The Panoramic Lens Model

Assessment of economic, industrial, and social factors to support enterprises in realizing the urgency of a digital transformation

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Abstract—**Digitalization represents increasing opportunities and challenges for enterprises. One challenge is to adequately evaluate their environment and its influence towards their strategy. This paper describes the Panoramic Lens, a new model that assesses and rates social, economic, and environmental factors of influencing the digital transformation of an enterprise. The framework thereby fulfills the requirements of being conclusive, traceable, repeatable, measurable, industry ambiguous, and easy to use. The Panoramic Lens Model has been developed by assessing current existing frameworks based on their strengths and weaknesses and their effectiveness in fulfilling these requirements. The model thereby combines the strength of several assessed frameworks and fuses them into one simple to use model, which fulfills all requirements.**

Keywords—ecosystem analysis; economic ecosystem; industrial ecosystem; social ecosystem; digitalisation; digital transformation

I. INTRODUCTION

Digitalization is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business [1]. Digital transformation is the profound and accelerating transformation of business activities, processes, competencies, and models to fully leverage the changes and opportunities of digital technologies and their impact across society in a strategic and prioritized way, with present and future shifts in mind [2].

Another definition of digital transformation is "the use of technology to radical improve the performance or reach of enterprises [3]." It refers to the optimization of organizational processes with the aim of operational excellence and adapting the business model to digitalized environments [4]. Adapted or innovative business models are an outcome of capturing the opportunities the digital age has to offer such as the use of data and result in a higher value for the customer [5].

Digitalization connects digital information with new technologies which are business relevant or yet arising as new digital business enablers. In order to seize the opportunities of such digitalization, digital transformation is required in order to transform business processes, business organisation, and business models, while it has a huge impact on businesses and society [2].

A research revealed that the challenges of digital transformation include points like [2] [6-8]:

- Lack of perceived urgency to begin the transformation
- Coordination and leadership issues, such as having unclear or conflicting roles, responsibilities, and goals
- Ineffectiveness of IT to respond to change and limiting legacy systems
- Unclear business case and not enough funding
- Lack of a vision or failing to communicate it
- Cultural issues and missing skills
- Lack of collaboration and segregated business units

The first one is the most prominent one. It is important for companies to always be aware of the current circumstances in highly competitive markets and to analyse whether a trend can be ignored or whether the company ought to change and adapt its strategy accordingly [2]. Both digitalisation and digital transformation can bring disruptive changes with a potential long-term impact on society [8]. It can also facilitate internal efficiency and change the operational environment and internal functionalities [6]. Moreover, it can lead to the emergence of new business opportunities, drive change within the value chain, or make existing businesses obsolete [2]. Hence, the analysis and the understanding of their economic and social environment related to the digital transformation is crucial for enterprises.

The main aim of this paper is to introduce the Panoramic Lens as a model, which allows enterprises to analyze and understand their economic and social environment related to the digital transformation. The aim of the Panoramic Lens analysis tool, which is based on the Panoramic Lens model, is to provide information on social, economic, and competitor trends and their individual relevance to the respective company. By analyzing the trends, the top management can understand in a facilitated manner a new constellation of the company, born out of the necessity of the digital transformation. Thus, the output of the Panoramic Lens is a significant foundation for the definition of the digital strategy.

To develop the tool the following questions were addressed in a first step:

- What criteria does a framework need to fulfill to adequately describe the impact of the social and economic environment on the digital transformation of an enterprise?

- What frameworks do exist that describe the social and economic environment of a company and what are their strengths and weaknesses?

- Which of the previously defined criteria do the existing frameworks fulfill?

The paper is organized as follows: first, the applied methodology of this research paper, followed by the requirements for the developed Panoramic Lens are elaborated. Afterward, an overview and comparison analysis of different frameworks and models is given, which were used as a starting point to develop the Panoramic Lens Model. Then, the Panoramic Lens itself is described in detail followed by the question catalogue used for the tool. Chapter V gives deeper insights into the tool. After that, the usage of the Panoramic Lens is described. The conclusion summarizes up the paper.

