

Development of an Online Dashboard of Economic Sustainability based on Producers' Expectations

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Abstract

◦*Purpose* – The study aimed at improving an existing benchmarking tool for economic sustainability to develop and advance it into an online dashboard support system.

◦*Design/methodology/approach* – Using a qualitative approach, 24 in-depth interviews were conducted with long-term users of the existing benchmarking tool to elicit their feedback and expectations for an optimal tool. Based on the wine producers' feedback an online benchmarking tool was designed and implemented.

◦*Findings* – Wine producers attached a great importance to benchmarking their economic performance. Besides pricing information, key performance indicators about the cost of production and investments in particular were deemed relevant. Producers requested an overall summary assessment of the most important KPI of their business, an intuitive visual presentation and long-term time span. Graphical presentations should ideally also be supported by short verbal comments. The suggestions were taken into consideration during the development of the online dashboard, which is the result of the research presented here.

◦*Practical implications* – The online dashboard developed will be an important tool for wine estates to assess and benchmark their current economic performance as a key part of their overall sustainability.

Key words: economic sustainability, usability, benchmarking, key performance indicators

1 INTRODUCTION AND LITERATURE REVIEW

Sustainability is an increasingly important topic for a variety of industries, including the wine industry. As a result, composing systems to make sustainability more tangible have become drivers in the recent development of new sustainability performance measurement tools.

In previous literature, sustainability has been concluded to comprehend three pillars of social, economic, and environmental sustainability, also known as the “triple bottom line” (Golicic *et al.*, 2016). These three categories are intertwined and must all be met, for a business to truly be sustainable in the long term (Elkington, 2002; Joyce and Paquin, 2016). As a result, a business that considers environmental and social interests, but cannot cover its cost or adapt to its economic surroundings will not be capable of surviving (Loose *et al.*, 2020). No amount of

excellent social and environmental performance will prolong the life of a company, if it is economically unsustainable (Doane and Macgillivray, 2001).

In general, economic sustainability can be defined as a future oriented concept, which aims at long-term economic survival, adaption to change and healthy economic growth (Doane and Macgillivray, 2001). As measuring sustainability performance becomes an increasingly emerging issue, more scientific knowledge is needed in order to make it less subjective (Sartori and Campos, 2016). In order to assist decision making and improve sustainability performance of companies, the development of sustainable KPI's (Key-Performance-Indicators) is a valuable source of information and a step toward making the measurement of sustainability less subjective and more data driven (Adams and Frost, 2008; Pannell and Glenn, 2000).

1.1 Management information systems and decision support tools

Management information systems (MIS) and decision support systems (DSS) provide this opportunity. MIS provide information related to internal operations and external intelligence, with the goal of supporting the planning, control and operation functions of an organization (Watson, 1987). Hereby, software is used to create data-based content in form of periodic reports, displaying various aspects of a firms operations (Asemi *et al.*, 2011). DSS complement MIS by generating supportive results based on mathematical models to aid managers at any organizational level in making decisions (McLeod and Schell, 2007). DSS can result in significantly greater decision-making performance, although a learning period is required for users to become familiar with the system (Sharda *et al.*, 1988). As a result, while designing the user interface of such a DSS, the ability of the human operator to use the final tool must be taken into account during the development process (Li *et al.*, 2001).

1.2 Economic sustainability of the wine sector

When focussing on the wine industry, tools to support wineries in becoming more economically sustainable are becoming increasingly sought-after. The economic sustainability of most wine estates in was found to be insufficient in many countries, unable to sufficiently reimburse their family labour (Delord *et al.*, 2015); and not providing sufficient return on equity (Loose *et al.*, 2020). On the other hand however, Broccardo and Zicari (2020) found that Italian family owned wineries involved in sustainability operations showed more favourable economic indicators, than businesses not involved in sustainability programs. In this regard, previous literature underlines the importance of company management being on board with sustainable goals and that management tools (e.g. web-platforms) to assess sustainability performance are essential (Corbo *et al.*, 2014).

1.3 Existing benchmarking system - Geisenheim business analysis

The Geisenheim University business analysis has provided German wine businesses feedback on general business data as well as key attributes in assessing business performance and functions as a MIS. It comprehends the analyses of six key dimensions (input factors, productivity and efficiency, profit, return on capital invested, liquidity and stability, (Loose *et al.*, 2020)). It is thereby closely aligned with the criteria of financial health (stability, profitability, liquidity, solvency) that is suggested by Labuschagne *et al.* (2005) to be the most important criteria to operationalise economic sustainability.

By evaluating business data of hundreds of German wineries, PDF reports with graphs encompassing a variety of KPIs are calculated in the Geisenheim business analysis through a centralised databank and subsequently distributed back to the wineries. Appendix 2 provides some examples of the PDF output. For a more detailed definition of the KPIs see Wetzler *et al.* (2021).

