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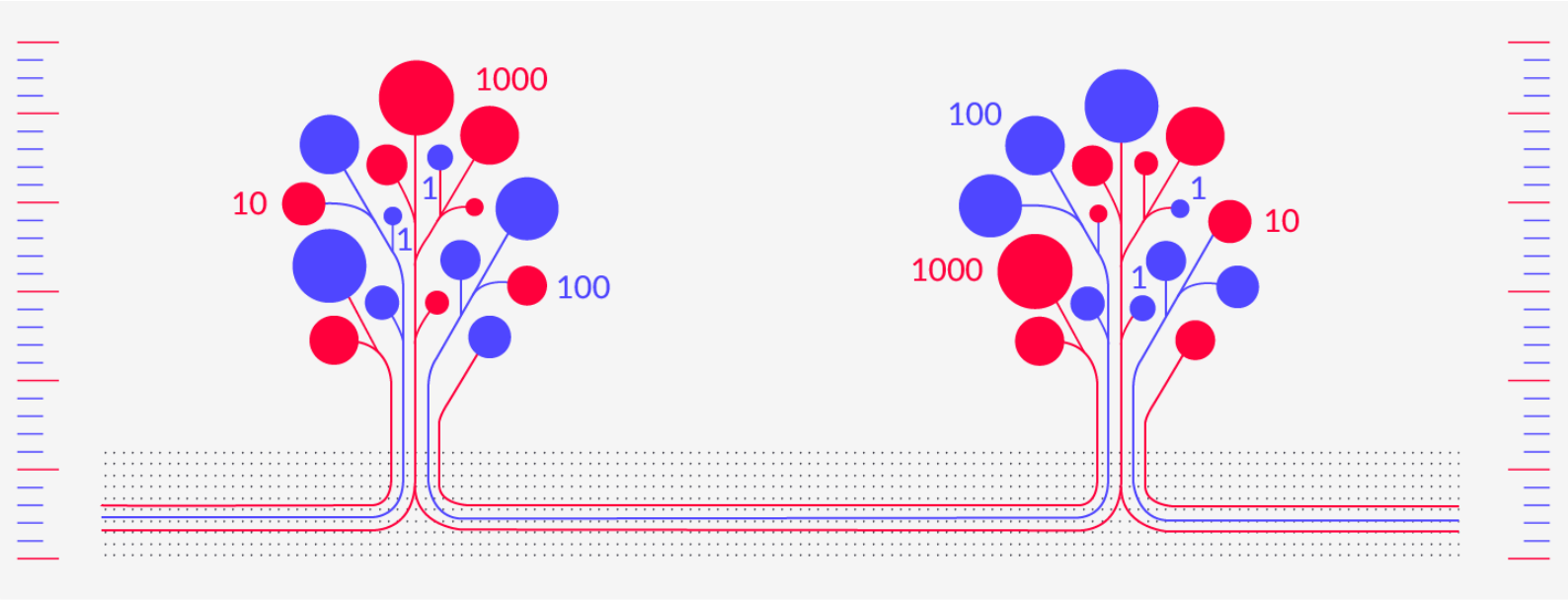

Foresight with System Dynamics

Quantification underpins strategic decisions about markets of the future

By Holger Glockner

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1 / Introduction

An important objective for our clients is to understand better future market developments – this requirement plays a central role in almost all our foresight projects. Strategic foresight helps to orientate, prepare and safeguard decision-making processes. As part of this, the ability to anticipate changes in the market is a crucial pre-requisite. What are the risks to our existing business? Is our market ready for a disruption?

In the context of innovation foresight, attention is generally focused on new markets. How can we grow in the future? What innovations will we use to impress customers of tomorrow? In this regard, discussions are often had about the potential business areas where the growth market is only perceivable in the distance. Or, it concerns market opportunities for radically new or improved products and services, or even those that are yet to be introduced.

2 / Explaining markets of the future in numbers

How can we find well-founded answers to the foregoing questions that will allow our clients to make better decisions? Traditionally, strategic predictions about the future had tended to concentrate predominantly on qualitative analysis using trends and scenarios. This approach has proven extremely successful and will remain indispensable in the future. It is not for nothing that almost all large companies have a department that deals with foresight to some extent. The qualitative methodological approach highlights new 'strategic issues', meaning future opportunities can be identified and – more importantly – enabling companies to justify why it makes sense to pursue certain topics.

Over the past ten years, however, our consultancy work has shown that the qualitative approach alone cannot meet the needs of a numbers-driven business. In order to justify the long-term choice of heading and to underpin investment decisions, more is required: the markets of tomorrow must be explained in numbers and made more precise and comprehensible. There is a need for more reliable, market-led models that 'concretise' findings about the future.

In many companies, the requirement for quantitative findings is met by traditional market forecasts. This approach, however, has

its boundaries because it does not adequately take into account possible changes in the market environment, so it is, at the end of the day, little use in predicting the future. The future hides many surprises; it is based on complex interplays between several different factors. Simple growth models do not do justice to this multidimensionality. This is particularly true in times where market environments are changing more quickly and more intrusively than ever before. Traditional forecasts are, therefore, unsuitable for depicting long-term market developments in a dynamic environment.

3 / Systemdynamic models of the future

Whereas traditional strategic predictions cannot deliver precise numbers on account of their qualitative methodologies, quantitative results from classic forecasts do not take into account the fact that the future cannot be calculated using isolated market indicators. The system-dynamic foresight models, which we have been using with our clients for many years, offer a more sensible alternative.