II. METHODOLOGY

The tool was designed by applying the design science research method [16]. Based on interviews with enterprises in Switzerland, the set of requirements were defined and the scope of the project was set. Out of these high-level requirements, more specific requirements were formulated and agreed on. In a second step, a literature review was conducted to analyze the existing frameworks that can provide insights into the economic and social landscape of an enterprise. In a third step, using design thinking mechanics a model was created which combines various elements of existing frameworks and combines them into a new model.

Since the applied research method is design science, the project was divided into four phases: awareness, suggestion and design, evaluation, and conclusion. In the awareness phase, two research question were assessed and answered, which are: what are the requirements of the tool and what frameworks are existing today. In the suggestion and design phase, a new tool was created called Panoramic Lens. Thereby, answering research question number three, which assesses the question if it is possible to design a tool that can adequately describe the economic and social landscape of an enterprise. In the third phase, the project team had a meeting with the client's customer to evaluate the tool regarding its benefit to the customer. In the last phase, the insights of the previous phase were used to form a conclusion.

III. REQUIREMENTS FOR THE PANORAMIC LENS

The goal of the model is to put environmental factors, such as social and economic factors, in perspective of an enterprise. The model should be able to assess which factors have a high impact on the company and are or will be topics that have an influence on the way the company conducts business. The outcome of the model will be a rating of influencers of the social and economic environment that have an impact on the digital transformation of an enterprise.

Before designing the model, a list of requirements that must be fulfilled, based on interviews with a number of companies in Switzerland was conducted:

- *Conclusive*: As the model should help enterprises to realize the urgency of the digital transformation based on an analysis of the economic and social environment of the enterprise, it is vital to include all important aspects.

- *Traceable and repeatable*: For the model to be effective, it should also be traceable. This means that in the end, each factor, which is included in the model, can be traced back and it can be evaluated why it is contained within the model. The model should also be repeatable for it to be consistent. Meaning that each time the model is used with the same amount of information, the outcome will be the same as well. This makes the model comparable to other later or earlier conducted iteration of the model. In this way, further information and insights can be won out of the model if chosen.

- *Measurable*: To provide the highest possible outcome of information and insight, all factors contained in the model must be comparable to each other. The factors must be assigned to a logical value. This requires the relation of the factors to indicators, which are based on numerical values or associated values derived from a set of terms.

- *Industry ambiguous*: The model should be used from enterprises operating in different industries without losing its effectiveness or accuracy. Besides some generic indicators, the model should be extensible with industry-specific ones.

- *Ease of Use*: As enterprises, especially the small and medium ones, have time limits and not always the necessary skills to investigate on the digital transformation; another requirement for the model is for it to be easy to use.

IV. OVERVIEW AND COMPARISON OF ANALYZED FRAMEWORKS AND MODELS

This chapter describes six existing frameworks and methodologies which have been used as the foundation to develop the Panoramic Lens.

Porters Five Forces model is based on the understanding that a corporate strategy should address opportunities and threats in the company's environment [9]. It is based on five competitive forces, which can be found in any industry and determine the intensity of competition and the attractiveness of an industry in terms of profitability [10].

The Value Net Model developed by Adam Brandenburger and Barry Nalebuff is based on the main idea that business is like a game with several roles assigned to act and to deliver value [11]. The model enables the identification of the key players among the customers, suppliers, competitors, and complementors. Within the Value Net, a complement is defined as any other product or service which adds to the attractiveness

of the subject product. The model encourages cooperation with other players to expand the market and the success of an enterprise. It also helps to explore the entry into new products, services, and industries [12].

The SWOT analysis framework is often used as the basis for the strategy development. It assesses strengths (S) and weaknesses (W) of an organization and the opportunities (O) and the threats (T) in the environment. The identified factors are paired to create new competitive strategic initiatives. For example, the S-O strategies focus on the company's strengths, where W-O strategies address the weaknesses a company must overcome. S-T strategies identify ways to use a company's strengths against external threats and the W-T strategies the risks against external threats [12, 13]. Individuals are often influenced by their own experiences and convictions and neglect or refuse to recognize the critical changes in their environments. The SWOT framework allows overcoming this tendency [12].

