenario technique and strategic early warning. *Karlsruhe.* https://doi.org/10.5445/ir/1000044947

Mietzner, D., & Reger, G. (2005). Advantages and disadvantages of scenario approaches for strategic foresight. *International Journal of Technology Intelligence and Planning*, *1*(2), 220. https://doi.org/10.1504/IJTIP.2005.006516

Mussnig, W., Zaglia, M., & Rausch, A. (2013). Die strategische Analyse als Basis der Grundstrategie. In W. Mussnig & G. Mödritscher (Eds.), *Strategien entwickeln und umsetzen speziell für kleine und mittelständische Unternehmen* (pp. 157–207). Wien: Linde Verlag GmbH.

Pearce, J. A., & Robinson, R. B. (2003). *Strategie Management: Strategy Formulation and Implementation* (8th ed.). Homewood.

Pearce, J. A., & Robinson, R. B. (2009). *Formulation, implementation, and control of competitive strategy* (11th ed., internat. student ed). Boston, Mass.: McGraw-Hill/Irwin.

Pieske, R. (1994). Benchmarking: das Lernen von anderen und seine Begrenzungen. *IO-Management Zeitschrift*, (6), 19–23.

Popp, R., Kreibich, R., & Schüll, E. (Eds.). (2009). *Zukunftsforschung und Zukunftsgestaltung: Beiträge aus Wissenschaft und Praxis ; [gewidmet Rolf Kreibich zum 70. Geburtstag]*. Berlin: Springer.

Porter, M. E. (1998). *Competitive advantage: creating and sustaining superior performance: with a new introduction* (1st Free Press ed). New York: Free Press.

Porter, M. E. (1999). *Wettbewerbsstrategie: Methoden zur Analyse von Branchen und Konkurrenten = (Competitive strategy)* (10., durchges. und erw. Aufl). Frankfurt am Main: Campus-Verl.

Porter, M. E. (2000). *Wettbewerbsvorteile: Spitzenleistungen erreichen und behaupten* (6th ed.). Frankfurt: Campus-Verl.

Proctor, R. A., & Hassard, J. S. (1990). Towards a New Model for Product Portfolio Analysis. *Management Decision*, *28*(3). https://doi.org/10.1108/00251749010141834

Rohrbeck, R., Arnold, H. M., & Heuer, J. (2007). Strategic Foresight in multinational enterprises – a case study on the Deutsche Telekom Laboratories. *ISPIM-Asia 2007 Conference*, 12.

Shetty, Y. K. (1993). Aiming high: Competitive benchmarking for superior performance. *Long Range Planning*, *26*(1), 39–44. https://doi.org/10.1016/0024-6301(93)90231-4

Siebe, A. (Ed.). (2018). *Die Zukunft vorausdenken und gestalten: Stärkung der Strategiekompetenz im Spitzencluster it's OWL*. Berlin: Springer Vieweg.

Stapenhurst, T. (2009). *The Benchmarking book: A How-to-Guide to Best Practice for Managers and Practitioners*. United Kingdom: Routledge.

Sternad, D. (2015). *Strategieentwicklung kompakt: eine praxisorientierte Einführung*. Wiesbaden: Springer Gabler.

Ulrich, H. (1990). *Unternehmungspolitik* (3rd ed.). Bern: Haupt.

Voigt, K.-I. (1993). *Strategische Unternehmensplanung: Grundlagen - Konzepte - Anwendung*. Wiesbaden: Gabler.

Volck, S. (1997). *Die Wertkette im prozeßorientierten Controlling*. Wiesbaden: Deutscher Universitätsverlag.

Warren, K. (1999). The Dynamics of Strategy. *Business Strategy Review*, *10*(3), 1–16. https://doi.org/10.1111/1467-8616.00107

Watson, G. H. (2007). *Strategic benchmarking reloaded with six sigma: improve your company's performance using global best practice*. Hoboken, N.J: John Wiley & Sons.

Weihrich, H. (1982). The TOWS matrix—A tool for situational analysis. *Long Range Planning*, *15*(2), 54–66. https://doi.org/10.1016/0024-6301(82)90120-0

Welge, M. K., & Al-Laham, A. (2003). *Strategisches Management* (4th ed.). Wiesbaden: Gabler.

Wulf, T., Stubner, S., Meißner, P., & Brands, C. (2012). Szenariobasierte strategische Planung in volatilen Umfeldern. *Controlling & Management*, *56*(S2), 34–38. https://doi.org/10.1365/s12176-012-0380-z

Yüksel, I. (2012). Developing a Multi-Criteria Decision Making Model for PESTEL Analysis. *International Journal of Business and Management*, *7*(24). https://doi.org/10.5539/ijbm.v7n24p52

Source list

Kück, P. (2019, April). *Expert interview: Head of Corporate Strategy Department - Porsche AG*.
Lang, M.-S. (2019, April). *Expert interview: Project Manager of the Corporate Strategy Department - Porsche AG*.
Sickinger, N. (2019, April). *Expert interview: Departmental Strategist of the Production Department - Porsche AG*.

Supervised study research project, diploma, bachelor and master thesis

Rapo, A. (2019). *Analyse und Adaption von Methoden der Strategieentwicklung zur Integration eines kontinuierlichen Strategie Review-Prozesses am Beispiel der Sportwagenentwicklung*. IPEK, Karlsruhe Institute of Technology, Master thesis.

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