1.4 Research objective – decision support system for economic sustainability

Internationally, multiple wine industry institutions have developed certification programs of sustainability for wineries ((CSWA), 2021; (SWNZ), 2021; (Nachhaltig Austria), 2019; (SWA), 2021). While some offer an online tool for evaluating sustainability performance factors, predominantly the main focus remains on the ecological and social pillars of sustainability. To our best knowledge there is no online dashboard tool available for in-depth economic sustainability in the wine sector. This paper attempts to evaluate the extent of the current Geisenheim business analysis helpfulness for participating wineries, as well as required additions to transform it into a more effective DSS web-based tool for economic sustainability.

2 METHODOLOGY

24 qualitative in-depth interviews were conducted with winery owners across a span of four months from March to July 2020. Wineries were picked at random from multiple German wine growing regions, with the only prerequisite being the participation in the Hochschule Geisenheim business analysis for three years or more. An interview questionnaire including 13 open and supported questions was developed, covering subjects of:

- 1) The current impression and helpfulness of the reports
- 2) Desired content-related additions or requests for more in-depth information
- 3) Structural changes and additional support tools for increased usability and intuitiveness

The interviews were conducted in person until no longer possible due to COVID-19 lockdown regulations, resulting in the remaining interviews being conducted by phone. After their transcription, the interviews were evaluated, followed by the implementation of key takeaways in the development process of the new web-tool for evaluating economic sustainability.

3 RESULTS

3.1 User demands for a Management Information System

3.1.1 Current impression and helpfulness of the reports for wineries

All respondents were satisfied with the different graphs and visualizations used to display the performance indicators with one exemplary participant describing the analysis as “*clear, concise, and good, especially the comparison with average values as well as averages of the best 25% of the reference group.*”.

This approach persisted when respondents were asked about the use of specific KPIs. Generally, the comparison and benchmarking of KPIs with reference groups was considered more important than focussing on a specific KPI. Nonetheless, the most important KPIs named by participants were cost per litre, profit per litre and labour intensity (working hours required per hectare of vineyard area). “*Principally, the cost-side is always relevant. In terms of turnover*

[per litre/ pricing] *I have the feeling we have it under control or, that we can flexibly increase it. But in the end, controlling costs is important for everything else.*” Cost per litre as well as labour intensity were seen as highly relevant KPIs to monitor.

The total operational result after the deduction of an imputed family wage, was only considered to be important by two winery owners: *“As a family worker, you often don’t take into account every hour of work you put in [...]”* and *“[...] in our industry, this is a problem.”* KPIs of capital information, such as return on equity, equity development, or debt ratio also received little attention and were only mentioned by single, isolated respondents.

While the majority (14) of all respondents claimed to have no issues understanding all KPIs, several were named as redundant or confusing: *“[...] What I currently take issue with, is the visual presentation of liquidity. [...] The annotations of the cash-flow and financing-cash-flow graphs are unfortunate, you always have to turn it to understand, what is trying to be conveyed?”*. A similar impression toward liquidity was shared by three other respondents.

3.1.2 *Desired content-related additions or requests for more in-depth information*

Decisional support for investments in general and, more specifically, construction investments was the most sought-after additional information by participants. Many mentioned currently relying on their *“gut feeling”* when it comes to investments or being forced to invest by sudden circumstances: *“When something breaks, I have no choice but to reinvest, I can’t preconceive if it is currently a good idea from an economic point of view or not.”*

Coincidentally, a KPI providing information on the degree of obsolescence was often sought-for by respondents seeking more in-depth information on investments: *“Others are in a better position and haven’t had to invest from scratch with everything being obsolete when taking over a business. [...] In our position we constantly doubt and question ourselves: ‘How do others do it? Why aren’t we able to?’”*.

Another subject requested by multiple respondents was a more in-depth look into the structure of the profit and loss statement and cost structures with main questions being ‘Where do I generate the highest profits?’ and ‘Where are my highest expenses?’. Dividing up costs and calculating expenses for individual products proved to be important needs respondents would like to have more comprehensively explored in the future.

3.1.3 *Structural changes and additional support tools for increased usability and intuitiveness*

Unprompted, isolated suggestions for improvement included the preference for an online tool as opposed to the PDF reports as well as expanding of the current graphs to show data of up to ten preceding years as opposed to five.

Almost all participants would prefer comments to be added to all graphs, with short individual feedback on the developments depicted: *“It would be a great help to receive one or two sentences commenting on a graph.”*, *“No long text, just a brief assessment.”*

Additional factors to benchmark oneself against other wineries were requested, for example when providing more information on investments: *“[...] If there was an opportunity to compare how much wineries of a similar category invest, that would be great, but here it would also be*

all the more important, to be able to divide up the reference groups by size.” Further desired benchmarking segments included the factors by region or certification (e.g. organic).