The Force Field Analysis is a step beyond a traditional list of plus and minus points towards a decision or positive and negative aspects of a project. The tool is useful for making decisions by analyzing the forces for and against the change and providing information about the reasons for your decision. The force field analysis assigns relative numbers to each of the discrete factors to determine the state of equilibrium of a problem [12]. Once you have found the state of equilibrium you can define the desired state and create a new influencing factor and strengthen or weaken existing factors.

The Consumer Trend Canvas is a more specific framework inspired by the Business Model Canvas from Alexander Osterwalder [14]. The goal of the Consumer Trend Canvas is to be simple to use as well as to support the understanding of consumer trends. It can also be used to launch successful consumer-facing innovations.

The PEST / STEEPLE (Political Economic Social Technological / Social Technological Economic Ethical Political-Legal Environmental) framework is a popular method for analyzing the company's activities in relation to external factors that have an influence on the company. The content of each factor includes different assessment criteria of the external environment and highlights the most active players with the most significant impact on the company. Such an analysis can be used to determine the main influencing factors [3]. It also helps to predict what might happen in the future and creates insights into the environment of an organization. Once these environmental factors are identified and analyzed, an organization is in a better position to plan effective strategies.

To compare the frameworks with each other, an overview was created as Figure 1, showing their general strength and weaknesses as well as a brief description of their intended use.

Model	Intended use	Strength	Weakness	Key Parts and takeaways
Porters Five Forces	Industry environment description	Covers the industry forces which a company is exposed to.	Limited to industry characteristics without evaluation of the dimensions according to their importance	Taking Industry as a key factor in- to account for a company to position itself
The Value Net	Identifies the key players among customers, suppliers, competitors, complementors	Acknowledges the five forces and creates a more detailed, ranked version of the five forces.	Limited to industry characteristics	Taking Industry as a key factor in- to account for a company to position itself
SWOT Analysis	Description of the internal and the external environment of a company	Definition of strategies to address opportunities and threats	Neglects long-term vision of threats and opportunities and a highly subjective situational analysis	Classification of the immediate environment into threats and op-portunities
Force Field Analysis	Assesses the forces which act upon an aspect	Focus on the environment and forces outside of a company's control	Can only focus on one aspect at a time	Forces act upon a company outside its boundaries
Consumer Trend Canvas	Analyzes consumer trends and evaluates their relevance	Evaluates trends and as-sesses their importance for the business	Is limited to one trend at a time which makes it slow	Focus on the Consumer trends
STEEPLE	Covers the environment of a company sorted by cat-egories	Covers all important aspects of the environment having e an impact on the company	Does not rate the various aspects and also does not evalu-ate the consequences	Various categories which cover most of a company's environment

Fig. 1. Comparison of different ecosystem frameworks

The result shows that each of the frameworks is strong in its own department. When comparing them for the intended purpose of describing the environment of an enterprise it becomes clear that all of them lack certain aspects, as demonstrated in Table 1.

TABLE I.   COMPARISON OF DIFFERENT ECOSYSTEM FRAMEWORKS BASED ON THE PREDEFINED REQUIREMENTS

	Conclusive	Traceable & Measurable	Industry Ambiguous	Easy to use
Porters Five Forces			✓	✓
The Value Net	✓	✓	✓	
SWOT Analysis				✓
Consumer Trend Canvas			✓	✓
Force Field Analysis	✓		✓	
STEEPLE	✓		✓	

V.   THE PANORAMIC LENS

The Panoramic Lens is designed to combine several aspects of other frameworks and to fulfill the previously mentioned requirements. Figure 2 shows the big picture of the Panoramic Lens model to which the following subchapters are referencing.
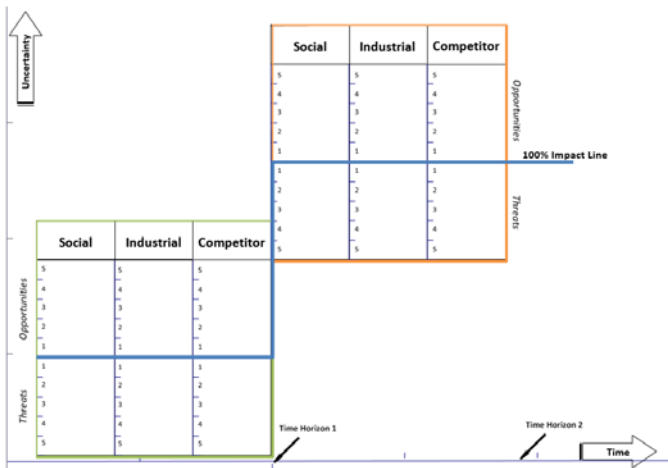
Fig. 2. The Panoramic Lens model