The 'system dynamics' approach was developed in the 1950s at MIT with the aim of enabling an holistic assessment of complex dynamic systems. It is suitable not just for understanding better the complex effects of one's own decisions, but also for determining what consequences arising from changes outside one's own control could have. The key is networked thinking. The system-dynamic approach is based on the identification of causal relationships and closed effectual chains (so-called 'feedback loops'). This pushes non-linear changes to the fore. Such changes are typical of complex systems and that is why their behaviour is often so surprising and unexpected for people.

System dynamics is based on tried-and-tested methods and software tools. As part of our consultancy activities, we have further developed the approach to meet the particular requirements of strategic foresight. Since even classic future research (particularly the scenario method) is, at its heart, based on interlinked thinking, it is directly compatible with system dynamics. It allows, for example, qualitative scenario assumptions to be transferred to a qualitative level. In addition, we often use data models from lar-

ge providers, whose underlying assumptions we vary systematically in our system-dynamic model. Thus, a broad spectrum of computational steps are represented in the qualitative scenarios.

It is typical of the system-dynamic approach that working with the model delivers standalone and interesting results. The feedback loops that are considered explicitly from a system-dynamic perspective result in more profound insights into the unexpected 'future earthquakes' – such as when prices for a particular product fall below specific conditions; or, conversely, an attractive new business area rapidly develops into a mature market.

4 / Fields of application

In consultancy practice, we differentiate between two fields of application for the system-dynamic approach: system-dynamic market modelling and quantification of growth areas, or rather product and service innovations.

4.1 / **Market modelling**

System-dynamic market modelling explores how our clients' existing markets can be depicted over the medium to long term under the influence of environmental developments. The aim is, in particular, to bring market risks, particularly potential disruptions and tipping points (i.e. erratic changes in market value-creation systems) into view and to understand their impact on KPIs (e.g. price and capacities) in various market segments. Of particular interest in this regard is the depiction of potential reactions from market actors at each stage of the value-creation chain. In addition, we show the interplay between the market value-creation chain and market mechanisms within the model; we also document external influences and quantify the impact of different environmental scenarios on market development.

4.2 / **Quantifying growth areas**

A key outcome from our innovation foresight projects is a portfolio of potential growth areas within or outside a company's core day-to-day business. Often, our clients approach us with ideas for new business areas and look to underpin their assumptions. Equally, companies are sometimes even discussing specific product and service innovations whose potential is, however, unclear. In all three cases, our modelling helps to gain a nuanced quantitative perspective for one or more growth areas (at a market or product level). Does it really make sense to invest? When will the market, which is currently still in its infancy, reach a relevant size? Are the upsides actually realistic? What level of future sales does our product idea hold? How will our market-entry strategy effect the speed of differentiation?

In order to answer these questions, we determine the factors that influence future market developments and create a database that can be used to simulate future changes in demand. Using variations for certain influences, we conduct a 'robustness check' that shows how stable the underlying future demand is. This allows us, for example, to show the specific influences of future regulatory measures on market size. As a result, system-dynamic modelling avoids falling into the trap of 'wishful thinking' when evaluating strategic innovation projects.

5 / Success factors

In our experience, the success of the system-dynamic approach lies, in essence, in an interplay between four factors. Firstly, the link between qualitative and quantitative analysis. A qualitative view becomes more detailed and clearer thanks to qualitative scenarios. Secondly, the well-founded, yet non-academic approach. Our clients do not have time for research projects that last years because markets do not stand still. Quality and speed are central to our projects thanks to our use of tried-and-trusted methods and processes. Thirdly, we place great store by transparency. The assumptions used in our model are intelligible to all those involved in the project; what is more, our clients can use the model for their own investigations. Fourthly, the system-dynamic analysis of the future is undertaken in close collaboration with the client. Since the results of the project are developed in consultation with clients and involve existing client knowledge, they are directly relevant for practice.

6 / Practical example: the future of Smart Home

A practical example of the use of system-dynamic future analysis is the Smart Home model that Z_punkt developed as part of its own market study. Currently, there are (again) huge expectations for the Smart Home market. For example, there are forecasts that predict the number of Smart Home households will grow from 300,000 in 2015 to 2,400,000 in 2020. At the same time, the market is characterised by a higher degree of complexity. Future developments will be determined by a variety of factors that have not been adequately considered in such calculations. From a commercial perspective, the objective is to determine what drivers will affect demand for Smart Home solutions, where the risks are to be found, when it is the right time to enter the market, which strategies and business models should be used to target the market; and what level of sales can be achieved. This is where the system-dynamic model can provide a solid basis for decision-making. It takes into account environmental factors, such as demographic shifts, changing household sizes, alterations to security requirements and the predilection amongst architects and investors for Smart Home solutions. As a result, it produces an interlinked understanding of the market that can be depicted in a number of scenarios, which are underpinned by various model calculations. This enables the development of ro-

bust strategies that can succeed in a variety of market situations. This increases the ability of a company to react to unexpected developments.

About the author

Holger Glockner has been working in the foresight sector for fifteen years, of which more than eight have been spent in a senior role at Z_punkt. He has provided guidance on numerous projects for clients from a range of sectors, including mobility and logistics, chemistry and mechanical engineering. Holger Glockner studied political science, sociology and business administration; today, he is involved in training the younger generation of foresight experts as a visiting lecturer for the Master's degree in Future Studies at FU Berlin.

About Z_punkt

Z_punkt The Foresight Company is a leading international strategy and foresight consultancy that focuses on strategic future issues. It translates findings derived from trend and futures research into practical advice to facilitate strategic management. Using corporate foresight processes, Z_punkt helps companies to make the most of sustainable future markets.

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