Furthermore, a support tool was desired to provide a more in-depth grading of KPIs using critical values/thresholds: *“A brief explanation of ideal values for example like ‘This is the ideal span for long-term success’ would be great”*. Ideally, this would also result in suggestions for which areas of the business require controlling: *“[...] giving recommendations, maybe in which areas there could be a need to act [...], wouldn’t be bad at all”*.

3.2 Implementation of requirements in online dashboard

Due to space limitations of the conference paper the key requirements identified are listed in Table 1 jointly with the steps taken for implementing them in the online dashboard. Visual examples are provided in Appendix 1.

Table 1 Overview of producer requirements and implementation in the online dashboard

	<i>Requirement</i>	<i>Implementation</i>	<i>Example</i>
1	Make the structure of the report easier to understand	Flexible and guided navigation through a bar with visual icons per chapter	Figure 1
2	Identify most important KPIs and their status	Summary of the most relevant KPIs based on their impact on the operational result incl. family wages and their current status.	Figure 2
3	Ideal values of KPIs	A traffic light system, that intuitively assesses good, average, and critical values, based on cut-off values provided in help text.	Figure 2 & Figure 3
4	Additional reference groups for benchmarking	The option of choosing and switching between different reference groups for relevant KPIs.	Figure 3
5	Comment on graphs	Automated comments stating current situation, average development over 5 years and relative difference to average businesses.	Figure 3
6	Visualise long term trends	Linear trend line included over 5 and 10 years.	Figure 3
7	Extend time span	Users can switch between a time span of 5 and 10 years of reference data.	Figure 3
8	Improve annotations and ease of understanding	Integrated help texts displayed via hovering over designated help icons distributed around and within the graphs.	Figure 4
9	More details on cost structures	Detailed visual analysis of expenses. Currently no more details possible due to data structure.	Currently unavailable
10	Include benchmark on investments and degree of obsolescence	New KPI for degree of investments included in the user story. Degree of obsolescence currently still a work in progress, expected completion: 2022.	Figure 1

4 DISCUSSION AND OUTLOOK

Economic sustainability is an important part of the overall sustainability of a wine business. It is the crucial dimension for a wine estates' long term survival (Loose *et al.*, 2020). Previous studies have shown an increasing urgency of wineries needing to align themselves more economically sustainably (Loose *et al.*, 2020; Delord *et al.*, 2015). In order to provide companies with more valuable information in terms of KPIs, MSI and DSS can help wine businesses assess and improve economic sustainability (Adams and Frost, 2008; Asemi *et al.*, 2011; Corbo *et al.*, 2014). This importance of KPIs was confirmed and strengthened through feedback by participating wineries of the Geisenheim business analysis. Based on qualitative research, this study advanced and enhanced a currently static PDF-based MSI for wineries into a flexible online support tool with automated comments. The development process and design of said tools interface was based on the needs and abilities of participating wineries, an essential step as pointed out by Li *et al.* (2001). To the authors best knowledge, this is the only currently available online tool assessing economic sustainability to such an in-depth extent within the wine sector. The tool has now been fully developed and is entering the testing stage, where further feedback by the users will be taken into account for further refinement.

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APPENDIX 1 – EXAMPLES OF THE NEW ONLINE DASHBOARD TO ASSESS ECONOMIC SUSTAINABILITY

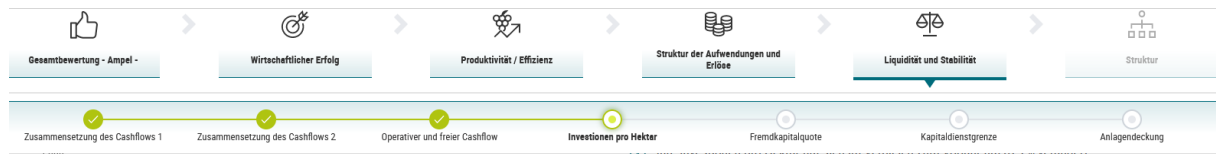


Figure 1: Example of navigation bar with fitting icons for each chapter of the user story and the opportunity of switching between benchmarks



Figure 2: Summary slide of the most important KPIs in terms of economic sustainability and their representative status based on cut-offs displayed in an intuitive traffic light system



Figure 3: Exemplary line chart for labour intensity with new requirements implemented