A. Two Dimensional Coordinate System with the Containers

The two-dimensional coordinate system reflects the aspect that over time the uncertainty for forecasts increases and predictions become more inaccurate as illustrated in Figure 3.
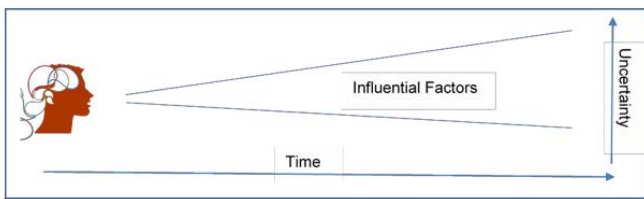

Fig. 3. Inverted cone of uncertainty

The whole system consists of two so-called containers, illustrated with the green and orange boxes in Figure 2. The containers reflect the time horizon for the influencers. The green box reflects the following time horizon: present until two years from now. The green box takes also into account factors, which will have an impact in the future, in two to five years. These containers also contain the different dimensions, which are being assessed.

So, the two-dimensional coordinate system is based loosely on the business model canvas which contains different fields, which reflect and relate to each other [15]. Theoretically, it is possible to add more containers or increase the time span of the containers. With an increase of time, uncertainty also increases and the validity of the model decreases. This is a trade-off, which must be made when defining the time horizon. This issue can also be addressed by increasing the multiplicator, which is described in this chapter's subchapter E, for the model to maintain its validity. Setting a high multiplicator the container will become redundant.

B. Dimensions and the Influential Factors

Each container consists of three dimensions: the social, the industrial and the competitor dimension. Each of these dimensions is divided into two sub-dimensions: opportunities and threats. Therefore, each container includes six shapes. Each shape consists of five influencers, which allow ranking the opportunities and the threats to each dimension. The design of the shapes is inspired by the SWOT Analysis where the aspects of opportunities and threats are derived from.

It is important that influential factors are only present in one dimension (either threat or opportunity), as the model otherwise does not function as anticipated. All influential factors exist only inside these dimensions. Also, the scales cannot be extended.

When enterprises use the Panoramic Lens Model to assess the economic and social dimensions, they are able to rank the influential factors (respectively for opportunities and for threats).

C. Influential Factors

The influential factors, which are analyzed, determined, and ranked by the Panoramic Lens Model, are based on questions from the question catalogue. These questions in return are derived from models and frameworks like STEEPLE, as well as other industry-specific characteristics, which deal with environmental factors that have an impact on the company. Afterward, these questions are associated to one of the three dimensions of the container (social, industry, competitor). To advance through the process in an efficient manner these questions are collected as a list of questions. The list can be expanded and complemented as more iterations have been made. The questions are then transcribed into influencers. These influential factors should be quantifiable with a KPI, which can be assessed and deemed as a threat or opportunity.

D. 100% Impact Line and Pre-Ranking System

The 100% impact line represents the border of the highest impact a factor can have on a company. Factors, which are included in the dimension, are scaled according to that line. In other words, factors being located near the line have a higher impact on the examined business than factors that are further away. The scale inside the dimension represents this with the values ranging from one to five, with the factor located at one having the highest impact. There is a restriction given that only one factor per number is allowed. The factors can only be on that specific number in either opportunity or threat. By doing so, the factors are already pre-prioritized. The reason for the limitation to five is that a company is only able to address a limited number of factors.

E. Score Calculation and Final Ranking

With the pre-ranking system, a simple ranking of influential factors has already taken place. This does not take time, uncertainty, or the potential greater impact of other dimensions located inside the container into account. Different multipliers are being applied to identify the factors with the highest urgency. This results in each of the dimensions receiving a multiplier as well as each of the containers. These multipliers must be discussed at the beginning before ranking the factors and they differ from company to company.

It is recommended that the multipliers for the dimension start with being social as the highest and competitor as the lowest. For the dimension industry, the multiplier should be somewhere in between the latter two. The reason for this is that a company cannot influence the social landscape it finds itself in. But the

industry landscape can be influenced by lobbying or combined efforts of companies inside the industry. On the competitor dimension, a company can have the highest amount of control as it can influence price, quality, and other factors by lowering or increasing its own price and quality. The biggest threat or opportunity emerges from the social dimension thus, receiving the highest multiplier.

Each container also receives a multiplier, as predictions over time become more uncertain. It would be imprecise to weigh factors on the two-year horizon equally to the factors on the five-year horizon.

In the end: the higher the calculated value is, the greater is the need for the company to consider that factor.

The prioritization of the influences can be done directly on the table or it can be transferred to the tool afterward. This depends on the workshop method chosen by the workshop coach. As it has the same appearance as the framework, the tool should become much easier to use as soon as the framework is fully understood.

An illustration of the multipliers is shown in Figure 4, to which the legend looks as follows:

1. Factor: This factor weights the near and distant future. It is defined by the coach.

2. Category Rank: Rank 1 to 3 is given for the near and far future. Rank 1 is given to the most important category and Rank 3 the least important. This is to be assessed by the customer.

3. Influencer Rank: The previously created prioritization is transferred directly to the tool.
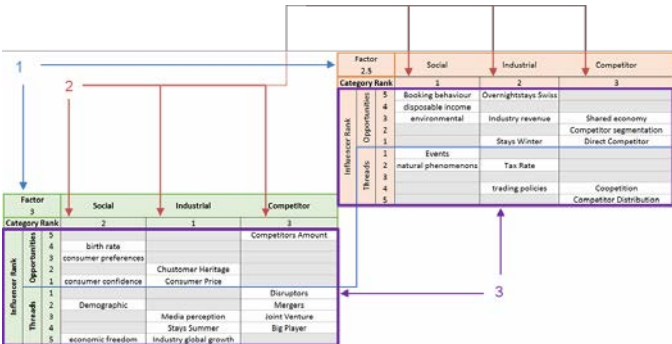

Fig. 4.   Description of a Panoramic Lens example

VI.   QUESTION CATALOGUE

The Panoramic Lens Model is supported by the Panoramic Lens Question Catalogue. The purpose of this question catalogue is to guarantee the model's requirements and assures experts and clients the maximum and optimal output from the framework.

The question catalogue contains a range of questions, which are measured and turned into influencers. An influencer contains a question that describes the content of the influencer itself, a measurement that should help to assess the impact of the influencer as well as a data source that delivers the current data

for the measurement. In addition, the question catalogue states the relevance of an influencer towards a certain industry as well as they are grouped into the three categories: social, industrial, and competitor.

The predefined question catalogue determines a various range of influencers that occur in an economic environment. Based on the questions, a possible measurement of the influencers is defined. By providing the customer this set of different influencers, the model guarantees various aspects, which are preconditions for the model:

- *Conclusive*: The possible influencers, which should be filled in the model, are predefined and do give to the user a set of possibilities. This set guarantees that all the addressed categories and aspects of the model are considered and it helps the user to see the complete ecosystem.

- *Easy to use*: The predefined influencers, supported by a question, a measurement, and a source of data is helping the user to decide quickly the impact on its business. The model can be used to efficiently assess the ecosystem without any pre-work from the user.

- *Traceability*: The question catalogue delivers data sources that allow measuring the influencers. By doing so, it guarantees the traceability of decisions since they can be made based on actual data and not only out of gut feeling.

The Panoramic Lens Question Catalogue is meant to be a dynamic supporting tool for the model itself. This means that the questions and influencers defined as the prototype of this project work are not static and thus, they need constant development.

The idea behind the catalogue is that the owner or provider of the Panoramic Lens Model is continuously developing and maintaining the question catalogue and keeping it up to date. Questions and influencers that are never or rarely assessed by users of the model can be deleted. As soon as new influencers appear, they should be added to the question catalogue. Only if the question catalogue is continuously maintained and optimized, it can fully serve the model with its purpose and its benefits.