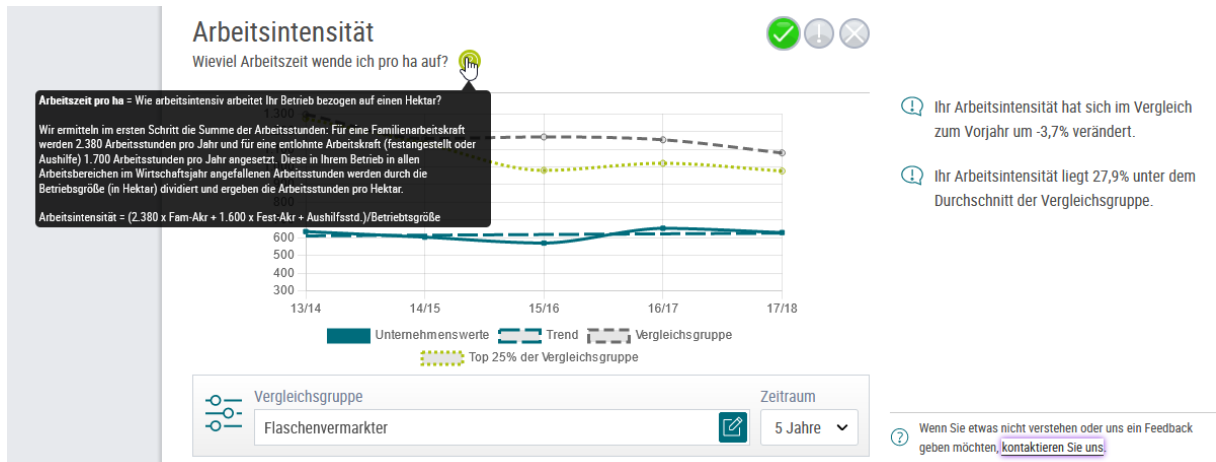


Figure 4: Example of integrated help text displayed by hovering over the help icon

**APPENDIX 2 EXAMPLES FROM EXISTING BENCHMARKING REPORT
(GEISENHEIM BUSINESS ANALYSIS)**

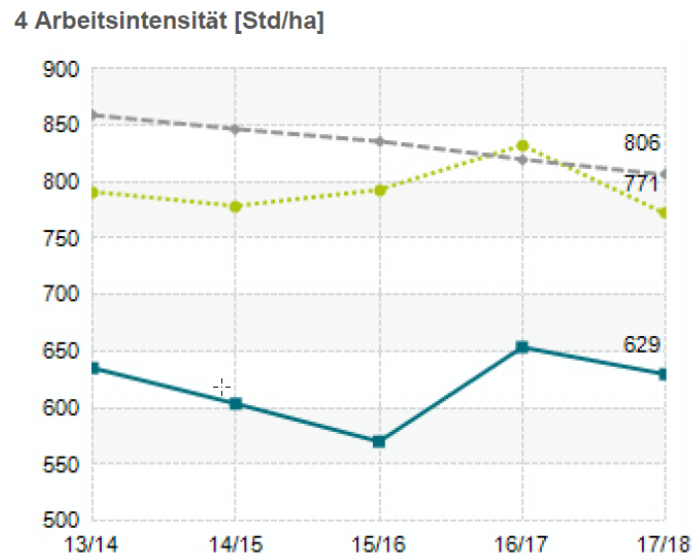


Figure 5: Exemplary line chart for labour intensity (old benchmarking report)

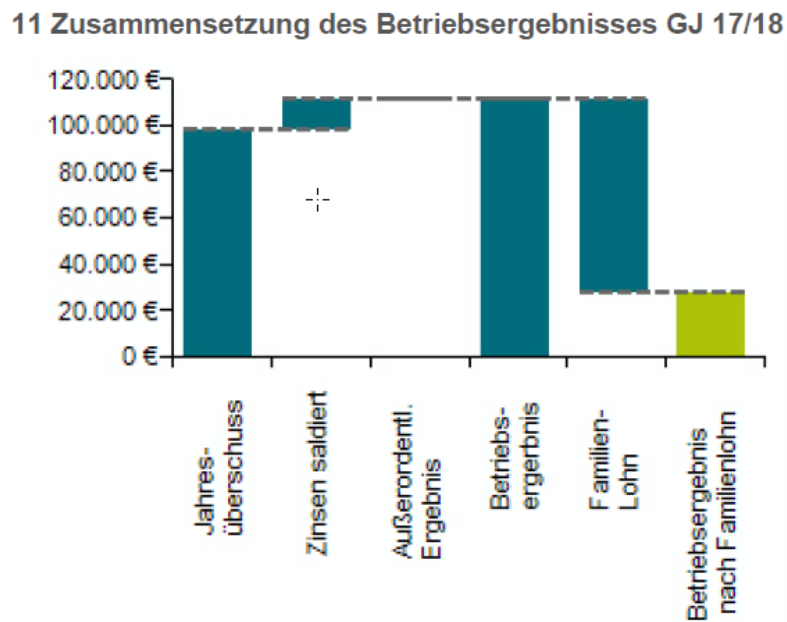


Figure 6: Exemplary bar chart for operational result inc. family wages (old benchmarking report)