For demonstration purposes, a prototype of a question catalogue has been developed with a focus on the evaluation of the hotel sector.

VII.   BEHIND THE FRAMEWORK

To obtain a clear statement of our framework after working out the prioritization, the result must be presented in a suitable form.

A.   Practical Guidance

Before the workshop, the workshop coach defines the factors for the near and distant future. These can be seen as a ratio. The first step of the customer during the workshop is to classify the categories towards each other. This must be done for the near and distant future. Subsequently, the influencers can be entered.

Once this step is completed, the automatically evaluated results can be viewed.

The final result is a heat-map dashboard, illustrated in Figure 5, which shows the most relevant opportunities and threats, based on the entered data within the tool. The workshop leader can create further diagrams or graphs with the existing analyses, but usually, the user is overwhelmed with too many dashboard illustrations on which similar information can be found. Thus, the heat-map dashboard is seen as a good instrument to only deliver the most relevant information to the user, which is which are the most relevant opportunities or threats to the individual company. In order to define how many entries should be displayed on the dashboard, the workshop coach can select the number of influencers, which can be displayed at once. The heat-map dashboard is set-up as follows: the bigger the box is, the more important the factor of that box is for the company. If there are no obvious differences in the size of the boxes, the coach can also empirically define a suitable size for the factor in the representation.
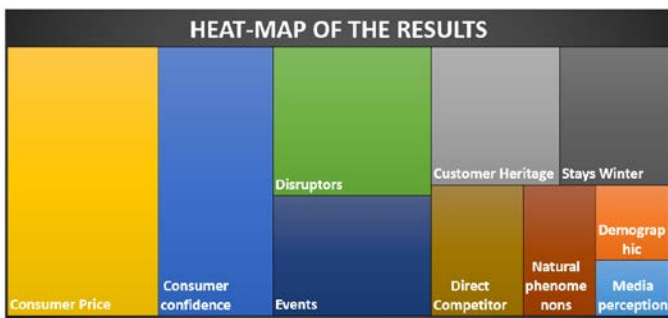

Fig. 5. Dashboard example of an evaluation result from the Panoramic Lens

B. Results

As there is already benchmark and or expert data available, the self-developed classification and prioritization can be compared by using spider diagrams. In this example, shown in Figure 6, the near and distant future are considered separately. The categories are divided into threats and opportunities and the calculated impact is displayed. In this case, the self-assessment is compared with the benchmark. With the help of different approaches, countless analyses and comparisons can be made in different forms. These must be defined and adjusted by the workshop coach in advance and the coach needs to adapt it as deemed necessary.
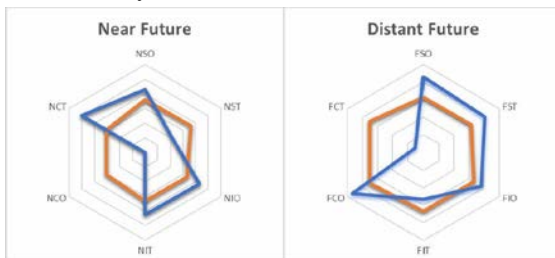

Fig. 6. Comparison example with a spider diagram

The result is the Blackboard showing the strongest influencers, whether as a hazard or an opportunity. The stronger an influencer is, the larger it is displayed, as shown in Figure 5.

If the topics are too irrelevant, and thus too small, they are hidden on the dashboard as they are no longer in the focus area of the view.

C. Calculation and Data Handling

Each cell has a unique name. This name designates the cell and is later replaced by an influencer or left blank. The structure of the cell name follows the following logic:

N or D	for near or distant future
S, I or C	for social, industrial or competitor
O or T	for opportunity or threat
1 to 5	for the influencer ranking

The initial value for the calculation is the definition of the factor, category classification, and influencer classification. As soon as these have been carried out, the following calculation steps are performed

$Y = Value\ for\ analysis$

$F = Factor$

$R_I = Influencer\ Rank \leftarrow Opportunities\ as\ a\ positi$

$V_{Max} = Maximum\ muliplied\ Value$

$V_{Max_1} = Factorized\ V_M\ to\ a\ maximum\ value\ of\ 1$

$$V_M = \begin{cases} R_i^2 \times R_C \times F, & R_I < 0 \\ R_I^2 \times R_C \times F \times (-1), & R_I \geq 0 \end{cases}$$

$$V_{Max_1} = V_M \times \frac{1}{V_{Max}}$$

$$Y = \begin{cases} (V_{Max_1} + 1)^2, & V_{Max_1} < 0 \\ (V_{Max_1} - 1)^2, & V_{Max_1} \geq 0 \end{cases}$$
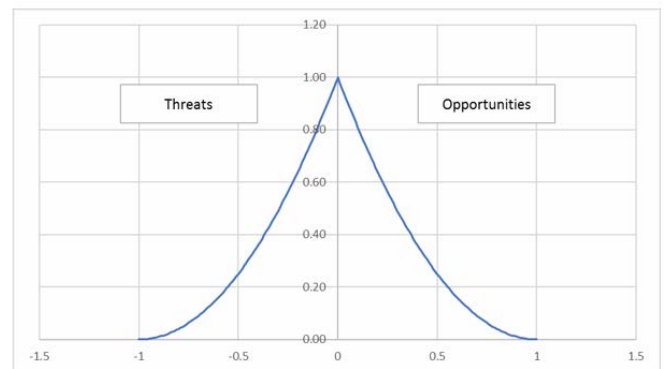
Fig. 7. Representation of the calculation

Fig. 8. The function of data evaluation

This calculation function produces the plot shown in Figure 8.

With this representation of the data, it is possible to optimally determine the importance of the different influencers and to display them as desired.

VIII. USAGE OF THE PANORAMIC LENS

The Panoramic Lens Model has been designed to be easy to use. The process starts with the identification of the dimensions

a company is influenced by and thus, needs to be examined. In a second step, multiplicators are applied according to the level of control and influence the company has on each dimension. Entering the workshop stage, indicators are ranked in each dimension with help of a prepared list of questions. Afterward, the time horizon is chosen. After the decision is made, the user decides on the indicator being an opportunity or a threat to his company. The next step is deciding on how big of an impact the indicator has on the company. This follows a simple system: if it is the first item, it is written directly in the associated dimension as either an opportunity or a threat. If there are other indicators present in that area, the indicator is ranked through the decision if it has a bigger or smaller impact than the present indicators and then written at the designated level on the scale (next empty slot either opportunity or threat on the scale). It can also be that the indicator has a lower impact than the lowest item on the scale in either dimension. It then would simply be ignored and not included in the model. This is repeated until all questions with its indicators are assessed. It is also important to note that the scales can but do not necessarily need to be fully occupied. The result at the end is a maximum of thirty indicators divided into two-time horizons (containers) consisting of three dimensions each containing five scaled indicators, placed inside the model. An example of a filled-out container can be seen in Figure 9. Finally, the calculation can be made which finishes the process of the Panoramic Lens.

	Social		Industrial		Competitor	
Opportunities	5	Growing health awareness	5	Employment	5	Competitor segmentation
	4		4		4	
	3		3	Industry global growth	3	
	2		2		2	
	1	Aging population	1	Overnight stays foreigner	1	
Threats	1	Population growth	1		1	Shared economy
	2		2	Consumer price	2	Disruptors
	3	Increased life expectancy	3		3	Mergers
	4		4	VAT	4	
	5		5		5	Competitor amount

Fig. 9.   Representation of the calculation

IX. Conclusion

This research paper, analyzed the current possibilities to gather, analyze, and evaluate current trends within the ecosystem of a business. Researchers have developed different methods to especially analyze and evaluate trends, but there has not been done much research regarding the gathering and on how to bring those three types of methods together. By bringing the three types of methods together, businesses would have an overarching method to obtain the possibility to analyze the ecosystem as a whole.

The assessment and evaluation of the tool were successful. The Panoramic Lens covers the requirements, which were defined during the analysis and development of this project. Furthermore, the tool is seen by the users as useful to assess the influencers from the ecosystem in the categories social, industrial, and competitor.

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